TPC Benchmark™ H
Full Disclosure Report

Sun Microsystems Sun Fire™ x4600 Server Using SQL Server 2008 Enterprise x64 Edition™ SP1

Submitted for Review
Report Date: July 6, 2009

TPC Benchmark H Full Disclosure Report

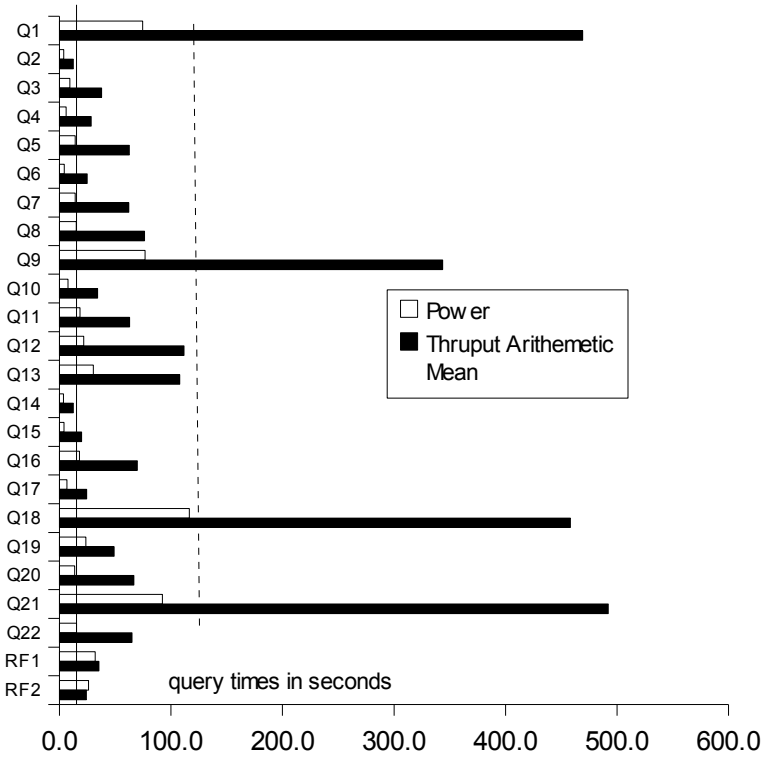
First Printing

901 San Antonio Road, Palo Alto, California 94303 U.S.A.

Sun microsystems	**Sun Fire™ x4600 Server with SQL Server 2008 Enterprise x64 Edition™ SP1**	**TPC-H Rev. 2.8.0** **Report Date: July 6, 2009**
Total System Cost $154,284.19	**55,157.5** QphH@300GB	Price/Performance **$2.80** per QphH@300GB

Database Size	Database Manager	Operating System	Other Software	Availability Date
300GB	**SQL Server 2008 Enterprise x64 Edition™ SP1**	**Microsoft Windows Server 2008 Enterprise x64 Edition™ SP1**	**MS Visual Studio Standard**	**July 6, 2009**

geometric mean = 16.1 arithmetic mean = 122.3



Database Load Time = 17H29M	Load Includes Backup: Y	Total Storage/Database Size=76.82
RAID (Base tables): N	RAID (Base tables and auxiliary data structures): N	RAID (All): N

System Configuration:

1 x SunFire x4600 Server, each server with
8 x AMD Opteron model 8384 2.7GHz processors (each processor is 1 chip, 4 cores, 4 threads)
256 GB memory
3 x 73,000,000,000 bytes (15K RPM) internal SAS disks
14 x J4200 SAS storage arrays, each consisting of 12 x 143,000,000,000 bytes 15K rpm SAS disks

Total Storage: 23,047.4 GB
(in this calculation 1 GB is defined as 1024 * 1024 * 1024) bytes

Sun Fire™ x4600 Server with SQL Server 2008 Enterprise x64 Edition™ SP1

TPC-H Rev. 2.8.0

Report Date: July 6, 2009

Description	Part Number	Source	Unit Price	Qty	Ext. Price	3 Yr. maint
Server Hardware						
SunFire X4600 M2 XATO Be with 4x1133W power supplies, also includes DVD-RW drive and slide rail kit.	A67-AVM2-1133	1	4,900.00	1	4,900.00	
73GB 15Krpm 2.5inch SAS hard disk drive	RA-SS2CD-73G15K	1	359.00	3	1,077.00	
X4600 M2 quad core processor board with 1x 8384 (2.7GHz Quad Core, 75W)	8476A	1	4,000.00	8	32,000.00	
8 GB Memory kit DDR2-667 Registered ECC DIMMS (2x4GB)	8098A	1	400.00	32	12,800.00	
Sun Storage ™ 8-port external SAS PCI-Express HBA	SG-XPCIE8SAS-E-Z	1	550.00	3	1,650.00	
Sun Storage ™ 8-port external SAS PCI-Express HBA X-option	SG-XPCIE8SAS-E-Z	1	550.00	3	1,650.00	
Server Discount (30%)		1			-16,223.10	
Sun GOLD Support. 24x7 hardware (chassis) only support with 4 hour response	IWU-A67M-3G	1	999.23	1		999.23
Sun GOLD Support. 24x7 hardware only support with 4 hour response	IWU-A67M1WY-3G	1	752.82	8		6,022.56
Server Hardware Subtotal					37,853.90	7,021.79
Storage						
Sun ™ Storage J4200 array Rack-Ready Chassis	TA4200R00A10D1	1	2,675.00	14	37,450.00	
146GB 15K rpm SAS 3.5inch Hard disk drive	TA-SS1NJ-146G15K	1	359.00	168	60,312.00	
Sun Storage 2.0m, mini, shielded, SAS cable	XTA-2.0M-SAS	1	150.00	14	2,100.00	
Storage discount (18%)		1			-17,975.16	
Sun GOLD Support. 24x7 hardware only support with 4 hour response	IWU-STJ4200-3G	1	799.19	14		11,188.66
Storage Subtotal					81,886.84	11,188.66
Server Software						
Microsoft Windows Server 2008 Enterprise Edition (x64) SP1	P72-03168	2	2,310.00	1	2,310.00	
Microsoft SQL Server 2008 Enterprise x64 Edition with 25 CALs	810-07578	2	8,318.00	1	8,318.00	245.00
Microsoft SQLServer 2008 Client License	359-01912	2	156.00	35	5,460.00	
Microsoft Visual Studio Standard 2005	127-00012	2	250.00	1	250.00	
Server Software Subtotal					16,088.00	245.00
			Total		**135,828.74**	**18,455.45**
			3 Yr. Cost		**154,284.19**	
			QphH @300GB		55,158	
			$/QphH @300GB		$2.80	

Sources

1. Sun Microssystems
2. Microsoft Corporation

Audited by: Francois Raab, InfoSizing, Inc. (www.sizing.com)

Prices used in TPC benchmarks reflect the actual prices a customer would pay for a one-time purchase of the standard components. Individually negotiated discounts are not permitted. Special prices based on assumptions about past or future purchase are not permitted. All discounts reflect standard pricing policies for the listed components. For complete details, see the pricing sections of the TPC benchmark specifications. If you find that the stated prices are not available according to these terms, please inform the TPC at pricing@tpc.org. Thank you.

Numerical Quantities

Measurement Results:

Database Scale Factor	= 300GB
Total Data Storage / Database Size	= 76.82
Start of database load time	= 12:46:38
End of database load time	= 6:15:55
Database Load Time	= 17H29M
Query Streams for Throughput Test	= 6
TPC-H Power	= 67,095.6
TPC-H Throughput	= 45,343.5
TPC-H Composite Query-per-Hour Rating (QphH@300GB)	= 55,157.5
Total System Price Over 3 Years	= $154,284.19
TPC-H Price/Performance Metric ($/QphH@300GB)	= $2.80

Measurement Intervals:

Measurement Interval in Throughput Test (Ts)	= 3,144 seconds

Duration of Stream Execution:

Stream ID	Seed	Start Date	Start Time	End Date	End Time	Duration
Stream 0	612061555	6/12/2009	8:07:13 AM	6/12/2009	8:19:05 AM	11m52s
Stream 1	612061556	6/12/2009	8:19:05 AM	6/12/2009	9:03:46 AM	44m41s
Stream 2	612061557	6/12/2009	8:19:05 AM	6/12/2009	9:04:38 AM	45m32s
Stream 3	612061558	6/12/2009	8:19:06 AM	6/12/2009	9:04:09 AM	45m03s
Stream 4	612061559	6/12/2009	8:19:06 AM	6/12/2009	9:05:23 AM	46m18s
Stream 5	612061560	6/12/2009	8:19:06 AM	6/12/2009	9:02:08 AM	43m03s
Stream6	612061561	6/12/2009	8:19:06 AM	6/12/2009	9:03:31 AM	44m25s
refreshes		6/12/2009	9:05:23 AM	6/12/2009	9:11:29 AM	6m5s

TPC-H Timing Intervals (in seconds)

Stream ID	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12
00	74.5	3.7	9.3	6.0	13.9	4.2	14.1	15.1	76.8	7.6	18.3	21.8
01	472.5	8.5	47.4	24.1	68.2	27.6	96.5	63.2	288.2	29.5	63.5	137.7
02	468.4	12.6	44.1	28.4	55.8	26.1	55.7	73.2	297.4	36.8	63.6	92.7
03	495.3	11.1	31.3	32.9	67.0	29.3	74.7	82.1	402.3	37.2	53.0	116.2
04	467.4	15.3	9.4	24.9	59.2	18.2	14.0	78.7	549.2	37.2	74.9	116.2
05	448.5	11.9	48.1	29.9	66.2	23.0	66.0	79.0	262.4	29.8	55.5	117.2
06	463.5	15.1	45.9	30.5	59.0	24.2	66.4	80.8	261.5	33.5	66.3	88.9
Minimum	448.5	8.5	9.4	24.1	55.8	18.2	14.0	63.2	261.5	29.5	53.0	88.9
Average	469.3	12.4	37.7	28.5	62.6	24.7	62.2	76.2	343.5	34.0	62.8	111.5
Maximum	495.3	15.3	48.1	32.9	68.2	29.3	96.5	82.1	549.2	37.2	74.9	137.7

Stream ID	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20	Q21	Q22	RF1	RF2
00	30.2	3.4	3.9	17.9	6.6	116.4	23.5	13.6	92.3	15.2	31.9	26.1
01	115.2	11.0	18.0	68.5	31.1	392.1	41.6	74.2	534.8	67.3	51.3	24.9
02	94.1	11.2	21.8	72.1	30.9	648.3	44.1	72.2	411.7	70.8	35.6	24.7
03	112.5	13.9	19.4	72.7	23.4	340.0	48.9	81.7	475.6	82.8	31.6	23.9
04	74.8	12.2	18.3	68.0	21.1	503.9	56.1	13.2	531.5	14.4	32.5	23.7
05	130.6	12.0	22.0	61.2	25.3	340.6	51.5	80.5	537.0	84.4	31.5	23.8
06	120.0	13.9	19.0	75.8	14.4	524.3	51.4	77.9	463.3	69.7	29.5	23.3
Minimum	74.8	11.0	18.0	61.2	14.4	340.0	41.6	13.2	411.7	14.4	29.5	23.3
Average	107.9	12.4	19.8	69.7	24.4	458.2	48.9	66.6	492.3	64.9	35.3	24.1
Maximum	130.6	13.9	22.0	75.8	31.1	648.3	56.1	81.7	537.0	84.4	51.3	24.9

Table of Contents

INFO SIZING

TPC TRANSACTION PROCESSING PERFORMANCE COUNCIL CERTIFIED AUDITOR

Benchmark Sponsor:

Brad Carlile
Director, Enterprise Benchmarking
Sun Microsystems, Inc.
8305 S. W. Creekside Place
Beaverton OR, 97008

July 3, 2009

I verified the TPC Benchmark™ H performance of the following configuration:

Platform:	**Sun Fire x4600 Server**
Database Manager:	**SQL Server 2008 Enterprise x64 Edition SP1**
Operating System:	**Windows Server 2008 Enterprise x64 Edition SP1**

The results were:

CPU (Speed)	Memory	Disks	QphH@300GB
Sun Fire x4600 Server			
8 x AMD Opteron Model 8384 (2.7 GHz)	256 GB Main	168 x 143 GB ext. 3 x 73 GB int.	**55,157.5**

In my opinion, this performance result was produced in compliance with the TPC's requirements for the benchmark. The following verification items were given special attention:

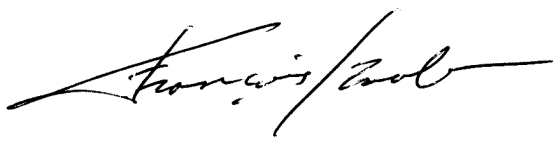
- The database records were defined with the proper layout and size
- The database population was generated using DBGEN and validated
- The database was properly scaled to 300GB and populated accordingly
- The compliance of the database auxiliary data structures was verified
- The database load time was correctly measured and reported
- The required ACID properties were verified and met
- The query text was produced using minor modifications and no query variant

- The execution of the queries against the SF1 database produced compliant answers
- A compliant implementation specific layer was used to drive the tests
- The throughput tests involved 6 query streams
- The ratio between the longest and the shortest query was such that no query timing was adjusted
- The execution times for queries and refresh functions were correctly measured and reported
- The repeatability of the measured results was verified
- The required amount of database log was configured
- The system pricing was verified for major components and maintenance
- The major pages from the FDR were verified for accuracy

Additional Audit Notes:

none.

Respectfully Yours,



François Raab
President

TPC Benchmark H Overview

The TPC BenchmarkTM H (TPC-H) is a Decision Support benchmark. It is a suite of business-oriented ad-hoc queries and concurrent modifications. The queries and the data populating the database have been chosen to have broad industry-wide relevance while maintaining a sufficient degree of ease of implementation. This benchmark illustrates Decision Support systems that:

- Examine large volumes of data
- Execute queries with a high degree of complexity
- Give answers to critical business questions

TPC-H evaluates the performance of various Decision Support systems by the execution of sets of queries against a standard database under controlled conditions. The TPC-H queries:

- Give answers to real-world business questions
- Simulate generated ad-hoc queries
- Are far more complex than most OLTP transactions
- Include a rich breadth of operators and selectivity constraints
- Generate intensive activity on the part of the database server component of the system under test
- Are executed against a database complying to specific population and scaling requirements
- Are implemented with constraints derived from staying closely synchronized with an on-line production database

1. General Items

1.1. Benchmark Sponsor

A statement identifying the benchmark sponsor(s) and other participating companies must be provided.

Sun Microsystems, Inc. is the sponsor of this TPC-H benchmark using a kit supplied by Microsoft.

1.2. Parameter Settings

Settings must be provided for all customer-tunable parameters and options that have been changed from the defaults found in actual products, including but not limited to:

- *Database Tuning Options*
- *Optimizer/Query execution options*
- *Query processing tool/language configuration parameters*
- *Recovery/commit options*
- *Consistency/locking options*
- *Operating system and configuration parameters*
- *Configuration parameters and options for any other software component incorporated into the pricing structure*
- *Compiler optimization options*

Details of system and database configuratiosn are provided in Appendix A.

1.1. Configuration Diagram

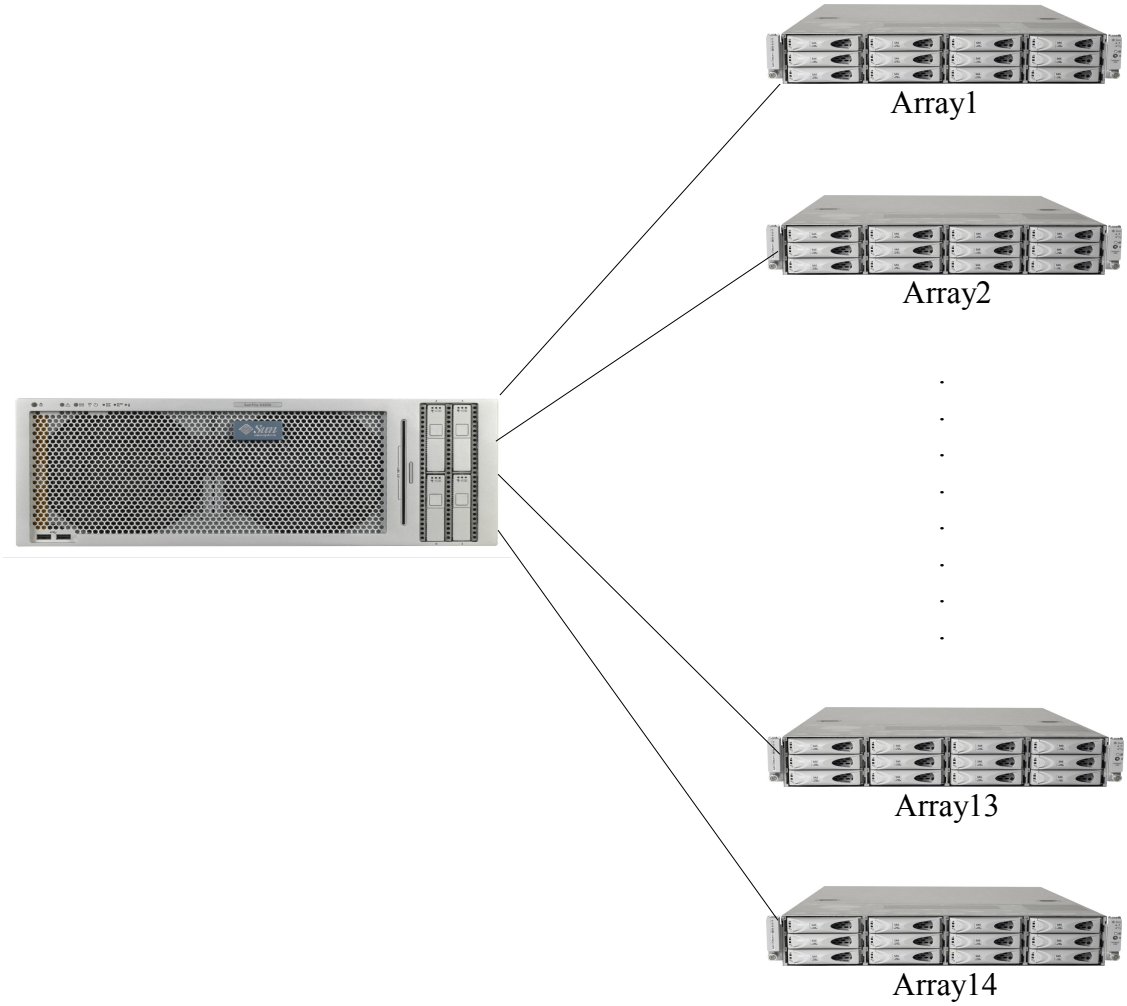
Provide diagrams of both the measured and priced configurations, accompanied by a description of the differences.

The priced and measured configuration is as follows:

1x SunFire X4600 Servers:

- **8 X 2.7 GHz AMD Opteron Processors**
- **256 GB Memory**
- **3 x 73,000,000,000 bytes internal drives**

14 x J4200 SAS storage arrays, each consisting of 12x 143,000,000,000 bytes 15krpm SAS HDDs



1. Clause 1 Logical Database Design

1.1. Database Definition Statements

Listings must be provided for all table definition statements and all other statements used to set up the test and qualification databases.

Appendix B contains the programs and scripts that create and analyze the tables for the TPC-H database.

1.2. Physical Organization

The physical organization of tables and indices within the test and qualification databases must be disclosed. If the column ordering of any table is different from that specified in Clause 1.4, it must be noted.

Appendix B contains the DDL for the index definitions.

1.3. Horizontal Partitioning

Horizontal partitioning of tables and rows in the test and qualification databases (see Clause 1.5.4) must be disclosed.

Horizontal partitioning was not used.

1.4. Replication

Any replication of physical objects must be disclosed and must conform to the requirements of Clause 1.5.6.

No replication was used.

2. Clause 2 Queries and Refresh Functions

2.1. Query Language

The query language used to implement the queries must be identified.

T-SQL was the query language used.

2.2. Verifying Method for Random Number Generation

The method of verification for the random number generation must be described unless the supplied DBGEN and QGEN were used.

TPC supplied versions 2.8.0 of DBGEN and QGEN were used for this TPC-H benchmark.

2.3. Generating Values for Substitution Parameters

The method used to generate values for substitution parameters must be disclosed. If QGEN is not used for this purpose, then the source code of any non-commercial tool used must be disclosed. If QGEN is used, the version number, release number, modification number, and patch level of QGEN must be disclosed.

The supplied QGEN version 2.8.0 was used to generate the substitution parameters.

2.4. Query Text and Output Data from Qualification Database

The executable query text used for query validation must be disclosed along with the corresponding output data generated during the execution of the query text against the qualification database. If minor modifications (see Clause 2.2.3) have been applied to any functional query definitions or approved variants in order to obtain executable query text, these modifications must be disclosed and justified. The justification for a particular minor query modification can apply collectively to all queries for which it has been used. The output data for the power and throughput tests must be made available electronically upon request.

Appendix C contains the query text and query output. The standard queries were used throughout with the following modifications:

- The “dateadd” function is used to perform date arithmetic in Q1, Q4, Q5, Q6, Q10, Q12, Q14 , Q15 and Q20.
- The “datepart” function is used to extract part of a date (“YY”) in Q7, Q8 and Q9.
- The “top” function is used to restrict the number of output rows in Q2, Q3, Q10, Q18 and Q21.

2.1. Query Substitution Parameters and Seeds Used

The query substitution parameters used for all performance tests must be disclosed in tabular format, along with the seeds used to generate these parameters.

Appendix D contains the seed and query substitution parameters.

2.2. Query Isolation Level

The isolation level used to run the queries must be disclosed. If the isolation level does not map closely to the levels defined in Clause 3.4, additional descriptive detail must be provided.

The queries and transactions were run with isolation level Read Committed.

2.3. Source Code of Refresh Functions

The details of how the refresh functions were implemented must be disclosed (including source code of any non-commercial program used).

Appendix E contains the source code for the refresh functions.

3. Clause 3 Database System Properties

3.1. ACID Properties

The ACID (Atomicity, Consistency, Isolation and Durability) properties of transaction processing systems must be supported by the system under test during the timed portion of this benchmark. Since TPC-H is not a transaction processing benchmark, the ACID properties must be evaluated outside the timed portion of the test.

All ACID tests were conducted according to specification. The steps performed are outlined below.

3.2. Atomicity

The system under test must guarantee that transactions are atomic; the system will either perform all individual operations on the data, or will assure that no partially-completed operations leave any effects on the data.

3.2.1 Completed Transaction

Perform the ACID Transaction for a randomly selected set of input data and verify that the appropriate rows have been changed in the ORDERS, LINEITEM, and HISTORY tables

1. The total price from the ORDERS table and the extended price from the LINEITEM table were retrieved for a randomly selected order key.
2. The ACID Transaction was performed using the order key from step 1.
3. The ACID Transaction committed.
4. The total price from the ORDERS table and the extended price from the LINEITEM table were retrieved for the same order key. It was verified that the appropriate rows had been changed.

3.2.1 Aborted Transaction

Perform the ACID Transaction for a randomly selected set of input data, substituting a ROLLBACK of the transaction for the COMMIT of the transaction. Verify that the appropriate rows have not been changed in the ORDERS, LINEITEM, and HISTORY tables.

1. The total price from the ORDERS table and the extended price from the LINEITEM table were retrieved for a randomly selected order key.
2. The ACID Transaction was performed using the order key from step 1. The transaction was stopped prior to the commit.
3. The ACID Transaction was ROLLED BACK.
4. The total price from the ORDERS table and the extended price from the LINEITEM table were retrieved for the same order key. It was verified that the appropriate rows had not been changed.

3.1. Consistency

Consistency is the property of the application that requires any execution of transactions to take the database from one consistent state to another.

3.1.1 Consistency Test

Verify that ORDERS and LINEITEM tables are initially consistent, submit the prescribed number of ACID Transactions with randomly selected input parameters, and re-verify the consistency of the ORDERS and LINEITEM.

1. The consistency of the ORDERS and LINEITEM tables was verified based on a sample of order keys.
2. 100 ACID Transactions were submitted by each of 7 execution streams.
3. The consistency of the ORDERS and LINEITEM tables was re-verified.

3.1. Isolation

Operations of concurrent transactions must yield results which are indistinguishable from the results which would be obtained by forcing each transaction to be serially executed to completion in the proper order.

3.1.1 Read-Write Conflict with Commit

Demonstrate isolation for the read-write conflict of a read-write transaction and a read-only transaction when the read-write transaction is committed.

1. An ACID Transaction was started for a randomly selected O_KEY, L_KEY, and DELTA. The ACID Transaction was suspended prior to COMMIT.
2. An ACID Query was started for the same O_KEY used in step 1.
3. The ACID Transaction was resumed and COMMITTED.
4. The ACID Query completed. It returned the data as committed by the ACID Transaction.

3.1.1 Read-Write Conflict with Rollback

Demonstrate isolation for the read-write conflict of a read-write transaction and a read-only transaction when the read-write transaction is rolled back.

1. An ACID Transaction was started for a randomly selected O_KEY, L_KEY, and DELTA. The ACID Transaction was suspended prior to ROLLBACK.
2. An ACID Query was started for the same O_KEY used in step 1. The ACID Query did not see the uncommitted changes made by the ACID Transaction.
3. The ACID Transaction was ROLLED BACK.
4. The ACID Query completed.

3.1.1 Write-Write Conflict with Commit

Demonstrate isolation for the write-write conflict of two update transactions when the first transaction is committed.

1. An ACID Transaction, T1, was started for a randomly selected O_KEY, L_KEY, and DELTA. T1 was suspended prior to COMMIT.
2. Another ACID Transaction, T2, was started using the same O_KEY and L_KEY and a randomly selected DELTA.
3. T2 waited.
4. T1 was allowed to COMMIT and T2 completed.

5. It was verified that T2.L_EXTENDEDPRICE = T1.L_EXTENDEDPRICE + (DELTA1*(T1.L_EXTENDEDPRICE/T1.L_QUANTITY))

3.1.1 Write-Write Conflict with Rollback

Demonstrate isolation for the write-write conflict of two update transactions when the first transaction is rolled back.

1. An ACID Transaction, T1, was started for a randomly selected O_KEY, L_KEY, and DELTA. T1 was suspended prior to COMMIT.
2. Another ACID Transaction, T2, was started using the same O_KEY and L_KEY and a randomly selected DELTA.
3. T2 waited.
4. T1 was allowed to ROLLBACK and T2 completed.
5. It was verified that T2.L_EXTENDEDPRICE = T1.L_EXTENDEDPRICE.

3.1.1 Concurrent Progress of Read and Write Transactions

Demonstrate the ability of read and write transactions affecting different database tables to make progress concurrently.

1. An ACID Transaction, T1, was started for a randomly selected O_KEY, L_KEY, and DELTA. T1 was suspended prior to ROLLBACK.
2. Another Transaction, T2, was started which did the following:

   For random values of PS_PARTKEY and PS_SUPPKEY, all columns of the PARTSUPP table for which PS_PARTKEY and PS_SUPPKEY are equal, are returned.
3. T2 completed.
4. T1 was allowed to COMMIT.
5. It was verified that appropriate rows in ORDERS, LINEITEM and HISTORY tables were changed.

3.1.1 Read-Only Query Conflict with Update Transaction

Demonstrate that the continuous submission of arbitrary (read-only) queries against one or more tables of the database does not indefinitely delay update transactions affecting those tables from making progress.

1. A Transaction, T1, executing iso6-Query against the qualification database, was started using a randomly selected O_KEY.
2. An ACID Transaction T2, was started for a randomly selected O_KEY, L_KEY and DELTA.
3. T2 completed and appropriate rows in the ORDERS, LINEITEM and HISTORY tables had been changed.
4. Transaction T1 completed executing iso6-Query.

3.1. Durability

The SUT must guarantee durability: the ability to preserve the effects of committed transactions and insure database consistency after recovery from any one of the failures listed in Clause 3.5.3

3.1.1 Failure of a Durable Medium

Guarantee the database and committed updates are preserved across a permanent irrecoverable failure of any single durable medium containing TPC-H database tables or recovery log tables.

The test database log was stored on a mirrored 2x internal drives. The tables for the test database were stored on the drives that were used for performance benchmark. A backup of the test database was taken.

The tests were conducted on the qualification database. The qualification database was loaded in the same fashion as the test database. The steps performed are shown below:

The complete database was backed up. 7 streams of ACID transactions were started. Each stream executed a minimum of 100 transactions. While the test was running, one of the log disks was removed. After it was determined the test would still run with the loss of a log disk, one physical data drive was removed. A query referencing one of the TPC-H tables whose data was on the failed disk was issued. This caused a message to be written in the SQL Server errorlog indicating a SQL Server failure. The failed database and log disks were replaced with new disks and the database was recovered from the backup using standard SQLServer procedures. The counts in the success files and the HISTORY table count were compared and were found to match.

3.1.2 System Crash

Guarantee the database and committed updates are preserved across an instantaneous interruption (system crash/system hang) in processing which requires the system to reboot to recover.

Seven streams of ACID transactions were started. Each stream executed a minimum of 100 transactions. While the streams of ACID transactions were running, a system hardware reset was issued. The system rebooted and the database was restarted. The database went through a recovery process. The success file and the HISTORY table counts were compared and were found to match.

3.1.3 Memory Failure

Guarantee the database and committed updates are preserved across failure of all or part of memory (loss of contents).

Since memory failure was combined with system crash test as described in section 3.5.2.

4. Clause 4 Scaling and Database Population

4.1. Ending Cardinality of Tables

The cardinality (i.e., the number of rows) of each table of the test database, as it existed at the completion of the database load (see clause 4.2.5) must be disclosed.

Table	*Rows*
Lineitem	1799989091
Orders	450000000
Partsupp	240000000
Part	60000000
Customer	45000000
Supplier	3000000
Nation	25
Region	5

4.2. Distribution of Tables and Logs Across Media

The distribution of tables and logs across all media must be explicitly described.

Microsoft SQL Server was configured on a Sun Fire X4600 M2 with the following configuration:

6 x dual-channel 8-port SAS HBAs

14 x J4200 SAS Storage arrays, each with 12 x 146GB 15krpm SAS HDDs

168 disks were used to hold table data, indexes and temporary database. 2 internal drives were mirrored and used for database log. Each data disk has been partitioned into 3 slices (whose sizes are shown below), one each for data, load and tempDB. All raw partitions for the database were mounted to a folder:

Data: C:\tpch\data – 4GB

Temp: C:\tpch\temp - 4GB

Load: C:\tpch\load - 4GB

4.1. Database partition/replication mapping

The mapping of database partitions/replications must be explicitly described.

Database partitioning/replication was not used.

4.2. RAID Feature

Implementations may use some form of RAID to ensure high availability. If used for data, auxiliary storage (e.g. indexes) or temporary space, the level of RAID must be disclosed for each device.

RAID-1 for database recovery logs. SQL Server automatically stripes all data device presented to it.

4.3. Modifications to the DBGEN

Any modifications to the DBGEN (see Clause 4.2.1) source code must be disclosed. In the event that a program other than DBGEN was used to populate the database, it must be disclosed in its entirety.

The supplied DBGEN version 2.8.0 was used to generate the database population for this benchmark.

4.4. Database Load Time

The database load time for the test database (see clause 4.3) must be disclosed.

The database load time was =17H29M

4.5. Data Storage Ratio

The data storage ratio must be disclosed. It is computed as the ratio between the total amount of priced disk space, and the chosen test database size as defined in Clause 4.1.3.

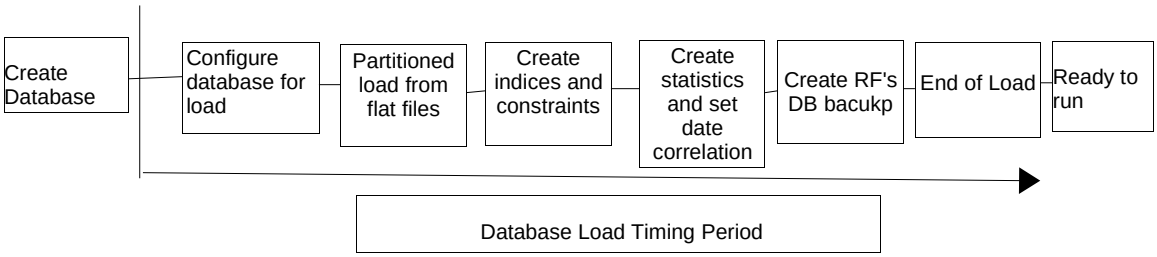
The data storage ratio is computed from the following information:

Disk Type	# of Disks	GB* per disk	Total Disk Space in GB**
Internal	3	73	203.96
External	168	146	22843.48
		Total Space	23047.44
		Data Storage Ratio	76.82

** Disk manufacturer definition of one GB is 10^9 bytes*
***In this calculation one GB is defined as 2^30 bytes*

4.6. Database Load Mechanism Details and Illustration

The details of the database load must be described, including a block diagram illustrating the overall process.



The test database was loaded using flat files. All load scripts are included in Appendix B.

Any differences between the configuration of the qualification database and the test database must be disclosed.

The qualification database used identical scripts to create and load the data with only the necessary size adjustments.

5. Clause 5 Performance Metrics and Execution Rules

5.1. System Activity Between Load and Performance Tests

Any system activity on the SUT that takes place between the conclusion of the load test and the beginning of the performance test must be fully disclosed.

No other activity on the SUT occurred between the conclusion of the load test and the beginning of the performance test

5.1. Steps in the Power Test

The details of the steps followed to implement the power test (.e.g., system boot, database restart, etc.) must be disclosed.

The following steps were used to implement the power test:

1. RF1 Refresh Transaction
2. Stream 0 Execution
3. RF2 Refresh Transaction

5.1. Timing Intervals for Each Query and Refresh Functions

The timing intervals for each query and for both refresh functions must be reported for the power test.

The timing intervals for each query and both update functions are reported on the page titled "Numerical Quantities", contained in the beginning of this document and replicated in the Executive Summary document.

5.2. Number of Streams for the Throughput Test

The number of execution streams used for the throughput test must be disclosed.

6 query streams and one refresh stream were used for the throughput test.

5.3. Start and End Date/Times for Each Query Stream

The start time and finish time for each query stream must be reported for the throughput test.

The start times and finish times for each query stream in the throughput test are reported on the page titled "Numerical Quantities", contained in the beginning of this document and replicated in the Executive Summary document.

5.4. Total Elapsed Time of the Measurement Interval

The total elapsed time of the measurement interval must be reported for the throughput test.

The total elapsed time of the throughput test is reported on the page titled "Numerical Quantities", contained in the beginning of this document and replicated in the Executive Summary document.

5.5. Refresh Function Start Date/Time and Finish Date/Time

Start and finish time for each refresh function in the refresh stream must be reported for the throughput test.

The start and finish times for each refresh function:

Stream ID	Refresh Function	Start Date	Start Time	End Date	End Time
Stream01	RF1	6/12/2009	9:05:24 AM	6/12/2009	9:06:15 AM
Stream01	RF2	6/12/2009	9:06:16 AM	6/12/2009	9:06:41 AM
Stream02	RF1	6/12/2009	9:06:42 AM	6/12/2009	9:07:17 AM
Stream02	RF2	6/12/2009	9:07:18 AM	6/12/2009	9:07:43 AM
Stream03	RF1	6/12/2009	9:07:43 AM	6/12/2009	9:08:15 AM
Stream03	RF2	6/12/2009	9:08:16 AM	6/12/2009	9:08:39 AM
Stream04	RF1	6/12/2009	9:08:40 AM	6/12/2009	9:09:13 AM
Stream04	RF2	6/12/2009	9:09:13 AM	6/12/2009	9:09:37 AM
Stream05	RF1	6/12/2009	9:09:38 AM	6/12/2009	9:10:09 AM
Stream05	RF2	6/12/2009	9:10:10 AM	6/12/2009	9:10:34 AM
Stream06	RF1	6/12/2009	9:10:35 AM	6/12/2009	9:11:04 AM
Stream06	RF2	6/12/2009	9:11:05 AM	6/12/2009	9:11:28 AM

5.6. Timing Intervals for Each Query and Each Refresh Function for Each Stream

The timing intervals for each query of each stream and each refresh function must be reported for the throughput test.

The timing intervals for each query and each refresh function for the throughput test are reported on the page titled "Numerical Quantities", contained in the beginning of this document and replicated in the Executive Summary document.

5.7. Performance Metrics

The computed performance metric, related numerical quantities and price performance metric must be reported.

The performance metrics, and the numbers on which they are based, are reported on the page titled "Numerical Quantities", contained in the beginning of this document and replicated in the Executive Summary document.

5.8. The Performance Metric and Numerical Quantities from Both Runs

The performance metric and numerical quantities from both runs must be disclosed.

Performance results from the first two executions of the TPC-H benchmark indicated the following percent difference for the three metrics:

Run ID	Qpp	Qth	Qph
Run 1	68,421.10	45,531.80	55,815.20
Run 2	67,095.60	45,343.50	55,157.50
% Difference	-1.98%	-0.42%	-1.19%

5.9. System Activity Between Performance Tests

Any activity on the SUT that takes place between the conclusion of Run1 and the beginning of Run2 must be disclosed.

No activity occurred between Run 1 and Run 2.

6. Clause 6 SUT and Driver Implementation

6.1. Driver

A detailed description of how the driver performs its functions must be supplied, including any related source code or scripts. This description should allow an independent reconstruction of the driver.

The TPC-H benchmark was implemented using a Microsoft tool called StepMaster. StepMaster is a general purpose test tool which can drive ODBC and shell commands. Within StepMaster, the user designs a workspace corresponding to the sequence of operations (or steps) to be executed. When the workspace is executed, StepMaster records information about the run into a database as well as a log file for later analysis.

StepMaster provides a mechanism for creating parallel streams of execution. This is used in the throughput tests to drive the query and refresh streams. Each step is timed using a millisecond resolution timer. A timestamp T1 is taken before beginning the operation and a timestamp T2 is taken after completing the operation. These times are recorded in a database as well as a log file for later analysis.

Two types of ODBC connections are supported. A dynamic connection is used to execute a single operation and is closed when the operation finishes. A static connection is held open until the run completes and may be used to execute more than one step. A connection (either static or dynamic) can only have one outstanding operation at any time.

In TPC-H, static connections are used for the query streams in the power and throughput tests. StepMaster reads an Access database to determine the sequence of steps to execute. These commands are represented as the Implementation Specific Layer. StepMaster records its execution history, including all timings, in the Access database. Additionally, StepMaster writes a textual log file of execution for each run.

The refresh functions were executed using multiple batch scripts. The initial script is invoked by StepMaster, subsequent scripts are called from within the scripts.

The source code for both StepMaster and the RF Scripts is disclosed on Appendix E/F

6.2. Implementation-Specific Layer

If an implementation-specific layer is used, then a detailed description of how it performs its functions must be supplied, including any related source code or scripts. This description should allow an independent reconstruction of the implementation-specific layer.

The following steps are performed, to accomplish the Power and Throughput Runs:

1. Power Run

- Execute 64 concurrent RF1 threads, each of which will apply a segment of a refresh set generate by DBGen. Each thread submits multiple transactions, where a transaction spawns a set of orders and their associated line items. A checkpoint was issued after RF1 completion.

- Execute the Stream0 queries in the order according to TPC Benchmark H Specification, Appendix A

- Execute 64 concurrent RF2 threads, each of which will apply a segment of a refresh set generated by DBGen. Each thread submits multiple transactions, where a transaction spawns a set of orders and their

associated line items.

2. Throughput Run

• Execute 6 concurrent query streams. Each stream executes queries in the order according to TPC Benchmark H Specification, Appendix A, for the appropriate Stream ID (01-06). Upon completion of each stream, a semaphore is signaled to indicate completion.

• Execute 6 consecutive RF1/RF2 transactions, against ascending Refresh sets produced by DBGen. The first RF1 waits on a semaphore prior to beginning its insert operations.

Each step during the query execution is timed by StepMaster. The timing information, together with an activity log, are stored for later analysis. The inputs and results of steps are stored in text files for later analysis.

6.3. Profile-Directed Optimization

If profile-directed optimization as described in Clause 5.2.9 is used, such use must be disclosed.

Profile-directed optimization was not used.

7. Clause 7 Pricing

7.1. Hardware and Software Used

A detailed list of hardware and software used in the priced system must be reported. Each item must have vendor part number, description, and release/revision level, and either general availability status or committed delivery date. If package-pricing is used, contents of the package must be disclosed. Pricing source(s) and effective date(s) of price(s) must also be reported.

Refer to the Executive Summary for the pricing spreadsheet and Appendix G for the actual price quotes used to create the spreadsheet.

7.2. Total Three Year Price

The total 3-year price of the entire configuration must be reported, including hardware, software, and maintenance charges. Separate component pricing is recommended. The basis of all discounts used must be disclosed.

Refer to the Executive Summary for the pricing spreadsheet, which contains all details.

7.3. Availability Date

The committed delivery date for general availability of products used in the price calculations must be reported. When the priced system includes products with different availability dates, the reported availability date for the priced system must be the date at which all components are committed to be available.

All hardware and software components used in the measured configuration are generally available as of July 6, 2009.

8. Auditor's Information and Attestation Letter

The auditor's agency name, address, phone number, and Attestation letter with a brief audit summary report indicating compliance must be included in the full disclosure report. A statement should be included specifying who to contact in order to obtain further information regarding the audit process.

The auditor's attestation letter is right after the table of contents above.

Appendix A: Tunable Parameters

System Information

System Information report written at: 07/01/09 14:36:23

System Name: WIN-3Q8F83BVFVF

[System Summary]

Item Value

OS Name Microsoft® Windows Server® 2008 Enterprise

Version 6.0.6001 Service Pack 1 Build 6001

Other OS Description Not Available

OS Manufacturer Microsoft Corporation

System Name WIN-3Q8F83BVFVF

System Manufacturer Sun Microsystems

System Model Sun Fire X4600 M2

System Type x64-based PC

Processor Quad-Core AMD Opteron(tm) Processor 8384, 2700 Mhz, 4 Core(s), 4 Logical Processor(s)

Processor Quad-Core AMD Opteron(tm) Processor 8384, 2700 Mhz, 4 Core(s), 4 Logical Processor(s)

Processor Quad-Core AMD Opteron(tm) Processor 8384, 2700 Mhz, 4 Core(s), 4 Logical Processor(s)

Processor Quad-Core AMD Opteron(tm) Processor 8384, 2700 Mhz, 4 Core(s), 4 Logical Processor(s)

Processor Quad-Core AMD Opteron(tm) Processor 8384, 2700 Mhz, 4 Core(s), 4 Logical Processor(s)

Processor Quad-Core AMD Opteron(tm) Processor 8384, 2700 Mhz, 4 Core(s), 4 Logical Processor(s)

Processor Quad-Core AMD Opteron(tm) Processor 8384, 2700 Mhz, 4 Core(s), 4 Logical Processor(s)

Processor Quad-Core AMD Opteron(tm) Processor 8384, 2700 Mhz, 4 Core(s), 4 Logical Processor(s)

BIOS Version/Date American Megatrends Inc. HABIT225, 3/13/2009

SMBIOS Version 2.5

Windows Directory C:\Windows

System Directory C:\Windows\system32

Boot Device \Device\HarddiskVolume258

Locale United States

Hardware Abstraction Layer Version = "6.0.6001.18000"

User Name WIN-3Q8F83BVFVF\Administrator

Time Zone Pacific Daylight Time

Installed Physical Memory (RAM) 256 GB

Total Physical Memory 4.00 GB

Available Physical Memory 238 GB

Total Virtual Memory 261 GB

Available Virtual Memory 249 GB

Page File Space 12.8 GB

Page File C:\pagefile.sys

[Hardware Resources]

[Conflicts/Sharing]

Resource	Device
I/O Port 0x0000A000-0x0000CFFF	PCI bus
I/O Port 0x0000A000-0x0000CFFF	PCI Express standard Root Port
I/O Port 0x00000000-0x000003AF	PCI bus
I/O Port 0x00000000-0x000003AF	Direct memory access controller

Memory Address 0xFDB00000-0xFEBFFFFF PCI bus

Memory Address 0xFDB00000-0xFEBFFFFF PCI Express standard Root Port

I/O Port 0x000003C0-0x000003DF PCI bus

I/O Port 0x000003C0-0x000003DF Standard VGA Graphics Adapter

IRQ 56 Emulex LightPulse LP11002-S, Storport Miniport Driver

IRQ 56 LSI Adapter, SAS 3000 series, 4-port with 1064

I/O Port 0x00009000-0x00009FFF PCI standard PCI-to-PCI bridge

I/O Port 0x00009000-0x00009FFF LSI Adapter, SAS 3000 series, 8-port with 1068 -StorPort

IRQ 57 Emulex LightPulse LP11002-S, Storport Miniport Driver

IRQ 57 LSI Adapter, SAS 3000 series, 8-port with 1068 -StorPort

Memory Address 0xFED10000-0xFED10FFF High precision event timer

Memory Address 0xFED10000-0xFED10FFF PCI bus

Memory Address 0xFEC00000-0xFED0FFFF PCI bus

Memory Address 0xFEC00000-0xFED0FFFF Motherboard resources

Memory Address 0xA0000-0xBFFFF PCI bus

Memory Address 0xA0000-0xBFFFF Standard VGA Graphics Adapter

I/O Port 0x000003B0-0x000003BB PCI bus

I/O Port 0x000003B0-0x000003BB Standard VGA Graphics Adapter

I/O Port 0x00008000-0x00008FFF PCI standard PCI-to-PCI bridge

I/O Port 0x00008000-0x00008FFF Intel(R) PRO/1000 MT Dual Port Server Adapter #4

[DMA]

Resource	Device	Status
Channel 4	Direct memory access controller	OK

[Forced Hardware]

Device	PNP Device ID

[I/O]

Resource	Device	Status
0x00000000-0x000003AF	PCI bus	OK
0x00000000-0x000003AF	Direct memory access controller	OK
0x000003B0-0x000003BB	PCI bus	OK
0x000003B0-0x000003BB	Standard VGA Graphics Adapter	OK
0x000003BC-0x000003BF	PCI bus	OK
0x000003C0-0x000003DF	PCI bus	OK
0x000003C0-0x000003DF	Standard VGA Graphics Adapter	OK
0x000003E0-0x00009FFF	PCI bus	OK
0x0000D000-0x0000EFFF	PCI bus	OK
0x00000020-0x00000021	Programmable interrupt controller	OK
0x000000A0-0x000000A1	Programmable interrupt controller	OK
0x00000081-0x00000083	Direct memory access controller	OK
0x00000087-0x00000087	Direct memory access controller	OK
0x00000089-0x0000008B	Direct memory access controller	OK
0x0000008F-0x0000008F	Direct memory access controller	OK

0x000000C0-0x000000DF Direct memory access controller OK

0x00000040-0x00000043 System timer OK

0x00000070-0x00000071 System CMOS/real time clock OK

0x00000061-0x00000061 System speaker OK

0x000000F0-0x000000FF Numeric data processor OK

0x00000010-0x0000001F Motherboard resources OK

0x00000022-0x0000003F Motherboard resources OK

0x00000044-0x0000005F Motherboard resources OK

0x00000062-0x00000063 Motherboard resources OK

0x00000065-0x0000006F Motherboard resources OK

0x00000072-0x0000007F Motherboard resources OK

0x00000080-0x00000080 Motherboard resources OK

0x00000084-0x00000086 Motherboard resources OK

0x00000088-0x00000088 Motherboard resources OK

0x0000008C-0x0000008E Motherboard resources OK

0x00000090-0x0000009F Motherboard resources OK

0x000000A2-0x000000BF Motherboard resources OK

0x000000E0-0x000000EF Motherboard resources OK

0x00000190-0x00000193 Motherboard resources OK

0x000004D0-0x000004D1 Motherboard resources OK

0x0000E000-0x0000E0FF Motherboard resources OK

0x0000E400-0x0000E4FF Motherboard resources OK

0x0000E800-0x0000E8FF Motherboard resources OK

0x00000CA6-0x00000CA7 Microsoft Generic IPMI Compliant Device OK

0x00000060-0x00000060 Motherboard resources OK

0x00000064-0x00000064 Motherboard resources OK

0x00000CF8-0x00000CFF Motherboard resources OK

0x00000CA0-0x00000CA5 Motherboard resources OK

0x00000CA8-0x00000CAF Motherboard resources OK

0x00000680-0x000006FF Motherboard resources OK

0x0000EE00-0x0000EE1F NVIDIA nForce PCI System Management OK

0x0000ED00-0x0000ED3F NVIDIA nForce PCI System Management OK

0x0000ED40-0x0000ED7F NVIDIA nForce PCI System Management OK

0x0000EFA0-0x0000EFAF Standard Dual Channel PCI IDE Controller OK

0x000001F0-0x000001F7 ATA Channel 0 OK

0x000003F6-0x000003F6 ATA Channel 0 OK

0x00000170-0x00000177 ATA Channel 1 OK

0x00000376-0x00000376 ATA Channel 1 OK

0x00004000-0x00004FFF PCI standard PCI-to-PCI bridge OK

0x00004800-0x000048FF Standard VGA Graphics Adapter OK

0x00005000-0x00005FFF PCI Express standard Root Port OK

0x00005800-0x000058FF LSI Adapter, SAS 3000 series, 8-port with 1068E -StorPort OK

0x00006000-0x00006FFF PCI Express standard Root Port OK

0x00006800-0x000068FF LSI Adapter, SAS 3000 series, 8-port with 1068E -StorPort OK

0x00007000-0x00007FFF PCI Express standard Root Port OK

0x00007800-0x000078FF LSI Adapter, SAS 3000 series, 8-port with 1068E -StorPort OK

0x00008000-0x00008FFF PCI standard PCI-to-PCI bridge OK

0x00008000-0x00008FFF Intel(R) PRO/1000 MT Dual Port Server Adapter #4 OK

0x00008C00-0x00008C3F Intel(R) PRO/1000 MT Dual Port Server Adapter OK

0x00008800-0x0000883F Intel(R) PRO/1000 MT Dual Port Server Adapter #2 OK

0x00008400-0x0000843F Intel(R) PRO/1000 MT Dual Port Server Adapter #3 OK

0x00009000-0x00009FFF PCI standard PCI-to-PCI bridge OK

0x00009000-0x00009FFF LSI Adapter, SAS 3000 series, 8-port with 1068 -StorPort OK

0x00009C00-0x00009CFF LSI Adapter, SAS 3000 series, 4-port with 1064 OK

0x0000A000-0x0000CFFF PCI bus OK

0x0000A000-0x0000CFFF PCI Express standard Root Port OK

0x0000F000-0x0000FFFF PCI bus OK

0x0000A800-0x0000A8FF LSI Adapter, SAS 3000 series, 8-port with 1068E -StorPort OK

0x0000B000-0x0000BFFF PCI Express standard Root Port OK

0x0000B800-0x0000B8FF LSI Adapter, SAS 3000 series, 8-port with 1068E -StorPort OK

0x0000C000-0x0000CFFF PCI Express standard Root Port OK

0x0000C800-0x0000C8FF LSI Adapter, SAS 3000 series, 8-port with 1068E -StorPort OK

[IRQs]

Resource Device Status

IRQ 81 Microsoft ACPI-Compliant System OK

IRQ 82 Microsoft ACPI-Compliant System OK

IRQ 83 Microsoft ACPI-Compliant System OK

IRQ 84 Microsoft ACPI-Compliant System OK

IRQ 85 Microsoft ACPI-Compliant System OK

IRQ 86 Microsoft ACPI-Compliant System OK

IRQ 87 Microsoft ACPI-Compliant System OK

IRQ 88 Microsoft ACPI-Compliant System OK

IRQ 89 Microsoft ACPI-Compliant System OK

IRQ 90 Microsoft ACPI-Compliant System OK

IRQ 91 Microsoft ACPI-Compliant System OK

IRQ 92 Microsoft ACPI-Compliant System OK

IRQ 93 Microsoft ACPI-Compliant System OK

IRQ 94 Microsoft ACPI-Compliant System OK

IRQ 95 Microsoft ACPI-Compliant System OK

IRQ 96 Microsoft ACPI-Compliant System OK

IRQ 97 Microsoft ACPI-Compliant System OK

IRQ 98 Microsoft ACPI-Compliant System OK

IRQ 99 Microsoft ACPI-Compliant System OK

IRQ 100	Microsoft ACPI-Compliant System OK
IRQ 101	Microsoft ACPI-Compliant System OK
IRQ 102	Microsoft ACPI-Compliant System OK
IRQ 103	Microsoft ACPI-Compliant System OK
IRQ 104	Microsoft ACPI-Compliant System OK
IRQ 105	Microsoft ACPI-Compliant System OK
IRQ 106	Microsoft ACPI-Compliant System OK
IRQ 107	Microsoft ACPI-Compliant System OK
IRQ 108	Microsoft ACPI-Compliant System OK
IRQ 109	Microsoft ACPI-Compliant System OK
IRQ 110	Microsoft ACPI-Compliant System OK
IRQ 111	Microsoft ACPI-Compliant System OK
IRQ 112	Microsoft ACPI-Compliant System OK
IRQ 113	Microsoft ACPI-Compliant System OK
IRQ 114	Microsoft ACPI-Compliant System OK
IRQ 115	Microsoft ACPI-Compliant System OK
IRQ 116	Microsoft ACPI-Compliant System OK
IRQ 117	Microsoft ACPI-Compliant System OK
IRQ 118	Microsoft ACPI-Compliant System OK
IRQ 119	Microsoft ACPI-Compliant System OK
IRQ 120	Microsoft ACPI-Compliant System OK
IRQ 121	Microsoft ACPI-Compliant System OK
IRQ 122	Microsoft ACPI-Compliant System OK
IRQ 123	Microsoft ACPI-Compliant System OK
IRQ 124	Microsoft ACPI-Compliant System OK
IRQ 125	Microsoft ACPI-Compliant System OK
IRQ 126	Microsoft ACPI-Compliant System OK
IRQ 127	Microsoft ACPI-Compliant System OK
IRQ 128	Microsoft ACPI-Compliant System OK

IRQ 129 Microsoft ACPI-Compliant System OK

IRQ 130 Microsoft ACPI-Compliant System OK

IRQ 131 Microsoft ACPI-Compliant System OK

IRQ 132 Microsoft ACPI-Compliant System OK

IRQ 133 Microsoft ACPI-Compliant System OK

IRQ 134 Microsoft ACPI-Compliant System OK

IRQ 135 Microsoft ACPI-Compliant System OK

IRQ 136 Microsoft ACPI-Compliant System OK

IRQ 137 Microsoft ACPI-Compliant System OK

IRQ 138 Microsoft ACPI-Compliant System OK

IRQ 139 Microsoft ACPI-Compliant System OK

IRQ 140 Microsoft ACPI-Compliant System OK

IRQ 141 Microsoft ACPI-Compliant System OK

IRQ 142 Microsoft ACPI-Compliant System OK

IRQ 143 Microsoft ACPI-Compliant System OK

IRQ 144 Microsoft ACPI-Compliant System OK

IRQ 145 Microsoft ACPI-Compliant System OK

IRQ 146 Microsoft ACPI-Compliant System OK

IRQ 147 Microsoft ACPI-Compliant System OK

IRQ 148 Microsoft ACPI-Compliant System OK

IRQ 149 Microsoft ACPI-Compliant System OK

IRQ 150 Microsoft ACPI-Compliant System OK

IRQ 151 Microsoft ACPI-Compliant System OK

IRQ 152 Microsoft ACPI-Compliant System OK

IRQ 153 Microsoft ACPI-Compliant System OK

IRQ 154 Microsoft ACPI-Compliant System OK

IRQ 155 Microsoft ACPI-Compliant System OK

IRQ 156 Microsoft ACPI-Compliant System OK

IRQ 157 Microsoft ACPI-Compliant System OK

IRQ 158	Microsoft ACPI-Compliant System OK
IRQ 159	Microsoft ACPI-Compliant System OK
IRQ 160	Microsoft ACPI-Compliant System OK
IRQ 161	Microsoft ACPI-Compliant System OK
IRQ 162	Microsoft ACPI-Compliant System OK
IRQ 163	Microsoft ACPI-Compliant System OK
IRQ 164	Microsoft ACPI-Compliant System OK
IRQ 165	Microsoft ACPI-Compliant System OK
IRQ 166	Microsoft ACPI-Compliant System OK
IRQ 167	Microsoft ACPI-Compliant System OK
IRQ 168	Microsoft ACPI-Compliant System OK
IRQ 169	Microsoft ACPI-Compliant System OK
IRQ 170	Microsoft ACPI-Compliant System OK
IRQ 171	Microsoft ACPI-Compliant System OK
IRQ 172	Microsoft ACPI-Compliant System OK
IRQ 173	Microsoft ACPI-Compliant System OK
IRQ 174	Microsoft ACPI-Compliant System OK
IRQ 175	Microsoft ACPI-Compliant System OK
IRQ 176	Microsoft ACPI-Compliant System OK
IRQ 177	Microsoft ACPI-Compliant System OK
IRQ 178	Microsoft ACPI-Compliant System OK
IRQ 179	Microsoft ACPI-Compliant System OK
IRQ 180	Microsoft ACPI-Compliant System OK
IRQ 181	Microsoft ACPI-Compliant System OK
IRQ 182	Microsoft ACPI-Compliant System OK
IRQ 183	Microsoft ACPI-Compliant System OK
IRQ 184	Microsoft ACPI-Compliant System OK
IRQ 185	Microsoft ACPI-Compliant System OK
IRQ 186	Microsoft ACPI-Compliant System OK

IRQ 187 Microsoft ACPI-Compliant System OK

IRQ 188 Microsoft ACPI-Compliant System OK

IRQ 189 Microsoft ACPI-Compliant System OK

IRQ 190 Microsoft ACPI-Compliant System OK

IRQ 0 System timer OK

IRQ 8 System CMOS/real time clock OK

IRQ 13 Numeric data processor OK

IRQ 20 Standard OpenHCD USB Host Controller OK

IRQ 21 Standard Enhanced PCI to USB Host Controller OK

IRQ 14 ATA Channel 0 OK

IRQ 15 ATA Channel 1 OK

IRQ 4294967294 PCI Express standard Root Port OK

IRQ 4294967288 LSI Adapter, SAS 3000 series, 8-port with 1068E -StorPort OK

IRQ 4294967293 PCI Express standard Root Port OK

IRQ 4294967287 LSI Adapter, SAS 3000 series, 8-port with 1068E -StorPort OK

IRQ 4294967292 PCI Express standard Root Port OK

IRQ 4294967286 LSI Adapter, SAS 3000 series, 8-port with 1068E -StorPort OK

IRQ 48 Intel(R) PRO/1000 MT Dual Port Server Adapter OK

IRQ 49 Intel(R) PRO/1000 MT Dual Port Server Adapter #2 OK

IRQ 50 Intel(R) PRO/1000 MT Dual Port Server Adapter #3 OK

IRQ 51 Intel(R) PRO/1000 MT Dual Port Server Adapter #4 OK

IRQ 56 Emulex LightPulse LP11002-S, Storport Miniport Driver OK

IRQ 56 LSI Adapter, SAS 3000 series, 4-port with 1064 OK

IRQ 57 Emulex LightPulse LP11002-S, Storport Miniport Driver OK

IRQ 57 LSI Adapter, SAS 3000 series, 8-port with 1068 -StorPort OK

IRQ 4294967291 PCI Express standard Root Port OK

IRQ 4294967285 LSI Adapter, SAS 3000 series, 8-port with 1068E -StorPort OK

IRQ 4294967290 PCI Express standard Root Port OK

IRQ 4294967284 LSI Adapter, SAS 3000 series, 8-port with 1068E -StorPort OK

IRQ 4294967289 PCI Express standard Root Port OK

IRQ 4294967283 LSI Adapter, SAS 3000 series, 8-port with 1068E -StorPort OK

[Memory]

Resource Device Status

0xD8000000-0xE7FFFFFF PCI bus OK

0xF0000000-0xFDAFFFFF PCI bus OK

0xFEC00000-0xFED0FFFF PCI bus OK

0xFEC00000-0xFED0FFFF Motherboard resources OK

0xA0000-0xBFFFF PCI bus OK

0xA0000-0xBFFFF Standard VGA Graphics Adapter OK

0xFED20000-0xFFFFFFFF PCI bus OK

0xFFB80000-0xFFFFFFFE Motherboard resources OK

0xFED00000-0xFED00FFF High precision event timer OK

0xFED10000-0xFED10FFF High precision event timer OK

0xFED10000-0xFED10FFF PCI bus OK

0xFEE00000-0xFEEFFFFF Motherboard resources OK

0xFEFFF000-0xFEFFFFFF Motherboard resources OK

0xFD9FF000-0xFD9FFFFF Standard OpenHCD USB Host Controller OK

0xFD9FEC00-0xFD9FECFF Standard Enhanced PCI to USB Host Controller OK

0xF9E00000-0xFBEFFFFF PCI standard PCI-to-PCI bridge OK

0xFA000000-0xFAFFFFFF Standard VGA Graphics Adapter OK

0xFBEFF000-0xFBEFFFFF Standard VGA Graphics Adapter OK

0xFBF00000-0xFC3FFFFF PCI Express standard Root Port OK

0xFC3FC000-0xFC3FFFFF LSI Adapter, SAS 3000 series, 8-port with 1068E -StorPort OK

0xFC3E0000-0xFC3EFFFF LSI Adapter, SAS 3000 series, 8-port with 1068E -StorPort OK

0xFC400000-0xFC8FFFFF PCI Express standard Root Port OK

0xFC8FC000-0xFC8FFFFF	LSI Adapter, SAS 3000 series, 8-port with 1068E -StorPort	OK
0xFC8E0000-0xFC8EFFFF	LSI Adapter, SAS 3000 series, 8-port with 1068E -StorPort	OK
0xFC900000-0xFCDFFFFF	PCI Express standard Root Port	OK
0xFCDFC000-0xFCDFFFFF	LSI Adapter, SAS 3000 series, 8-port with 1068E -StorPort	OK
0xFCDE0000-0xFCDEFFFF	LSI Adapter, SAS 3000 series, 8-port with 1068E -StorPort	OK
0xFCE00000-0xFCEFFFFF	PCI standard PCI-to-PCI bridge	OK
0xFCEE0000-0xFCEFFFFF	Intel(R) PRO/1000 MT Dual Port Server Adapter	OK
0xFCEC0000-0xFCEDFFFF	Intel(R) PRO/1000 MT Dual Port Server Adapter #2	OK
0xFCEA0000-0xFCEBFFFF	Intel(R) PRO/1000 MT Dual Port Server Adapter #3	OK
0xFCE80000-0xFCE9FFFF	Intel(R) PRO/1000 MT Dual Port Server Adapter #4	OK
0xFD9FD000-0xFD9FDFFF	AMD-8132 HyperTransport(tm) IOAPIC Controller	OK
0xFCF00000-0xFD8FFFFF	PCI standard PCI-to-PCI bridge	OK
0xFD8FF000-0xFD8FFFFF	Emulex LightPulse LP11002-S, Storport Miniport Driver	OK
0xFD8FEC00-0xFD8FECFF	Emulex LightPulse LP11002-S, Storport Miniport Driver	OK
0xFD8FD000-0xFD8FDFFF	Emulex LightPulse LP11002-S, Storport Miniport Driver	OK
0xFD8FE800-0xFD8FE8FF	Emulex LightPulse LP11002-S, Storport Miniport Driver	OK
0xFD8F8000-0xFD8FBFFF	LSI Adapter, SAS 3000 series, 8-port with 1068 -StorPort	OK
0xFD8E0000-0xFD8EFFFF	LSI Adapter, SAS 3000 series, 8-port with 1068 -StorPort	OK
0xFD8F4000-0xFD8F7FFF	LSI Adapter, SAS 3000 series, 4-port with 1064	OK
0xFD8D0000-0xFD8DFFFF	LSI Adapter, SAS 3000 series, 4-port with 1064	OK
0xFD9FC000-0xFD9FCFFF	AMD-8132 HyperTransport(tm) IOAPIC Controller	OK
0xE0000000-0xEFFFFFFF	Motherboard resources	OK
0x0000-0x9FFFF	System board	OK

0xC0000-0xDFFFF System board OK

0xE0000-0xFFFFF System board OK

0x100000-0xD7FFFFFF System board OK

0xFDB00000-0xFEBFFFFF PCI bus OK

0xFDB00000-0xFEBFFFFF PCI Express standard Root Port OK

0xE8000000-0xEFFFFFFF PCI bus OK

0xFEAFF000-0xFEAFFFFF NVIDIA nForce4 Low Pin Count Controller OK

0xFDFFC000-0xFDFFFFFF LSI Adapter, SAS 3000 series, 8-port with 1068E -StorPort OK

0xFDFE0000-0xFDFEFFFF LSI Adapter, SAS 3000 series, 8-port with 1068E -StorPort OK

0xFE000000-0xFE4FFFFF PCI Express standard Root Port OK

0xFE4FC000-0xFE4FFFFF LSI Adapter, SAS 3000 series, 8-port with 1068E -StorPort OK

0xFE4E0000-0xFE4EFFFF LSI Adapter, SAS 3000 series, 8-port with 1068E -StorPort OK

0xFE500000-0xFE9FFFFF PCI Express standard Root Port OK

0xFE9FC000-0xFE9FFFFF LSI Adapter, SAS 3000 series, 8-port with 1068E -StorPort OK

0xFE9E0000-0xFE9EFFFF LSI Adapter, SAS 3000 series, 8-port with 1068E -StorPort OK

[Components]

[Multimedia]

[Audio Codecs]

CODEC	Manufacturer	Description	Status	File	Version	Size	Creation Date
c:\windows\system32\imaadp32.acm	Microsoft Corporation		OK				
C:\Windows\system32\IMAADP32.ACM			6.0.6000.16386			21.00 KB (21,504 bytes)	1/18/2008 10:43 PM
c:\windows\system32\msadp32.acm	Microsoft Corporation		OK				
C:\Windows\system32\MSADP32.ACM			6.0.6000.16386			22.00 KB (22,528 bytes)	1/18/2008 10:43 PM
c:\windows\system32\msgsm32.acm	Microsoft Corporation		OK				
C:\Windows\system32\MSGSM32.ACM			6.0.6000.16386			28.00 KB (28,672 bytes)	1/18/2008 10:43 PM
c:\windows\system32\msg711.acm	Microsoft Corporation		OK				
C:\Windows\system32\MSG711.ACM			6.0.6000.16386			14.00 KB (14,336 bytes)	1/18/2008 10:43 PM

[Video Codecs]

CODEC	Manufacturer	Description	Status	File	Version	Size	Creation Date
c:\windows\system32\iyuv_32.dll	Microsoft Corporation		OK				
C:\Windows\system32\IYUV_32.DLL			6.0.6000.16386			52.50 KB (53,760 bytes)	1/18/2008 10:34 PM
c:\windows\system32\msyuv.dll	Microsoft Corporation		OK				
C:\Windows\system32\MSYUV.DLL			6.0.6000.16386			24.50 KB (25,088 bytes)	1/18/2008 10:34 PM
c:\windows\system32\msrle32.dll	Microsoft Corporation		OK				
C:\Windows\system32\MSRLE32.DLL			6.0.6000.16386			15.50 KB (15,872 bytes)	1/18/2008 10:43 PM
c:\windows\system32\msvidc32.dll	Microsoft Corporation		OK				
C:\Windows\system32\MSVIDC32.DLL			6.0.6001.18000			37.50 KB (38,400 bytes)	1/18/2008 10:43 PM
c:\windows\system32\tsbyuv.dll	Microsoft Corporation		OK				
C:\Windows\system32\TSBYUV.DLL			6.0.6000.16386			13.50 KB (13,824 bytes)	1/18/2008 10:34 PM

[CD-ROM]

Item Value

Drive D:

Description CD-ROM Drive

Media Loaded No

Media Type UNKNOWN

Name TEAC DV-28SL ATA Device

Manufacturer (Standard CD-ROM drives)

Status OK

Transfer Rate -1.00 kbytes/sec

SCSI Target ID 0

PNP Device ID IDE\CDROMTEAC_DV-28SL_____1.0A____\5&4F316C2&0&0.0.0

Driver c:\windows\system32\drivers\cdrom.sys (6.0.6001.18000, 78.00 KB (79,872 bytes), 1/18/2008 10:29 PM)

[Sound Device]

Item Value

[Display]

Item Value

Name Standard VGA Graphics Adapter

PNP Device ID PCI\VEN_1002&DEV_4752&SUBSYS_4732108E&REV_27\4&33FEE7F9&0&3048

Adapter Type Not Available, (Standard display types) compatible

Adapter Description Standard VGA Graphics Adapter

Adapter RAM Not Available

Installed Drivers Not Available

Driver Version 6.0.6001.18000

INF File display.inf (vga section)

Color Planes Not Available

Color Table Entries Not Available

Resolution Not Available

Bits/Pixel Not Available

Memory Address 0xFA000000-0xFAFFFFFF

I/O Port 0x00004800-0x000048FF

Memory Address 0xFBEFF000-0xFBEFFFFF

I/O Port 0x000003B0-0x000003BB

I/O Port 0x000003C0-0x000003DF

Memory Address 0xA0000-0xBFFFF

Driver c:\windows\system32\drivers\vgapnp.sys (6.0.6001.18000, 28.50 KB (29,184 bytes), 1/19/2008 1:38 AM)

[Infrared]

Item Value

[Input]

[Keyboard]

Item Value

Description USB Human Interface Device

Name Enhanced (101- or 102-key)

Layout 00000409

PNP Device ID USB\VID_046B&PID_FF10&MI_00\6&296F595A&0&0000

Number of Function Keys 12

Driver c:\windows\system32\drivers\hidusb.sys (6.0.6001.18000, 15.50 KB (15,872 bytes), 1/18/2008 10:33 PM)

Description USB Human Interface Device

Name Enhanced (101- or 102-key)

Layout 00000409

PNP Device ID USB\VID_0430&PID_0005\6&1217A9&0&2

Number of Function Keys 12

Driver c:\windows\system32\drivers\hidusb.sys (6.0.6001.18000, 15.50 KB (15,872 bytes), 1/18/2008 10:33 PM)

[Pointing Device]

Item Value

Hardware Type USB Human Interface Device

Number of Buttons 0

Status OK

PNP Device ID USB\VID_046B&PID_FF10&MI_01\6&296F595A&0&0001

Power Management Supported No

Double Click Threshold Not Available

Handedness Not Available

Driver c:\windows\system32\drivers\hidusb.sys (6.0.6001.18000, 15.50 KB (15,872 bytes), 1/18/2008 10:33 PM)

[Modem]

Item Value

[Network]

[Adapter]

Item Value

Name [00000000] WAN Miniport (SSTP)

Adapter Type Not Available

Product Type WAN Miniport (SSTP)

Installed Yes

PNP Device ID ROOT\MS_SSTPMINIPORT\0000

Last Reset 7/1/2009 1:19 PM

Index 0

Service Name RasSstp

IP Address Not Available

IP Subnet Not Available

Default IP Gateway Not Available

DHCP Enabled No

DHCP Server Not Available

DHCP Lease Expires Not Available

DHCP Lease Obtained Not Available

MAC Address Not Available

Driver c:\windows\system32\drivers\rassstp.sys (6.0.6001.18000, 76.50 KB (78,336 bytes), 1/18/2008 10:37 PM)

Name [00000001] WAN Miniport (L2TP)

Adapter Type Not Available

Product Type WAN Miniport (L2TP)

Installed Yes

PNP Device ID ROOT\MS_L2TPMINIPORT\0000

Last Reset 7/1/2009 1:19 PM

Index 1

Service Name Rasl2tp

IP Address Not Available

IP Subnet Not Available

Default IP Gateway Not Available

DHCP Enabled No

DHCP Server Not Available

DHCP Lease Expires Not Available

DHCP Lease Obtained Not Available

MAC Address Not Available

Driver c:\windows\system32\drivers\rasl2tp.sys (6.0.6001.18000, 122.00 KB (124,928 bytes), 1/18/2008 10:37 PM)

Name [00000002] WAN Miniport (PPTP)

Adapter Type Wide Area Network (WAN)

Product Type WAN Miniport (PPTP)

Installed Yes

PNP Device ID ROOT\MS_PPTPMINIPORT\0000

Last Reset 7/1/2009 1:19 PM

Index 2

Service Name PptpMiniport

IP Address Not Available

IP Subnet Not Available

Default IP Gateway Not Available

DHCP Enabled No

DHCP Server Not Available

DHCP Lease Expires Not Available

DHCP Lease Obtained Not Available

MAC Address 50:50:54:50:30:30

Driver c:\windows\system32\drivers\raspptp.sys (6.0.6001.18000, 96.50 KB (98,816 bytes), 1/18/2008 10:37 PM)

Name [00000003] WAN Miniport (PPPOE)

Adapter Type Wide Area Network (WAN)

Product Type WAN Miniport (PPPOE)

Installed Yes

PNP Device ID ROOT\MS_PPPOEMINIPORT\0000

Last Reset 7/1/2009 1:19 PM

Index 3

Service Name RasPppoe

IP Address Not Available

IP Subnet Not Available

Default IP Gateway Not Available

DHCP Enabled No

DHCP Server Not Available

DHCP Lease Expires Not Available

DHCP Lease Obtained Not Available

MAC Address 33:50:6F:45:30:30

Driver c:\windows\system32\drivers\raspppoe.sys (6.0.6001.18000, 49.00 KB (50,176 bytes), 1/18/2008 10:37 PM)

Name [00000004] WAN Miniport (IPv6)

Adapter Type Not Available

Product Type WAN Miniport (IPv6)

Installed Yes

PNP Device ID ROOT\MS_NDISWANIPV6\0000

Last Reset 7/1/2009 1:19 PM

Index 4

Service Name NdisWan

IP Address Not Available

IP Subnet Not Available

Default IP Gateway Not Available

DHCP Enabled No

DHCP Server Not Available

DHCP Lease Expires Not Available

DHCP Lease Obtained Not Available

MAC Address Not Available

Driver c:\windows\system32\drivers\ndiswan.sys (6.0.6001.18000, 165.50 KB (169,472 bytes), 1/18/2008 10:37 PM)

Name [00000005] WAN Miniport (Network Monitor)

Adapter Type Not Available

Product Type WAN Miniport (Network Monitor)

Installed Yes

PNP Device ID ROOT\MS_NDISWANBH\0000

Last Reset 7/1/2009 1:19 PM

Index 5

Service Name NdisWan

IP Address Not Available

IP Subnet Not Available

Default IP Gateway Not Available

DHCP Enabled No

DHCP Server Not Available

DHCP Lease Expires Not Available

DHCP Lease Obtained Not Available

MAC Address Not Available

Driver c:\windows\system32\drivers\ndiswan.sys (6.0.6001.18000, 165.50 KB (169,472 bytes), 1/18/2008 10:37 PM)

Name [00000006] Intel(R) PRO/1000 MT Dual Port Server Adapter

Adapter Type Ethernet 802.3

Product Type Intel(R) PRO/1000 MT Dual Port Server Adapter

Installed Yes

PNP Device ID PCI\VEN_8086&DEV_1010&SUBSYS_10118086&REV_03\4&1BC235&0&0880

Last Reset 7/1/2009 1:19 PM

Index 6

Service Name E1G60

IP Address 10.8.34.55

IP Subnet 255.255.255.0

Default IP Gateway 10.8.34.254

DHCP Enabled No

DHCP Server Not Available

DHCP Lease Expires Not Available

DHCP Lease Obtained Not Available

MAC Address 00:14:4F:EB:36:24

Memory Address 0xFCEE0000-0xFCEFFFFF

I/O Port 0x00008C00-0x00008C3F

IRQ Channel IRQ 48

Driver c:\windows\system32\drivers\e1g6032e.sys (8.3.2.8, 142.75 KB (146,176 bytes), 1/19/2008 1:38 AM)

Name [00000007] Intel(R) PRO/1000 MT Dual Port Server Adapter

Adapter Type Ethernet 802.3

Product Type Intel(R) PRO/1000 MT Dual Port Server Adapter

Installed Yes

PNP Device ID PCI\VEN_8086&DEV_1010&SUBSYS_10118086&REV_03\4&1BC235&0&0980

Last Reset 7/1/2009 1:19 PM

Index 7

Service Name E1G60

IP Address Not Available

IP Subnet Not Available

Default IP Gateway Not Available

DHCP Enabled Yes

DHCP Server Not Available

DHCP Lease Expires Not Available

DHCP Lease Obtained Not Available

MAC Address 00:14:4F:EB:36:25

Memory Address 0xFCEC0000-0xFCEDFFFF

I/O Port 0x00008800-0x0000883F

IRQ Channel IRQ 49

Driver c:\windows\system32\drivers\e1g6032e.sys (8.3.2.8, 142.75 KB (146,176 bytes), 1/19/2008 1:38 AM)

Name [00000008] WAN Miniport (IP)

Adapter Type Not Available

Product Type WAN Miniport (IP)

Installed Yes

PNP Device ID ROOT\MS_NDISWANIP\0000

Last Reset 7/1/2009 1:19 PM

Index 8

Service Name NdisWan

IP Address Not Available

IP Subnet Not Available

Default IP Gateway Not Available

DHCP Enabled No

DHCP Server Not Available

DHCP Lease Expires Not Available

DHCP Lease Obtained Not Available

MAC Address Not Available

Driver c:\windows\system32\drivers\ndiswan.sys (6.0.6001.18000, 165.50 KB (169,472 bytes), 1/18/2008 10:37 PM)

Name [00000009] Microsoft ISATAP Adapter

Adapter Type Tunnel

Product Type Microsoft ISATAP Adapter

Installed Yes

PNP Device ID ROOT*ISATAP\0000

Last Reset 7/1/2009 1:19 PM

Index 9

Service Name tunnel

IP Address Not Available

IP Subnet Not Available

Default IP Gateway Not Available

DHCP Enabled No

DHCP Server Not Available

DHCP Lease Expires Not Available

DHCP Lease Obtained Not Available

MAC Address Not Available

Driver c:\windows\system32\drivers\tunnel.sys (6.0.6001.18000, 27.50 KB (28,160 bytes), 1/18/2008 10:36 PM)

Name [00000010] Microsoft ISATAP Adapter

Adapter Type Tunnel

Product Type Microsoft ISATAP Adapter

Installed Yes

PNP Device ID ROOT*ISATAP\0001

Last Reset 7/1/2009 1:19 PM

Index 10

Service Name tunnel

IP Address Not Available

IP Subnet Not Available

Default IP Gateway Not Available

DHCP Enabled No

DHCP Server Not Available

DHCP Lease Expires Not Available

DHCP Lease Obtained Not Available

MAC Address Not Available

Driver c:\windows\system32\drivers\tunnel.sys (6.0.6001.18000, 27.50 KB (28,160 bytes), 1/18/2008 10:36 PM)

Name [00000011] RAS Async Adapter

Adapter Type Wide Area Network (WAN)

Product Type RAS Async Adapter

Installed Yes

PNP Device ID SW\{EEAB7790-C514-11D1-B42B-00805FC1270E}\ASYNCMAC

Last Reset 7/1/2009 1:19 PM

Index 11

Service Name AsyncMac

IP Address Not Available

IP Subnet Not Available

Default IP Gateway Not Available

DHCP Enabled No

DHCP Server Not Available

DHCP Lease Expires Not Available

DHCP Lease Obtained Not Available

MAC Address 20:41:53:59:4E:FF

Driver c:\windows\system32\drivers\asyncmac.sys (6.0.6001.18000, 21.50 KB (22,016 bytes), 1/18/2008 10:37 PM)

Name [00000012] Intel(R) PRO/1000 MT Dual Port Server Adapter

Adapter Type Ethernet 802.3

Product Type Intel(R) PRO/1000 MT Dual Port Server Adapter

Installed Yes

PNP Device ID PCI\VEN_8086&DEV_1010&SUBSYS_10118086&REV_03\4&1BC235&0&1080

Last Reset 7/1/2009 1:19 PM

Index 12

Service Name E1G60

IP Address Not Available

IP Subnet Not Available

Default IP Gateway Not Available

DHCP Enabled Yes

DHCP Server Not Available

DHCP Lease Expires Not Available

DHCP Lease Obtained Not Available

MAC Address 00:14:4F:EB:36:26

Memory Address 0xFCEA0000-0xFCEBFFFF

I/O Port 0x00008400-0x0000843F

IRQ Channel IRQ 50

Driver c:\windows\system32\drivers\e1g6032e.sys (8.3.2.8, 142.75 KB (146,176 bytes), 1/19/2008 1:38 AM)

Name [00000013] Intel(R) PRO/1000 MT Dual Port Server Adapter

Adapter Type Ethernet 802.3

Product Type Intel(R) PRO/1000 MT Dual Port Server Adapter

Installed Yes

PNP Device ID PCI\VEN_8086&DEV_1010&SUBSYS_10118086&REV_03\4&1BC235&0&1180

Last Reset 7/1/2009 1:19 PM

Index 13

Service Name E1G60

IP Address Not Available

IP Subnet Not Available

Default IP Gateway Not Available

DHCP Enabled Yes

DHCP Server Not Available

DHCP Lease Expires Not Available

DHCP Lease Obtained Not Available

MAC Address 00:14:4F:EB:36:27

Memory Address 0xFCE80000-0xFCE9FFFF

I/O Port 0x00008000-0x00008FFF

IRQ Channel IRQ 51

Driver c:\windows\system32\drivers\e1g6032e.sys (8.3.2.8, 142.75 KB (146,176 bytes), 1/19/2008 1:38 AM)

Name [00000014] Microsoft ISATAP Adapter

Adapter Type Tunnel

Product Type Microsoft ISATAP Adapter

Installed Yes

PNP Device ID ROOT*ISATAP\0002

Last Reset 7/1/2009 1:19 PM

Index 14

Service Name tunnel

IP Address Not Available

IP Subnet Not Available

Default IP Gateway Not Available

DHCP Enabled No

DHCP Server Not Available

DHCP Lease Expires Not Available

DHCP Lease Obtained Not Available

MAC Address Not Available

Driver c:\windows\system32\drivers\tunnel.sys (6.0.6001.18000, 27.50 KB (28,160 bytes), 1/18/2008 10:36 PM)

Name [00000015] Microsoft ISATAP Adapter

Adapter Type Tunnel

Product Type Microsoft ISATAP Adapter

Installed Yes

PNP Device ID ROOT*ISATAP\0003

Last Reset 7/1/2009 1:19 PM

Index 15

Service Name tunnel

IP Address Not Available

IP Subnet Not Available

Default IP Gateway Not Available

DHCP Enabled No

DHCP Server Not Available

DHCP Lease Expires Not Available

DHCP Lease Obtained Not Available

MAC Address Not Available

Driver c:\windows\system32\drivers\tunnel.sys (6.0.6001.18000, 27.50 KB (28,160 bytes), 1/18/2008 10:36 PM)

Name [00000016] Microsoft Tun Miniport Adapter

Adapter Type Ethernet 802.3

Product Type Microsoft Tun Miniport Adapter

Installed Yes

PNP Device ID ROOT*TUNMP\0000

Last Reset 7/1/2009 1:19 PM

Index 16

Service Name tunmp

IP Address Not Available

IP Subnet Not Available

Default IP Gateway Not Available

DHCP Enabled No

DHCP Server Not Available

DHCP Lease Expires Not Available

DHCP Lease Obtained Not Available

MAC Address 02:00:54:55:4E:01

Driver c:\windows\system32\drivers\tunmp.sys (6.0.6001.18000, 18.00 KB (18,432 bytes), 1/18/2008 10:36 PM)

[Protocol]

Item Value

Name MSAFD Tcpip [TCP/IP]

Connectionless Service No

Guarantees Delivery Yes

Guarantees Sequencing Yes

Maximum Address Size 16 bytes

Maximum Message Size 0 bytes

Message Oriented No

Minimum Address Size 16 bytes

Pseudo Stream Oriented No

Supports Broadcasting No

Supports Connect Data No

Supports Disconnect Data No

Supports Encryption No

Supports Expedited Data Yes

Supports Graceful Closing Yes

Supports Guaranteed Bandwidth No

Supports Multicasting No

Name MSAFD Tcpip [UDP/IP]

Connectionless Service Yes

Guarantees Delivery No

Guarantees Sequencing No

Maximum Address Size 16 bytes

Maximum Message Size 63.99 KB (65,527 bytes)

Message Oriented Yes

Minimum Address Size 16 bytes

Pseudo Stream Oriented No

Supports Broadcasting Yes

Supports Connect Data No

Supports Disconnect Data No

Supports Encryption No

Supports Expedited Data No

Supports Graceful Closing No

Supports Guaranteed Bandwidth No

Supports Multicasting Yes

Name MSAFD Tcpip [TCP/IPv6]

Connectionless Service No

Guarantees Delivery Yes

Guarantees Sequencing Yes

Maximum Address Size 28 bytes

Maximum Message Size 0 bytes

Message Oriented No

Minimum Address Size 28 bytes

Pseudo Stream Oriented No

Supports Broadcasting No

Supports Connect Data No

Supports Disconnect Data No

Supports Encryption No

Supports Expedited Data Yes

Supports Graceful Closing Yes

Supports Guaranteed Bandwidth No

Supports Multicasting No

Name MSAFD Tcpip [UDP/IPv6]

Connectionless Service Yes

Guarantees Delivery No

Guarantees Sequencing No

Maximum Address Size 28 bytes

Maximum Message Size 63.99 KB (65,527 bytes)

Message Oriented Yes

Minimum Address Size 28 bytes

Pseudo Stream Oriented No

Supports Broadcasting Yes

Supports Connect Data No

Supports Disconnect Data No

Supports Encryption No

Supports Expedited Data No

Supports Graceful Closing No

Supports Guaranteed Bandwidth No

Supports Multicasting Yes

Name RSVP TCPv6 Service Provider

Connectionless Service No

Guarantees Delivery Yes

Guarantees Sequencing Yes

Maximum Address Size 28 bytes

Maximum Message Size 0 bytes

Message Oriented No

Minimum Address Size 28 bytes

Pseudo Stream Oriented No

Supports Broadcasting No

Supports Connect Data No

Supports Disconnect Data No

Supports Encryption Yes

Supports Expedited Data Yes

Supports Graceful Closing Yes

Supports Guaranteed Bandwidth No

Supports Multicasting No

Name RSVP TCP Service Provider

Connectionless Service No

Guarantees Delivery Yes

Guarantees Sequencing Yes

Maximum Address Size 16 bytes

Maximum Message Size 0 bytes

Message Oriented No

Minimum Address Size 16 bytes

Pseudo Stream Oriented No

Supports Broadcasting No

Supports Connect Data No

Supports Disconnect Data No

Supports Encryption Yes

Supports Expedited Data Yes

Supports Graceful Closing Yes

Supports Guaranteed Bandwidth No

Supports Multicasting No

Name RSVP UDPv6 Service Provider

Connectionless Service Yes

Guarantees Delivery No

Guarantees Sequencing No

Maximum Address Size 28 bytes

Maximum Message Size 63.99 KB (65,527 bytes)

Message Oriented Yes

Minimum Address Size 28 bytes

Pseudo Stream Oriented No

Supports Broadcasting Yes

Supports Connect Data No

Supports Disconnect Data No

Supports Encryption Yes

Supports Expedited Data No

Supports Graceful Closing No

Supports Guaranteed Bandwidth No

Supports Multicasting Yes

Name RSVP UDP Service Provider

Connectionless Service Yes

Guarantees Delivery No

Guarantees Sequencing No

Maximum Address Size 16 bytes

Maximum Message Size 63.99 KB (65,527 bytes)

Message Oriented Yes

Minimum Address Size 16 bytes

Pseudo Stream Oriented No

Supports Broadcasting Yes

Supports Connect Data No

Supports Disconnect Data No

Supports Encryption Yes

Supports Expedited Data No

Supports Graceful Closing No

Supports Guaranteed Bandwidth No

Supports Multicasting Yes

[WinSock]

Item Value

File c:\windows\syswow64\wsock32.dll

Size 15.00 KB (15,360 bytes)

Version 6.0.6001.18000

File c:\windows\system32\wsock32.dll

Size 18.00 KB (18,432 bytes)

Version 6.0.6001.18000

[Ports]

[Serial]

Item Value

[Parallel]

Item Value

[Storage]

[Drives]

Item Value

Drive C:

Description Local Fixed Disk

Compressed No

File System NTFS

Size 68.36 GB (73,405,558,784 bytes)

Free Space 15.31 GB (16,436,858,880 bytes)

Volume Name

Volume Serial Number 9E1F1DD5

Drive D:

Description CD-ROM Disc

Drive G:

Description Local Fixed Disk

Compressed No

File System NTFS

Size 125.01 GB (134,223,953,920 bytes)

Free Space 79.90 GB (85,791,670,272 bytes)

Volume Name backup1

Volume Serial Number 7CC945A4

Drive H:

Description Local Fixed Disk

Compressed No

File System NTFS

Size 125.01 GB (134,223,953,920 bytes)

Free Space 79.86 GB (85,750,775,808 bytes)

Volume Name backup2

Volume Serial Number 64D8E955

Drive I:

Description Local Fixed Disk

Compressed No

File System NTFS

Size 125.01 GB (134,223,953,920 bytes)

Free Space 79.63 GB (85,505,867,776 bytes)

Volume Name backup3

Volume Serial Number 48EB8B81

Drive J:

Description Local Fixed Disk

Compressed No

File System NTFS

Size 125.01 GB (134,223,953,920 bytes)

Free Space 79.81 GB (85,698,478,080 bytes)

Volume Name backup4

Volume Serial Number 68FECB02

Drive Y:

Description Network Connection

Provider Name \\129.148.93.100\wgsperf

Drive Z:

Description Local Fixed Disk

Compressed No

File System NTFS

Size 814.39 GB (874,446,258,176 bytes)

Free Space 476.60 GB (511,741,460,480 bytes)

Volume Name dbgen

Volume Serial Number F2587461

[Disks]

Item Value

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 3

SCSI Target ID 0

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #24, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #24, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #24, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 3

SCSI Target ID 1

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #25, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #25, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #25, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 3

SCSI Target ID 2

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #26, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #26, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #26, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 3

SCSI Target ID 3

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #27, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #27, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #27, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 3

SCSI Target ID 4

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #28, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #28, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #28, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 3

SCSI Target ID 5

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #29, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #29, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #29, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 3

SCSI Target ID 6

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #30, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #30, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #30, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 3

SCSI Target ID 7

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #31, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #31, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #31, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 3

SCSI Target ID 8

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #32, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #32, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #32, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 3

SCSI Target ID 9

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #33, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #33, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #33, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 3

SCSI Target ID 10

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #34, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #34, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #34, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 3

SCSI Target ID 11

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #35, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #35, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #35, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 3

SCSI Target ID 13

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #36, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #36, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #36, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 3

SCSI Target ID 14

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #37, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #37, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #37, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 3

SCSI Target ID 15

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #38, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #38, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #38, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 3

SCSI Target ID 16

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #39, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #39, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #39, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 3

SCSI Target ID 17

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #40, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #40, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #40, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 3

SCSI Target ID 18

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #41, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #41, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #41, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 3

SCSI Target ID 19

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #42, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #42, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #42, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 3

SCSI Target ID 20

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #43, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #43, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #43, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 3

SCSI Target ID 21

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #44, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #44, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #44, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 3

SCSI Target ID 22

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #45, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #45, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #45, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 3

SCSI Target ID 23

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #46, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #46, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #46, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 3

SCSI Target ID 24

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #47, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #47, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #47, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 4

SCSI Target ID 26

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #48, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #48, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #48, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 4

SCSI Target ID 27

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #49, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #49, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #49, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 4

SCSI Target ID 28

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #50, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #50, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #50, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 4

SCSI Target ID 29

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #51, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #51, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #51, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 4

SCSI Target ID 30

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #52, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #52, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #52, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 4

SCSI Target ID 31

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #53, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #53, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #53, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 4

SCSI Target ID 32

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #54, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #54, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #54, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 4

SCSI Target ID 33

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #55, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #55, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #55, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 4

SCSI Target ID 34

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #56, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #56, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #56, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 4

SCSI Target ID 36

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #57, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #57, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #57, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 4

SCSI Target ID 37

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #58, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #58, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #58, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 4

SCSI Target ID 43

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #59, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #59, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #59, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 4

SCSI Target ID 47

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #60, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #60, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #60, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 4

SCSI Target ID 52

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #61, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #61, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #61, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 4

SCSI Target ID 53

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #62, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #62, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #62, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 4

SCSI Target ID 54

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #63, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #63, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #63, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 4

SCSI Target ID 55

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #64, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #64, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #64, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 4

SCSI Target ID 56

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #65, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #65, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #65, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 4

SCSI Target ID 57

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #66, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #66, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #66, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 4

SCSI Target ID 58

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #67, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #67, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #67, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 4

SCSI Target ID 59

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #68, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #68, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #68, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 4

SCSI Target ID 60

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #69, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #69, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #69, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 4

SCSI Target ID 62

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #70, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #70, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #70, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 4

SCSI Target ID 65

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #71, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #71, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #71, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 4

SCSI Target ID 66

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #72, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #72, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #72, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 4

SCSI Target ID 67

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #73, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #73, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #73, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 4

SCSI Target ID 68

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #74, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #74, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #74, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 4

SCSI Target ID 69

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #75, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #75, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #75, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 4

SCSI Target ID 70

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #76, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #76, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #76, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 4

SCSI Target ID 71

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #77, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #77, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #77, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 4

SCSI Target ID 72

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #78, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #78, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #78, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 4

SCSI Target ID 73

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #79, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #79, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #79, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 4

SCSI Target ID 74

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #80, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #80, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #80, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 4

SCSI Target ID 75

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #81, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #81, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #81, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 4

SCSI Target ID 76

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #82, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #82, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #82, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 4

SCSI Target ID 104

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #83, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #83, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #83, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 8

SCSI Target ID 0

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #111, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #111, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #111, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 8

SCSI Target ID 1

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #112, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #112, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #112, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 8

SCSI Target ID 2

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #113, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #113, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #113, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 8

SCSI Target ID 104

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #114, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #114, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #114, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 8

SCSI Target ID 105

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #115, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #115, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #115, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 8

SCSI Target ID 106

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #116, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #116, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #116, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 8

SCSI Target ID 107

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #117, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #117, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #117, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 8

SCSI Target ID 108

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #118, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #118, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #118, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 8

SCSI Target ID 109

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #119, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #119, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #119, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 8

SCSI Target ID 110

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #120, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #120, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #120, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 8

SCSI Target ID 111

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #121, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #121, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #121, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 8

SCSI Target ID 112

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #122, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #122, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #122, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 8

SCSI Target ID 113

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #123, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #123, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #123, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 8

SCSI Target ID 114

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #124, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #124, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #124, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 8

SCSI Target ID 115

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #125, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #125, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #125, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 8

SCSI Target ID 117

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #126, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #126, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #126, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 8

SCSI Target ID 118

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #127, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #127, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #127, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 8

SCSI Target ID 119

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #128, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #128, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #128, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 8

SCSI Target ID 120

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #129, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #129, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #129, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 8

SCSI Target ID 121

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #130, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #130, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #130, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 8

SCSI Target ID 122

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #131, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #131, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #131, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 8

SCSI Target ID 123

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #132, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #132, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #132, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 8

SCSI Target ID 124

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #133, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #133, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #133, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 8

SCSI Target ID 127

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #134, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #134, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #134, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 9

SCSI Target ID 0

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #135, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #135, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #135, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 9

SCSI Target ID 79

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #136, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #136, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #136, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 9

SCSI Target ID 80

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #137, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #137, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #137, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 9

SCSI Target ID 81

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #138, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #138, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #138, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 9

SCSI Target ID 82

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #139, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #139, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #139, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 9

SCSI Target ID 83

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #140, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #140, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #140, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 9

SCSI Target ID 84

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #141, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #141, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #141, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 9

SCSI Target ID 85

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #142, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #142, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #142, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 9

SCSI Target ID 86

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #143, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #143, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #143, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 9

SCSI Target ID 87

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #144, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #144, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #144, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 9

SCSI Target ID 88

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #145, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #145, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #145, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 9

SCSI Target ID 89

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #146, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #146, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #146, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 9

SCSI Target ID 90

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #147, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #147, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #147, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 9

SCSI Target ID 104

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #148, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #148, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #148, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 9

SCSI Target ID 105

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #149, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #149, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #149, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 9

SCSI Target ID 106

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #150, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #150, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #150, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 9

SCSI Target ID 107

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #151, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #151, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #151, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 9

SCSI Target ID 108

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #152, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #152, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #152, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 9

SCSI Target ID 109

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #153, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #153, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #153, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 9

SCSI Target ID 110

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #154, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #154, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #154, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 9

SCSI Target ID 111

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #155, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #155, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #155, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 9

SCSI Target ID 112

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #156, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #156, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #156, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 9

SCSI Target ID 113

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #157, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #157, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #157, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 9

SCSI Target ID 114

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #158, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #158, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #158, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 9

SCSI Target ID 115

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #159, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #159, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #159, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 9

SCSI Target ID 117

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #160, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #160, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #160, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 9

SCSI Target ID 118

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #161, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #161, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #161, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 9

SCSI Target ID 119

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #162, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #162, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #162, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 9

SCSI Target ID 120

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #163, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #163, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #163, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 9

SCSI Target ID 121

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #164, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #164, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #164, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 9

SCSI Target ID 122

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #165, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #165, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #165, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 9

SCSI Target ID 123

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #166, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #166, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #166, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 9

SCSI Target ID 124

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #167, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #167, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #167, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 9

SCSI Target ID 125

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #168, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #168, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #168, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 9

SCSI Target ID 126

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #169, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #169, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #169, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 9

SCSI Target ID 127

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #170, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #170, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #170, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 7

SCSI Target ID 91

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #87, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #87, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #87, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 7

SCSI Target ID 92

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #88, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #88, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #88, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 7

SCSI Target ID 93

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #89, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #89, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #89, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 7

SCSI Target ID 94

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #90, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #90, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #90, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 7

SCSI Target ID 95

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #91, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #91, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #91, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 7

SCSI Target ID 96

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #92, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #92, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #92, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 7

SCSI Target ID 97

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #93, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #93, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #93, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 7

SCSI Target ID 98

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #94, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #94, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #94, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 7

SCSI Target ID 99

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #95, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #95, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #95, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 7

SCSI Target ID 100

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #96, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #96, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #96, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 7

SCSI Target ID 101

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #97, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #97, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #97, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 7

SCSI Target ID 102

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #98, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #98, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #98, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 7

SCSI Target ID 104

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #99, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #99, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #99, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 7

SCSI Target ID 105

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #100, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #100, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #100, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 7

SCSI Target ID 106

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #101, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #101, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #101, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 7

SCSI Target ID 107

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #102, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #102, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #102, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 7

SCSI Target ID 108

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #103, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #103, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #103, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 7

SCSI Target ID 109

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #104, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #104, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #104, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 7

SCSI Target ID 110

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #105, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #105, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #105, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 7

SCSI Target ID 111

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #106, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #106, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #106, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 7

SCSI Target ID 112

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #107, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #107, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #107, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 7

SCSI Target ID 113

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #108, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #108, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #108, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 7

SCSI Target ID 114

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #109, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #109, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #109, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 7

SCSI Target ID 115

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #110, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #110, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #110, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 2

SCSI Target ID 0

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #0, Partition #0

Partition Size 4.49 GB (4,822,401,024 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #0, Partition #1

Partition Size 4.49 GB (4,823,449,600 bytes)

Partition Starting Offset 4,824,498,176 bytes

Partition Disk #0, Partition #2

Partition Size 4.49 GB (4,823,449,600 bytes)

Partition Starting Offset 9,647,947,776 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 4

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 2

SCSI Target ID 26

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #1, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #1, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #1, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Partition Disk #1, Partition #3

Partition Size 125.01 GB (134,225,068,032 bytes)

Partition Starting Offset 12,583,960,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 4

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 2

SCSI Target ID 27

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #2, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #2, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #2, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Partition Disk #2, Partition #3

Partition Size 125.01 GB (134,225,068,032 bytes)

Partition Starting Offset 12,583,960,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 4

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 2

SCSI Target ID 28

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #3, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #3, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #3, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Partition Disk #3, Partition #3

Partition Size 125.01 GB (134,225,068,032 bytes)

Partition Starting Offset 12,583,960,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 4

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 2

SCSI Target ID 29

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #4, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #4, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #4, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Partition Disk #4, Partition #3

Partition Size 125.01 GB (134,225,068,032 bytes)

Partition Starting Offset 12,583,960,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 2

SCSI Target ID 31

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #5, Partition #0

Partition Size 3.91 GB (4,193,255,424 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #5, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #5, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 2

SCSI Target ID 32

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #6, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #6, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #6, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 2

SCSI Target ID 33

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #7, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #7, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #7, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 2

SCSI Target ID 34

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #8, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #8, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #8, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 2

SCSI Target ID 35

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #9, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #9, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #9, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 2

SCSI Target ID 36

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #10, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #10, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #10, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 2

SCSI Target ID 37

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #11, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #11, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #11, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 2

SCSI Target ID 39

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #12, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #12, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #12, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 2

SCSI Target ID 40

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #13, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #13, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #13, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 2

SCSI Target ID 41

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #14, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #14, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #14, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 2

SCSI Target ID 42

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #15, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #15, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #15, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 2

SCSI Target ID 43

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #16, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #16, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #16, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 2

SCSI Target ID 44

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #17, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #17, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #17, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 2

SCSI Target ID 45

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #18, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #18, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #18, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 2

SCSI Target ID 46

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #19, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #19, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #19, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 2

SCSI Target ID 47

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #20, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #20, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #20, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 2

SCSI Target ID 48

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #21, Partition #0

Partition Size 3.91 GB (4,193,255,424 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #21, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #21, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 2

SCSI Target ID 49

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #22, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #22, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #22, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST314655SSUN146G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 3

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 2

SCSI Target ID 50

Sectors/Track 63

Size 136.72 GB (146,804,797,440 bytes)

Total Cylinders 17,848

Total Sectors 286,728,120

Total Tracks 4,551,240

Tracks/Cylinder 255

Partition Disk #23, Partition #0

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 1,048,576 bytes

Partition Disk #23, Partition #1

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 4,195,352,576 bytes

Partition Disk #23, Partition #2

Partition Size 3.91 GB (4,194,304,000 bytes)

Partition Starting Offset 8,389,656,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST973451SSUN72G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 1

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 6

SCSI Target ID 0

Sectors/Track 63

Size 68.36 GB (73,402,398,720 bytes)

Total Cylinders 8,924

Total Sectors 143,364,060

Total Tracks 2,275,620

Tracks/Cylinder 255

Partition Disk #84, Partition #0

Partition Size 68.36 GB (73,405,562,880 bytes)

Partition Starting Offset 1,048,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST973451SSUN72G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 1

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 6

SCSI Target ID 2

Sectors/Track 63

Size 68.36 GB (73,402,398,720 bytes)

Total Cylinders 8,924

Total Sectors 143,364,060

Total Tracks 2,275,620

Tracks/Cylinder 255

Partition Disk #85, Partition #0

Partition Size 68.37 GB (73,406,785,024 bytes)

Partition Starting Offset 32,256 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SEAGATE ST973451SSUN72G SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 1

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 6

SCSI Target ID 3

Sectors/Track 63

Size 68.36 GB (73,402,398,720 bytes)

Total Cylinders 8,924

Total Sectors 143,364,060

Total Tracks 2,275,620

Tracks/Cylinder 255

Partition Disk #86, Partition #0

Partition Size 68.37 GB (73,406,785,024 bytes)

Partition Starting Offset 32,256 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SUN LCSM100_F SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 1

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 11

SCSI Target ID 0

Sectors/Track 63

Size 814.39 GB (874,445,967,360 bytes)

Total Cylinders 106,312

Total Sectors 1,707,902,280

Total Tracks 27,109,560

Tracks/Cylinder 255

Partition Disk #173, Partition #0

Partition Size 814.39 GB (874,446,323,712 bytes)

Partition Starting Offset 1,048,576 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model SUN LCSM100_F SCSI Disk Device

Bytes/Sector 512

Media Loaded No

Media Type Fixed hard disk

Partitions Not Available

SCSI Bus 0

SCSI Logical Unit 0

SCSI Port 10

SCSI Target ID 0

Sectors/Track 63

Size 814.39 GB (874,445,967,360 bytes)

Total Cylinders 106,312

Total Sectors 1,707,902,280

Total Tracks 27,109,560

Tracks/Cylinder 255

Description Disk drive

Manufacturer (Standard disk drives)

Model SUN Universal Xport SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 0

SCSI Bus 0

SCSI Logical Unit 31

SCSI Port 11

SCSI Target ID 0

Sectors/Track 63

Size 15.69 MB (16,450,560 bytes)

Total Cylinders 2

Total Sectors 32,130

Total Tracks 510

Tracks/Cylinder 255

Description Disk drive

Manufacturer (Standard disk drives)

Model SUN Universal Xport SCSI Disk Device

Bytes/Sector 512

Media Loaded Yes

Media Type Fixed hard disk

Partitions 0

SCSI Bus 0

SCSI Logical Unit 31

SCSI Port 10

SCSI Target ID 0

Sectors/Track 63

Size 15.69 MB (16,450,560 bytes)

Total Cylinders 2

Total Sectors 32,130

Total Tracks 510

Tracks/Cylinder 255

[SCSI]

Item Value

Name LSI Adapter, SAS 3000 series, 8-port with 1068E -StorPort

Manufacturer LSI Corporation

Status OK

PNP Device ID PCI\VEN_1000&DEV_0058&SUBSYS_31501000&REV_08\4&BE688C9&0&0060

I/O Port 0x00005800-0x000058FF

Memory Address 0xFC3FC000-0xFC3FFFFF

Memory Address 0xFC3E0000-0xFC3EFFFF

IRQ Channel IRQ 4294967288

Driver c:\windows\system32\drivers\lsi_sas.sys (1.28.3.0, 130.01 KB (133,128 bytes), 1/28/2009 4:14 AM)

Name LSI Adapter, SAS 3000 series, 8-port with 1068E -StorPort

Manufacturer LSI Corporation

Status OK

PNP Device ID PCI\VEN_1000&DEV_0058&SUBSYS_31501000&REV_08\4&22B12808&0&0068

I/O Port 0x00006800-0x000068FF

Memory Address 0xFC8FC000-0xFC8FFFFF

Memory Address 0xFC8E0000-0xFC8EFFFF

IRQ Channel IRQ 4294967287

Driver c:\windows\system32\drivers\lsi_sas.sys (1.28.3.0, 130.01 KB (133,128 bytes), 1/28/2009 4:14 AM)

Name LSI Adapter, SAS 3000 series, 8-port with 1068E -StorPort

Manufacturer LSI Corporation

Status OK

PNP Device ID PCI\VEN_1000&DEV_0058&SUBSYS_31501000&REV_08\4&5F83F54&0&0070

I/O Port 0x00007800-0x000078FF

Memory Address 0xFCDFC000-0xFCDFFFFF

Memory Address 0xFCDE0000-0xFCDEFFFF

IRQ Channel IRQ 4294967286

Driver c:\windows\system32\drivers\lsi_sas.sys (1.28.3.0, 130.01 KB (133,128 bytes), 1/28/2009 4:14 AM)

Name Emulex LightPulse LP11002-S, Storport Miniport Driver

Manufacturer Emulex

Status OK

PNP Device ID PCI\VEN_10DF&DEV_FC10&SUBSYS_FC1210DF&REV_01\4&2EB37306&0&0888

Memory Address 0xFD8FF000-0xFD8FFFFF

Memory Address 0xFD8FEC00-0xFD8FECFF

IRQ Channel IRQ 56

Driver c:\windows\system32\drivers\elxstor.sys (7.2.1.4, 468.50 KB (479,744 bytes), 4/1/2009 1:57 PM)

Name Emulex LightPulse LP11002-S, Storport Miniport Driver

Manufacturer Emulex

Status OK

PNP Device ID PCI\VEN_10DF&DEV_FC10&SUBSYS_FC1210DF&REV_01\4&2EB37306&0&0988

Memory Address 0xFD8FD000-0xFD8FDFFF

Memory Address 0xFD8FE800-0xFD8FE8FF

IRQ Channel IRQ 57

Driver c:\windows\system32\drivers\elxstor.sys (7.2.1.4, 468.50 KB (479,744 bytes), 4/1/2009 1:57 PM)

Name LSI Adapter, SAS 3000 series, 8-port with 1068 -StorPort

Manufacturer LSI Corporation

Status OK

PNP Device ID PCI\VEN_1000&DEV_0054&SUBSYS_31601000&REV_01\4&2EB37306&0&1088

I/O Port 0x00009000-0x00009FFF

Memory Address 0xFD8F8000-0xFD8FBFFF

Memory Address 0xFD8E0000-0xFD8EFFFF

IRQ Channel IRQ 57

Driver c:\windows\system32\drivers\lsi_sas.sys (1.28.3.0, 130.01 KB (133,128 bytes), 1/28/2009 4:14 AM)

Name LSI Adapter, SAS 3000 series, 4-port with 1064

Manufacturer LSI Logic

Status OK

PNP Device ID PCI\VEN_1000&DEV_0050&SUBSYS_30601000&REV_02\4&2EB37306&0&2088

I/O Port 0x00009C00-0x00009CFF

Memory Address 0xFD8F4000-0xFD8F7FFF

Memory Address 0xFD8D0000-0xFD8DFFFF

IRQ Channel IRQ 56

Driver c:\windows\system32\drivers\lsi_sas.sys (1.28.3.0, 130.01 KB (133,128 bytes), 1/28/2009 4:14 AM)

Name LSI Adapter, SAS 3000 series, 8-port with 1068E -StorPort

Manufacturer LSI Corporation

Status OK

PNP Device ID PCI\VEN_1000&DEV_0058&SUBSYS_31501000&REV_08\4&1116298B&0&0060

I/O Port 0x0000A800-0x0000A8FF

Memory Address 0xFDFFC000-0xFDFFFFFF

Memory Address 0xFDFE0000-0xFDFEFFFF

IRQ Channel IRQ 4294967285

Driver c:\windows\system32\drivers\lsi_sas.sys (1.28.3.0, 130.01 KB (133,128 bytes), 1/28/2009 4:14 AM)

Name LSI Adapter, SAS 3000 series, 8-port with 1068E -StorPort

Manufacturer LSI Corporation

Status OK

PNP Device ID PCI\VEN_1000&DEV_0058&SUBSYS_31501000&REV_08\4&D81C78F&0&0068

I/O Port 0x0000B800-0x0000B8FF

Memory Address 0xFE4FC000-0xFE4FFFFF

Memory Address 0xFE4E0000-0xFE4EFFFF

IRQ Channel IRQ 4294967284

Driver c:\windows\system32\drivers\lsi_sas.sys (1.28.3.0, 130.01 KB (133,128 bytes), 1/28/2009 4:14

AM)

Name LSI Adapter, SAS 3000 series, 8-port with 1068E -StorPort

Manufacturer LSI Corporation

Status OK

PNP Device ID PCI\VEN_1000&DEV_0058&SUBSYS_31501000&REV_08\4&2A3AB043&0&0070

I/O Port 0x0000C800-0x0000C8FF

Memory Address 0xFE9FC000-0xFE9FFFFF

Memory Address 0xFE9E0000-0xFE9EFFFF

IRQ Channel IRQ 4294967283

Driver c:\windows\system32\drivers\lsi_sas.sys (1.28.3.0, 130.01 KB (133,128 bytes), 1/28/2009 4:14 AM)

Name Microsoft iSCSI Initiator

Manufacturer Microsoft

Status OK

PNP Device ID ROOT\ISCSIPRT\0000

Driver c:\windows\system32\drivers\msiscsi.sys (6.0.6001.18000, 210.05 KB (215,096 bytes), 1/18/2008 10:30 PM)

[IDE]

Item Value

Name Standard Dual Channel PCI IDE Controller

Manufacturer (Standard IDE ATA/ATAPI controllers)

Status OK

PNP Device ID PCI\VEN_10DE&DEV_0053&SUBSYS_CB8410DE&REV_F3\3&267A616A&0&30

I/O Port 0x0000EFA0-0x0000EFAF

Driver c:\windows\system32\drivers\pciide.sys (6.0.6000.16386, 13.10 KB (13,416 bytes), 1/18/2008

10:28 PM)

Name ATA Channel 0

Manufacturer (Standard IDE ATA/ATAPI controllers)

Status OK

PNP Device ID PCIIDE\IDECHANNEL\4&113AB1F1&0&0

I/O Port 0x000001F0-0x000001F7

I/O Port 0x000003F6-0x000003F6

IRQ Channel IRQ 14

Driver c:\windows\system32\drivers\atapi.sys (6.0.6001.18000, 22.05 KB (22,584 bytes), 1/18/2008 10:28 PM)

Name ATA Channel 1

Manufacturer (Standard IDE ATA/ATAPI controllers)

Status OK

PNP Device ID PCIIDE\IDECHANNEL\4&113AB1F1&0&1

I/O Port 0x00000170-0x00000177

I/O Port 0x00000376-0x00000376

IRQ Channel IRQ 15

Driver c:\windows\system32\drivers\atapi.sys (6.0.6001.18000, 22.05 KB (22,584 bytes), 1/18/2008 10:28 PM)

[Printing]

Name Driver Port Name Server Name

Microsoft XPS Document Writer Microsoft XPS Document Writer XPSPort:

[Problem Devices]

Device PNP Device ID Error Code

[USB]

Device PNP Device ID

Standard OpenHCD USB Host Controller
PCI\VEN_10DE&DEV_005A&SUBSYS_CB84108E&REV_A2\3&267A616A&0&10

Standard Enhanced PCI to USB Host Controller
PCI\VEN_10DE&DEV_005B&SUBSYS_CB84108E&REV_A4\3&267A616A&0&11

[Software Environment]

[System Drivers]

Name Description File Type Started Start Mode State Status Error Control Accept Pause Accept Stop

acpi Microsoft ACPI Driver c:\windows\system32\drivers\acpi.sys Kernel Driver Yes Boot Running OK Critical No Yes

adp94xx adp94xx c:\windows\system32\drivers\adp94xx.sys Kernel Driver No Disabled Stopped OK Normal No No

adpahci adpahci c:\windows\system32\drivers\adpahci.sys Kernel Driver No Disabled Stopped OK Normal No No

adpu160m adpu160m c:\windows\system32\drivers\adpu160m.sys Kernel Driver No Disabled Stopped OK Normal No No

adpu320 adpu320 c:\windows\system32\drivers\adpu320.sys Kernel Driver No Disabled Stopped OK Normal No No

afd Ancilliary Function Driver for Winsock c:\windows\system32\drivers\afd.sys Kernel Driver Yes System Running OK Normal No Yes

agp440 Intel AGP Bus Filter c:\windows\system32\drivers\agp440.sys Kernel Driver No Manual Stopped OK Normal No No

aic78xx aic78xx c:\windows\system32\drivers\djsvs.sys Kernel Driver No Disabled Stopped OK Normal No No

aliide aliide c:\windows\system32\drivers\aliide.sys Kernel Driver No Disabled

Stopped OK Critical No No

amdide amdide c:\windows\system32\drivers\amdide.sys Kernel Driver No Disabled
Stopped OK Critical No No

amdk8 AMD K8 Processor Driver c:\windows\system32\drivers\amdk8.sys Kernel Driver
No Disabled Stopped OK Normal No No

arc arc c:\windows\system32\drivers\arc.sys Kernel Driver No Disabled
Stopped OK Normal No No

arcsas Adaptec SAS/SATA-II RAID Storport's Miniport Driver
c:\windows\system32\drivers\arcsas.sys Kernel Driver Yes Boot Running OK
Normal No Yes

asyncmac RAS Asynchronous Media Driver c:\windows\system32\drivers\asyncmac.sys Kernel
Driver Yes Manual Running OK Normal No Yes

atapi IDE Channel c:\windows\system32\drivers\atapi.sys Kernel Driver Yes Boot
Running OK Critical No Yes

b06bdrv Broadcom NetXtreme II VBD c:\windows\system32\drivers\bxvbda.sys Kernel
Driver No Disabled Stopped OK Normal No No

blbdrive blbdrive c:\windows\system32\drivers\blbdrive.sys Kernel Driver No Disabled
Stopped OK Normal No No

bowser Bowser c:\windows\system32\drivers\bowser.sys File System Driver Yes Manual
Running OK Normal No Yes

brfiltlo Brother USB Mass-Storage Lower Filter Driver c:\windows\system32\drivers\brfiltlo.sys
Kernel Driver No Manual Stopped OK Normal No No

brfiltup Brother USB Mass-Storage Upper Filter Driver c:\windows\system32\drivers\brfiltup.sys
Kernel Driver No Manual Stopped OK Normal No No

brserid Brother MFC Serial Port Interface Driver (WDM) c:\windows\system32\drivers\brserid.sys
Kernel Driver No Disabled Stopped OK Normal No No

brserwdm Brother WDM Serial driver c:\windows\system32\drivers\brserwdm.sys Kernel
Driver No Disabled Stopped OK Normal No No

brusbmdm Brother MFC USB Fax Only Modem c:\windows\system32\drivers\brusbmdm.sys
Kernel Driver No Disabled Stopped OK Normal No No

brusbser Brother MFC USB Serial WDM Driver c:\windows\system32\drivers\brusbser.sys
Kernel Driver No Manual Stopped OK Normal No No

cdfs CD/DVD File System Reader c:\windows\system32\drivers\cdfs.sys File System
Driver Yes Disabled Running OK Normal No Yes

cdrom CD-ROM Driver c:\windows\system32\drivers\cdrom.sys Kernel Driver Yes System
Running OK Normal No Yes

circlass Consumer IR Devices c:\windows\system32\drivers\circlass.sys Kernel Driver No
Disabled Stopped OK Normal No No

clfs Common Log (CLFS) c:\windows\system32\clfs.sys Kernel Driver Yes Boot
Running OK Critical No Yes

cmdide cmdide c:\windows\system32\drivers\cmdide.sys Kernel Driver No Disabled
Stopped OK Critical No No

compbatt Microsoft Composite Battery Driver c:\windows\system32\drivers\compbatt.sys
Kernel Driver No Disabled Stopped OK Critical No No

crcdisk Crcdisk Filter Driver c:\windows\system32\drivers\crcdisk.sys Kernel Driver Yes
Boot Running OK Normal No Yes

csc Offline Files Driver c:\windows\system32\drivers\csc.sys Kernel Driver No
Disabled Stopped OK Normal No No

dfsc DFS Namespace Client Driver c:\windows\system32\drivers\dfsc.sys File System
Driver Yes System Running OK Normal No Yes

disk Disk Driver c:\windows\system32\drivers\disk.sys Kernel Driver Yes Boot
Running OK Normal No Yes

dxgkrnl LDDM Graphics Subsystem c:\windows\system32\drivers\dxgkrnl.sys Kernel Driver
No Manual Stopped OK Ignore No No

e1g60 Intel(R) PRO/1000 NDIS 6 Adapter Driver c:\windows\system32\drivers\e1g6032e.sys Kernel
Driver Yes Manual Running OK Normal No Yes

elxplus Emulex PLUS Service c:\windows\system32\drivers\elxplus.sys Kernel Driver Yes
Boot Running OK Normal No Yes

elxstor elxstor c:\windows\system32\drivers\elxstor.sys Kernel Driver Yes Boot Running
OK Normal No Yes

errdev Microsoft Hardware Error Device Driver c:\windows\system32\drivers\errdev.sys Kernel
Driver No Disabled Stopped OK Normal No No

exfat exFAT File System Driver c:\windows\system32\drivers\exfat.sys File System Driver
No Manual Stopped OK Normal No No

fastfat FAT12/16/32 File System Driver c:\windows\system32\drivers\fastfat.sys File System
Driver No Manual Stopped OK Normal No No

fdc Floppy Disk Controller Driver c:\windows\system32\drivers\fdc.sys Kernel Driver
No Disabled Stopped OK Normal No No

fileinfo File Information FS MiniFilter c:\windows\system32\drivers\fileinfo.sys File System
Driver No Manual Stopped OK Normal No No

filetrace FileTrace c:\windows\system32\drivers\filetrace.sys File System Driver No
Manual Stopped OK Normal No No

flpydisk Floppy Disk Driver c:\windows\system32\drivers\flpydisk.sys Kernel Driver No
Disabled Stopped OK Normal No No

fltmgr FltMgr c:\windows\system32\drivers\fltmgr.sys File System Driver Yes Boot
Running OK Critical No Yes

gagp30kx Microsoft Generic AGPv3.0 Filter for K8 Processor Platforms
c:\windows\system32\drivers\gagp30kx.sys Kernel Driver No Manual Stopped OK Normal
No No

hdaudbus Microsoft UAA Bus Driver for High Definition Audio
c:\windows\system32\drivers\hdaudbus.sys Kernel Driver No Disabled Stopped OK
Normal No No

hidbth Microsoft Bluetooth HID Miniport c:\windows\system32\drivers\hidbth.sys Kernel Driver
No Disabled Stopped OK Ignore No No

hidir Microsoft Infrared HID Driver c:\windows\system32\drivers\hidir.sys Kernel Driver
No Disabled Stopped OK Ignore No No

hidusb Microsoft HID Class Driver c:\windows\system32\drivers\hidusb.sys Kernel Driver
Yes Manual Running OK Ignore No Yes

hpcisss HpCISSs c:\windows\system32\drivers\hpcisss.sys Kernel Driver No Disabled
Stopped OK Normal No No

http HTTP c:\windows\system32\drivers\http.sys Kernel Driver Yes Manual Running
OK Normal No Yes

i2omp i2omp c:\windows\system32\drivers\i2omp.sys Kernel Driver No Disabled
Stopped OK Normal No No

i8042prt i8042 Keyboard and PS/2 Mouse Port Driver
c:\windows\system32\drivers\i8042prt.sys Kernel Driver No Disabled Stopped OK
Normal No No

iastorv Intel RAID Controller Vista c:\windows\system32\drivers\iastorv.sys Kernel Driver
No Disabled Stopped OK Normal No No

iirsp iirsp c:\windows\system32\drivers\iirsp.sys Kernel Driver No Disabled
Stopped OK Normal No No

intelide intelide c:\windows\system32\drivers\intelide.sys Kernel Driver No Disabled
Stopped OK Critical No No

intelppm Intel Processor Driver c:\windows\system32\drivers\intelppm.sys Kernel Driver
No Disabled Stopped OK Normal No No

ioatdma Intel(R) QuickData Technology Device c:\windows\system32\drivers\qd260x64.sys Kernel
Driver No Disabled Stopped OK Normal No No

ipfilterdriver IP Traffic Filter Driver c:\windows\system32\drivers\ipfltdrv.sys Kernel Driver
No Manual Stopped OK Normal No No

ipmidrv IPMIDRV c:\windows\system32\drivers\ipmidrv.sys Kernel Driver Yes Manual
Running OK Normal No Yes

ipnat IP Network Address Translator c:\windows\system32\drivers\ipnat.sys Kernel Driver
No Manual Stopped OK Normal No No

irenum IR Bus Enumerator c:\windows\system32\drivers\irenum.sys Kernel Driver No
Manual Stopped OK Ignore No No

isapnp PnP ISA/EISA Bus Driver c:\windows\system32\drivers\isapnp.sys Kernel Driver No
Disabled Stopped OK Critical No No

iscsiprt iScsiPort Driver c:\windows\system32\drivers\msiscsi.sys Kernel Driver Yes Manual
Running OK Normal No Yes

iteatapi ITEATAPI_Service_Install c:\windows\system32\drivers\iteatapi.sys Kernel Driver
No Disabled Stopped OK Normal No No

iteraid ITERAID_Service_Install c:\windows\system32\drivers\iteraid.sys Kernel Driver No
Disabled Stopped OK Normal No No

kbdclass Keyboard Class Driver c:\windows\system32\drivers\kbdclass.sys Kernel Driver
Yes System Running OK Normal No Yes

kbdhid Keyboard HID Driver c:\windows\system32\drivers\kbdhid.sys Kernel Driver Yes
System Running OK Ignore No Yes

ksecdd KSecDD c:\windows\system32\drivers\ksecdd.sys Kernel Driver Yes Boot
Running OK Critical No Yes

ksthunk Kernel Streaming Thunks c:\windows\system32\drivers\ksthunk.sys Kernel Driver No
Manual Stopped OK Normal No No

lltdio Link-Layer Topology Discovery Mapper I/O Driver c:\windows\system32\drivers\lltdio.sys
Kernel Driver Yes Auto Running OK Normal No Yes

lsi_fc LSI_FC c:\windows\system32\drivers\lsi_fc.sys Kernel Driver No Disabled
Stopped OK Normal No No

lsi_sas LSI_SAS c:\windows\system32\drivers\lsi_sas.sys Kernel Driver Yes Boot
Running OK Normal No Yes

lsi_scsi LSI_SCSI c:\windows\system32\drivers\lsi_scsi.sys Kernel Driver No Disabled
Stopped OK Normal No No

luafv UAC File Virtualization c:\windows\system32\drivers\luafv.sys File System Driver
Yes Auto Running OK Normal No Yes

megasas megasas c:\windows\system32\drivers\megasas.sys Kernel Driver No
Disabled Stopped OK Normal No No

megasr MegaSR c:\windows\system32\drivers\megasr.sys Kernel Driver No Disabled
Stopped OK Normal No No

modem Modem c:\windows\system32\drivers\modem.sys Kernel Driver No Manual Stopped
OK Ignore No No

monitor Microsoft Monitor Class Function Driver Service c:\windows\system32\drivers\monitor.sys
Kernel Driver Yes Manual Running OK Normal No Yes

mouclass Mouse Class Driver c:\windows\system32\drivers\mouclass.sys Kernel Driver
Yes System Running OK Normal No Yes

mouhid Mouse HID Driver c:\windows\system32\drivers\mouhid.sys Kernel Driver Yes
Manual Running OK Ignore No Yes

mountmgr Mount Point Manager c:\windows\system32\drivers\mountmgr.sys Kernel Driver
Yes Boot Running OK Critical No Yes

mpio Microsoft Multi-Path Bus Driver c:\windows\system32\drivers\mpio.sys Kernel Driver
No Disabled Stopped OK Normal No No

mpsdrv Windows Firewall Authorization Driver c:\windows\system32\drivers\mpsdrv.sys Kernel
Driver Yes Manual Running OK Normal No Yes

mraid35x Mraid35x c:\windows\system32\drivers\mraid35x.sys Kernel Driver No
Disabled Stopped OK Normal No No

mrxsmb SMB MiniRedirector Wrapper and Engine c:\windows\system32\drivers\mrxsmb.sys File
System Driver Yes Manual Running OK Normal No Yes

mrxsmb10 SMB 1.x MiniRedirector c:\windows\system32\drivers\mrxsmb10.sys File System
Driver Yes Manual Running OK Normal No Yes

mrxsmb20 SMB 2.0 MiniRedirector c:\windows\system32\drivers\mrxsmb20.sys File System
Driver Yes Manual Running OK Normal No Yes

msahci msahci c:\windows\system32\drivers\msahci.sys Kernel Driver No Disabled
Stopped OK Critical No No

msdsm Microsoft Multi-Path Device Specific Module c:\windows\system32\drivers\msdsm.sys
Kernel Driver No Disabled Stopped OK Normal No No

msfs Msfs c:\windows\system32\drivers\msfs.sys File System Driver Yes System
Running OK Normal No Yes

msisadrv ISA/EISA Class Driver c:\windows\system32\drivers\msisadrv.sys Kernel Driver
Yes Boot Running OK Critical No Yes

msrpc MsRPC c:\windows\system32\drivers\msrpc.sys Kernel Driver No Manual Stopped
OK Normal No No

mssmbios Microsoft System Management BIOS Driver
c:\windows\system32\drivers\mssmbios.sys Kernel Driver Yes Manual Running OK
Normal No Yes

mup Mup c:\windows\system32\drivers\mup.sys File System Driver Yes Boot
Running OK Normal No Yes

ndis NDIS System Driver c:\windows\system32\drivers\ndis.sys Kernel Driver Yes
Boot Running OK Critical No Yes

ndistapi Remote Access NDIS TAPI Driver c:\windows\system32\drivers\ndistapi.sys Kernel Driver
Yes Manual Running OK Normal No Yes

ndisuio NDIS Usermode I/O Protocol c:\windows\system32\drivers\ndisuio.sys Kernel Driver
No Manual Stopped OK Normal No No

ndiswan Remote Access NDIS WAN Driver c:\windows\system32\drivers\ndiswan.sys Kernel Driver
Yes Manual Running OK Normal No Yes

ndproxy NDIS Proxy c:\windows\system32\drivers\ndproxy.sys Kernel Driver Yes Manual

```
            Running         OK      Normal  No      Yes

netbios     NetBIOS Interface       c:\windows\system32\drivers\netbios.sys  File System Driver
            Yes     System  Running         OK      Normal  No      Yes

netbt       NETBT   c:\windows\system32\drivers\netbt.sys   Kernel Driver   Yes     System  Running
            OK      Normal  No      Yes

nfrd960     nfrd960 c:\windows\system32\drivers\nfrd960.sys Kernel Driver   No      Disabled
            Stopped OK      Normal  No      No

npfs        Npfs    c:\windows\system32\drivers\npfs.sys    File System Driver      Yes     System
            Running         OK      Normal  No      Yes

nsiproxy            NSI proxy service       c:\windows\system32\drivers\nsiproxy.sys Kernel Driver
            Yes     System  Running         OK      Normal  No      Yes

ntfs        Ntfs    c:\windows\system32\drivers\ntfs.sys    File System Driver      Yes     Manual
            Running         OK      Normal  No      Yes

null        Null    c:\windows\system32\drivers\null.sys    Kernel Driver   Yes     System  Running
            OK      Normal  No      Yes

nvraid      NVIDIA nForce RAID Driver       c:\windows\system32\drivers\nvraid.sys  Kernel Driver
            No      Disabled        Stopped OK      Normal  No      No

nvstor      nvstor  c:\windows\system32\drivers\nvstor.sys  Kernel Driver   No      Disabled
            Stopped OK      Critical        No      No

nv_agp      NVIDIA nForce AGP Bus Filter    c:\windows\system32\drivers\nv_agp.sys  Kernel Driver
            No      Manual  Stopped OK      Normal  No      No

ohci1394            NEC FireWarden OHCI Compliant IEEE 1394 Host Controller
c:\windows\system32\drivers\ohci1394.sys    Kernel Driver   No      Disabled        Stopped OK
            Normal  No      No

parport     Parallel port driver    c:\windows\system32\drivers\parport.sys  Kernel Driver   No
            Disabled        Stopped OK      Normal  No      No

partmgr     Partition Manager       c:\windows\system32\drivers\partmgr.sys  Kernel Driver   Yes
            Boot    Running         OK      Critical        No      Yes

pci         PCI Bus Driver  c:\windows\system32\drivers\pci.sys   Kernel Driver   Yes     Boot
            Running         OK      Critical        No      Yes

pciide      pciide  c:\windows\system32\drivers\pciide.sys  Kernel Driver   Yes     Boot    Running
            OK      Critical        No      Yes

pcmcia      pcmcia  c:\windows\system32\drivers\pcmcia.sys  Kernel Driver   No      Disabled
            Stopped OK      Normal  No      No

peauth      PEAUTH  c:\windows\system32\drivers\peauth.sys  Kernel Driver   Yes     Auto
            Running         OK      Normal  No      Yes

pptpminiport        WAN Miniport (PPTP)     c:\windows\system32\drivers\raspptp.sys Kernel Driver
            Yes     Manual  Running         OK      Normal  No      Yes
```

processor Processor Driver c:\windows\system32\drivers\processr.sys Kernel Driver Yes
Manual Running OK Normal No Yes

psched QoS Packet Scheduler c:\windows\system32\drivers\pacer.sys Kernel Driver Yes
System Running OK Normal No Yes

ql2300 QLogic Fibre Channel Miniport Driver c:\windows\system32\drivers\ql2300.sys Kernel
Driver Yes Boot Running OK Normal No Yes

ql40xx QLogic iSCSI Miniport Driver c:\windows\system32\drivers\ql40xx.sys Kernel Driver
No Disabled Stopped OK Normal No No

rasacd Remote Access Auto Connection Driver c:\windows\system32\drivers\rasacd.sys Kernel
Driver Yes System Running OK Normal No Yes

rasl2tp WAN Miniport (L2TP) c:\windows\system32\drivers\rasl2tp.sys Kernel Driver Yes
Manual Running OK Normal No Yes

raspppoe Remote Access PPPOE Driver c:\windows\system32\drivers\raspppoe.sys Kernel
Driver Yes Manual Running OK Normal No Yes

rassstp WAN Miniport (SSTP) c:\windows\system32\drivers\rassstp.sys Kernel Driver Yes
Manual Running OK Normal No Yes

rdbss Redirected Buffering Sub Sysytem c:\windows\system32\drivers\rdbss.sys File System
Driver Yes System Running OK Normal No Yes

rdpcdd RDPCDD c:\windows\system32\drivers\rdpcdd.sys Kernel Driver Yes System
Running OK Ignore No Yes

rdpdr Terminal Server Device Redirector Driver c:\windows\system32\drivers\rdpdr.sys Kernel
Driver Yes Manual Running OK Normal No Yes

rdpencdd RDP Encoder Mirror Driver c:\windows\system32\drivers\rdpencdd.sys Kernel
Driver Yes System Running OK Ignore No Yes

rdpwd RDP Winstation Driver c:\windows\system32\drivers\rdpwd.sys Kernel Driver Yes
Manual Running OK Ignore No Yes

rsfx0102 RsFx0102 Driver c:\windows\system32\drivers\rsfx0102.sys File System
Driver No Disabled Stopped OK Normal No No

rspndr Link-Layer Topology Discovery Responder c:\windows\system32\drivers\rspndr.sys Kernel
Driver Yes Auto Running OK Normal No Yes

s3cap Microsoft Emulated S3 Device Cap Driver c:\windows\system32\drivers\s3cap.sys Kernel
Driver No Disabled Stopped OK Normal No No

sacdrv sacdrv c:\windows\system32\drivers\sacdrv.sys Kernel Driver Yes Boot Running
OK Ignore No Yes

sbp2port SBP-2 Transport/Protocol Bus Driver c:\windows\system32\drivers\sbp2port.sys
Kernel Driver No Disabled Stopped OK Normal No No

secdrv Security Driver c:\windows\system32\drivers\secdrv.sys Kernel Driver Yes Auto
Running OK Normal No Yes

serenum Serenum Filter Driver c:\windows\system32\drivers\serenum.sys Kernel Driver
No Manual Stopped OK Normal No No

serial Serial Port Driver c:\windows\system32\drivers\serial.sys Kernel Driver No
Disabled Stopped OK Ignore No No

sermouse Serial Mouse Driver c:\windows\system32\drivers\sermouse.sys Kernel Driver
No Disabled Stopped OK Normal No No

sffdisk SFF Storage Class Driver c:\windows\system32\drivers\sffdisk.sys Kernel Driver No
Disabled Stopped OK Normal No No

sffp_mmc SFF Storage Protocol Driver for MMC c:\windows\system32\drivers\sffp_mmc.sys
Kernel Driver No Manual Stopped OK Normal No No

sffp_sd SFF Storage Protocol Driver for SDBus c:\windows\system32\drivers\sffp_sd.sys Kernel
Driver No Manual Stopped OK Normal No No

sfloppy High-Capacity Floppy Disk Drive c:\windows\system32\drivers\sfloppy.sys Kernel Driver
No Disabled Stopped OK Normal No No

sisraid2 SiSRaid2 c:\windows\system32\drivers\sisraid2.sys Kernel Driver No Disabled
Stopped OK Normal No No

sisraid4 SiSRaid4 c:\windows\system32\drivers\sisraid4.sys Kernel Driver No Disabled
Stopped OK Normal No No

smb Message-oriented TCP/IP and TCP/IPv6 Protocol (SMB session)
c:\windows\system32\drivers\smb.sys Kernel Driver Yes System Running OK
Normal No Yes

spldr Security Processor Loader Driver c:\windows\system32\drivers\spldr.sys Kernel Driver
Yes Boot Running OK Critical No Yes

srv srv c:\windows\system32\drivers\srv.sys File System Driver Yes Manual
Running OK Normal No Yes

srv2 srv2 c:\windows\system32\drivers\srv2.sys File System Driver Yes Manual
Running OK Normal No Yes

srvnet srvnet c:\windows\system32\drivers\srvnet.sys File System Driver Yes Manual
Running OK Normal No Yes

storflt Disk VMBUS Acceleration Filter Driver c:\windows\system32\drivers\storflt.sys Kernel
Driver Yes Boot Running OK Normal No Yes

storvsc storvsc c:\windows\system32\drivers\storvsc.sys Kernel Driver No Disabled
Stopped OK Normal No No

storvsp Microsoft Virtual Disk Server Driver c:\windows\system32\drivers\storvsp.sys Kernel
Driver No Disabled Stopped OK Normal No No

swenum Software Bus Driver c:\windows\system32\drivers\swenum.sys Kernel Driver Yes
Manual Running OK Normal No Yes

symc8xx Symc8xx c:\windows\system32\drivers\symc8xx.sys Kernel Driver No

```
        Disabled        Stopped OK      Normal  No      No

sym_hi  Sym_hi  c:\windows\system32\drivers\sym_hi.sys    Kernel Driver   No      Disabled
        Stopped OK      Normal  No      No

sym_u3  Sym_u3  c:\windows\system32\drivers\sym_u3.sys    Kernel Driver   No      Disabled
        Stopped OK      Normal  No      No

tcpip   TCP/IP Protocol Driver  c:\windows\system32\drivers\tcpip.sys    Kernel Driver   Yes
        Boot    Running         OK      Normal  No      Yes

tcpip6  Microsoft IPv6 Protocol Driver  c:\windows\system32\drivers\tcpip.sys    Kernel Driver
        No      Manual  Stopped OK      Normal  No      No

tcpipreg TCP/IP Registry Compatibility  c:\windows\system32\drivers\tcpipreg.sys  Kernel Driver
        Yes     Auto    Running         OK      Normal  No      Yes

tdpipe  TDPIPE          c:\windows\system32\drivers\tdpipe.sys  Kernel Driver   No      Manual
        Stopped OK      Normal  No      No

tdtcp   TDTCP   c:\windows\system32\drivers\tdtcp.sys    Kernel Driver   Yes     Manual  Running
        OK      Normal  No      Yes

tdx     NetIO Legacy TDI Support Driver  c:\windows\system32\drivers\tdx.sys    Kernel Driver
        Yes     System  Running         OK      Normal  No      Yes

termdd  Terminal Device Driver  c:\windows\system32\drivers\termdd.sys  Kernel Driver   Yes
        System  Running         OK      Normal  No      Yes

tssecsrv Terminal Services Security Filter Driver  c:\windows\system32\drivers\tssecsrv.sys  Kernel
Driver  Yes     Manual  Running         OK      Ignore  No      Yes

tunmp   Microsoft Tun Miniport Adapter Driver  c:\windows\system32\drivers\tunmp.sys  Kernel
Driver  Yes     Manual  Running         OK      Normal  No      Yes

tunnel  Microsoft IPv6 Tunnel Miniport Adapter Driver  c:\windows\system32\drivers\tunnel.sys
        Kernel Driver   Yes     Manual  Running         OK      Normal  No      Yes

uagp35  Microsoft AGPv3.5 Filter  c:\windows\system32\drivers\uagp35.sys  Kernel Driver   No
        Manual  Stopped OK      Normal  No      No

udfs    udfs    c:\windows\system32\drivers\udfs.sys    File System Driver      No      Disabled
        Stopped OK      Normal  No      No

uliagpkx        Uli AGP Bus Filter      c:\windows\system32\drivers\uliagpkx.sys  Kernel Driver
        No      Manual  Stopped OK      Normal  No      No

uliahci uliahci c:\windows\system32\drivers\uliahci.sys  Kernel Driver   No      Disabled
        Stopped OK      Normal  No      No

ulsata  UlSata  c:\windows\system32\drivers\ulsata.sys  Kernel Driver   No      Disabled
        Stopped OK      Normal  No      No

ulsata2 ulsata2 c:\windows\system32\drivers\ulsata2.sys  Kernel Driver   No      Disabled
        Stopped OK      Normal  No      No
```

umbus UMBus Enumerator Driver c:\windows\system32\drivers\umbus.sys Kernel Driver
Yes Manual Running OK Normal No Yes

umpass Microsoft UMPass Driver c:\windows\system32\drivers\umpass.sys Kernel Driver No
Disabled Stopped OK Normal No No

usbccgp Microsoft USB Generic Parent Driver c:\windows\system32\drivers\usbccgp.sys Kernel
Driver Yes Manual Running OK Normal No Yes

usbcir eHome Infrared Receiver (USBCIR) c:\windows\system32\drivers\usbcir.sys Kernel
Driver No Disabled Stopped OK Normal No No

usbehci Microsoft USB 2.0 Enhanced Host Controller Miniport Driver
c:\windows\system32\drivers\usbehci.sys Kernel Driver Yes Manual Running OK
Normal No Yes

usbhub Microsoft USB Standard Hub Driver c:\windows\system32\drivers\usbhub.sys Kernel
Driver Yes Manual Running OK Normal No Yes

usbohci Microsoft USB Open Host Controller Miniport Driver
c:\windows\system32\drivers\usbohci.sys Kernel Driver Yes Manual Running OK
Normal No Yes

usbprint Microsoft USB PRINTER Class c:\windows\system32\drivers\usbprint.sys Kernel Driver
No Disabled Stopped OK Normal No No

usbstor USB Mass Storage Driver c:\windows\system32\drivers\usbstor.sys Kernel Driver No
Manual Stopped OK Normal No No

usbuhci Microsoft USB Universal Host Controller Miniport Driver
c:\windows\system32\drivers\usbuhci.sys Kernel Driver No Disabled Stopped OK
Normal No No

vga vga c:\windows\system32\drivers\vgapnp.sys Kernel Driver Yes Manual Running
OK Ignore No Yes

vgasave VgaSave c:\windows\system32\drivers\vga.sys Kernel Driver Yes System
Running OK Ignore No Yes

viaide viaide c:\windows\system32\drivers\viaide.sys Kernel Driver No Disabled
Stopped OK Critical No No

vid Virtualization Infrastructure Driver c:\windows\system32\drivers\vid.sys Kernel Driver
No Disabled Stopped OK Normal No No

vmbus VMBus c:\windows\system32\drivers\vmbus.sys Kernel Driver No Disabled
Stopped OK Normal No No

volmgr Volume Manager Driver c:\windows\system32\drivers\volmgr.sys Kernel Driver Yes
Boot Running OK Critical No Yes

volmgrx Dynamic Volume Manager c:\windows\system32\drivers\volmgrx.sys Kernel
Driver Yes Boot Running OK Critical No Yes

volsnap Storage volumes c:\windows\system32\drivers\volsnap.sys Kernel Driver Yes Boot
Running OK Critical No Yes

vsmraid vsmraid c:\windows\system32\drivers\vsmraid.sys Kernel Driver No Disabled Stopped OK Normal No No

wacompen Wacom Serial Pen HID Driver c:\windows\system32\drivers\wacompen.sys Kernel Driver No Disabled Stopped OK Normal No No

wanarp Remote Access IP ARP Driver c:\windows\system32\drivers\wanarp.sys Kernel Driver No Manual Stopped OK Normal No No

wanarpv6 Remote Access IPv6 ARP Driver c:\windows\system32\drivers\wanarp.sys Kernel Driver Yes System Running OK Normal No Yes

wd Microsoft Watchdog Timer Driver c:\windows\system32\drivers\wd.sys Kernel Driver No Disabled Stopped OK Normal No No

wdf01000 Kernel Mode Driver Frameworks service c:\windows\system32\drivers\wdf01000.sys Kernel Driver Yes Boot Running OK Normal No Yes

wmiacpi Microsoft Windows Management Interface for ACPI c:\windows\system32\drivers\wmiacpi.sys Kernel Driver No Disabled Stopped OK Normal No No

ws2ifsl Winsock IFS driver c:\windows\system32\drivers\ws2ifsl.sys Kernel Driver No Disabled Stopped OK Normal No No

[Signed Drivers]

Device Name Signed Device Class Driver Version Driver Date Manufacturer INF Name Driver Name Device ID

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A54FOFFSET100000LENGTHF9F00000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available STORAGE\VOLUME\1&19F7E59C&0&LDM#{1FC16CE8-22E2-11DE-8E27-00144FEB3627}

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A333OFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A333OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available

STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A333OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A339OFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A339OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A339OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A30FOFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A30FOFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A30FOFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A315OFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A315OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A315OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A31BOFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available

STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A31BOFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A31BOFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A361OFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A361OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A361OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A377OFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A377OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A377OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A37DOFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A37DOFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A37DOFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available

STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A343OFFSET1F4100000LENGTHFA00000
0

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A343OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A343OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A349OFFSET1F4100000LENGTHFA00000
0

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A349OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A349OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A35FOFFSET1F4100000LENGTHFA00000
0

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A35FOFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A35FOFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A2A5OFFSET1F4100000LENGTHFA00000
0

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A2A5OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available

STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A2A5OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A2ABOFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A2ABOFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A2ABOFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A2B1OFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A2B1OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A2B1OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A287OFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A287OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A287OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A28DOFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available

STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A28DOFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A28DOFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A293OFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A293OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A293OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A299OFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A299OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A299OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A2EFOFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A2EFOFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A2EFOFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available

STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A2F5OFFSET1F4100000LENGTHFA00000
0

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A2F5OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A2F5OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A2FBOFFSET1F4100000LENGTHFA00000
0

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A2FBOFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A2FBOFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A2C1OFFSET1F4100000LENGTHFA00000
0

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A2C1OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A2C1OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A2D7OFFSET1F4100000LENGTHFA00000
0

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A2D7OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available

STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A2D7OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A2DDOFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A2DDOFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A2DDOFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A223OFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A223OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A223OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A229OFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A229OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A229OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A23FOFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available

STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A23FOFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A23FOFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A205OFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A205OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A205OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A20BOFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A20BOFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A20BOFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A211OFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A211OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A211OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available

STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A267OFFSET1F4100000LENGTHFA00000
0

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A267OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A267OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A26DOFFSET1F4100000LENGTHFA00000
0

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A26DOFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A26DOFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A273OFFSET1F4100000LENGTHFA00000
0

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A273OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A273OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A279OFFSET1F4100000LENGTHFA00000
0

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A279OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available

STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A279OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A24FOFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A24FOFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A24FOFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A255OFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A255OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A255OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A25BOFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A25BOFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A25BOFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A1A1OFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available

STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A1A1OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A1A1OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A1B7OFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A1B7OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A1B7OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A1BDOFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A1BDOFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A1BDOFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A183OFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A183OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A183OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available

STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A189OFFSET1F4100000LENGTHFA00000
0

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A189OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A189OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A19FOFFSET1F4100000LENGTHFA00000
0

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A19FOFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A19FOFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A1E5OFFSET1F4100000LENGTHFA00000
0

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A1E5OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A1E5OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A1EBOFFSET1F4100000LENGTHFA00000
0

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A1EBOFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available

STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A1EBOFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A1F1OFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A1F1OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A1F1OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A1C7OFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A1C7OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A1C7OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A1CDOFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A1CDOFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A1CDOFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A1D3OFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available

STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A1D3OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A1D3OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A1D9OFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A1D9OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A1D9OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A12FOFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A12FOFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A12FOFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A135OFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A135OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A135OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available

STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A13BOFFSET1F4100000LENGTHFA00000
0

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A13BOFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A13BOFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A101OFFSET1F4100000LENGTHFA00000
0

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A101OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A101OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A117OFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A117OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A117OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A11DOFFSET1F4100000LENGTHFA00000
0

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A11DOFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available

STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A11DOFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A163OFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A163OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A163OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A169OFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A169OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A169OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A17FOFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A17FOFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A17FOFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A145OFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available

STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A145OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A145OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A14BOFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A14BOFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A14BOFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A151OFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A151OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A151OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A0A7OFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A0A7OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A0A7OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available

STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A0ADOFFSET1F4100000LENGTHFA00000
0

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A0ADOFFSETFA100000LENGTHFA00000
0

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A0ADOFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A0B3OFFSET1F4100000LENGTHFA00000
0

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A0B3OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A0B3OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A0B9OFFSET1F4100000LENGTHFA00000
0

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A0B9OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A0B9OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A08FOFFSET1F4100000LENGTHFA00000
0

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A08FOFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available

STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A08FOFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A095OFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A095OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A095OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A09BOFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A09BOFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A09BOFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A0E1OFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A0E1OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A0E1OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A0F7OFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available

STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A0F7OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A0F7OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A0FDOFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A0FDOFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A0FDOFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A0C3OFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A0C3OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A0C3OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A0C9OFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A0C9OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A0C9OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available

STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A0DFOFFSET1F4100000LENGTHFA00000
0

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A0DFOFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A0DFOFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A025OFFSET1F4100000LENGTHFA00000
0

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A025OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A025OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A02BOFFSET1F4100000LENGTHFA00000
0

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A02BOFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A02BOFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A031OFFSET1F4100000LENGTHFA00000
0

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A031OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available

STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A031OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A007OFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A007OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A007OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A00DOFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A00DOFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A00DOFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A013OFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A013OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A013OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A019OFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available

STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A019OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A019OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A06FOFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A06FOFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A06FOFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A075OFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A075OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A075OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE558EF845OFFSET100000LENGTH1117500000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATUREF9F0CC61OFFSET100000LENGTHCB99100000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A07BOFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available

STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A07BOFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A07BOFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A041OFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A041OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A041OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A057OFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A057OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A057OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A05DOFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A05DOFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A05DOFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available

STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A7A3OFFSET1F4100000LENGTHFA00000
0

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A7A3OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A7A3OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A7A9OFFSET1F4100000LENGTHFA00000
0

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A7A9OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A7A9OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A7BFOFFSET1F4100000LENGTHFA00000
0

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A7BFOFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A7BFOFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A785OFFSET1F4100000LENGTHFA00000
0

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A785OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available

STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A785OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A78BOFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A78BOFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A78BOFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A791OFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A791OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A791OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A7E7OFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A7E7OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A7E7OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A7EDOFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available

STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A7EDOFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A7EDOFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A7F3OFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A7F3OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A7F3OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A7F9OFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A7F9OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A7F9OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A7CFOFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A7CFOFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A7CFOFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available

STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A7D5OFFSET1F4100000LENGTHFA00000
0

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A7D5OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A7D5OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A7DBOFFSET1F4100000LENGTHFA00000
0

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A7DBOFFSETFA100000LENGTHFA00000
0

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A7DBOFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A721OFFSET1F4100000LENGTHFA00000
0

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A721OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A721OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A737OFFSET1F4100000LENGTHFA00000
0

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A737OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available

STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A737OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A73DOFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A73DOFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A73DOFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A703OFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A703OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A703OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A709OFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A709OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A709OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A71FOFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available

STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A71FOFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A71FOFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A765OFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A765OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A765OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A76BOFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A76BOFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A76BOFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A771OFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A771OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A771OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available

STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A747OFFSET1F4100000LENGTHFA00000
0

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A747OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A747OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A74DOFFSET1F4100000LENGTHFA00000
0

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A74DOFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A74DOFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A753OFFSET1F4100000LENGTHFA00000
0

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A753OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A753OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A759OFFSET1F4100000LENGTHFA00000
0

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A759OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available

STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A759OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A6AFOFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A6AFOFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A6AFOFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A6B5OFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A6B5OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A6B5OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A6BBOFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A6BBOFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A6BBOFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A681OFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available

STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A681OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A681OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A697OFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A697OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A697OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A69DOFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A69DOFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A69DOFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A6E3OFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A6E3OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A6E3OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available

STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A6E9OFFSET1F4100000LENGTHFA00000
0

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A6E9OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A6E9OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A6FFOFFSET1F4100000LENGTHFA00000
0

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A6FFOFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A6FFOFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A6C5OFFSET1F4100000LENGTHFA00000
0

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A6C5OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A6C5OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A6CBOFFSET1F4100000LENGTHFA00000
0

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A6CBOFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available

STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A6CBOFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A6D1OFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A6D1OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A6D1OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A627OFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A627OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A627OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A62DOFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A62DOFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A62DOFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A633OFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available

STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A633OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A633OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A639OFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A639OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A639OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A60FOFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A60FOFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A60FOFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A615OFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A615OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A615OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available

STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A61BOFFSET1F4100000LENGTHFA00000
0

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A61BOFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A61BOFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A661OFFSET1F4100000LENGTHFA00000
0

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A661OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A661OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A677OFFSET1F4100000LENGTHFA00000
0

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A677OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A677OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A67DOFFSET1F4100000LENGTHFA00000
0

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A67DOFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available

STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A67DOFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A643OFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A643OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A643OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A649OFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A649OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A649OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A65FOFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A65FOFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A65FOFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A5A5OFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available

STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A5A5OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A5A5OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A5ABOFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A5ABOFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A5ABOFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A5B1OFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A5B1OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A5B1OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A587OFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A587OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A587OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available

STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A58DOFFSET1F4100000LENGTHFA00000
0

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A58DOFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A58DOFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A593OFFSET1F4100000LENGTHFA00000
0

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A593OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A593OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A599OFFSET1F4100000LENGTHFA00000
0

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A599OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A599OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A5EFOFFSET1F4100000LENGTHFA00000
0

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A5EFOFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available

STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A5EFOFFSET100000LENGTHF9F00000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A5F5OFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A5F5OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A5F5OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A5FBOFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A5FBOFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A5FBOFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A5C1OFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A5C1OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A5C1OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A5D7OFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available

STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A5D7OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A5D7OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A5DDOFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A5DDOFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A5DDOFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A523OFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A523OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A523OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A529OFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A529OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A529OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available

STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A53FOFFSET1F4100000LENGTHFA00000
0

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A53FOFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A53FOFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A505OFFSET1F4100000LENGTHFA00000
0

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A505OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A505OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A50BOFFSET1F4100000LENGTHFA00000
0

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A50BOFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A50BOFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A511OFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A511OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft
volume.inf Not Available

STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A511OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A567OFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A567OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A567OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A56DOFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A56DOFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A56DOFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A573OFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A573OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A573OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A579OFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available

STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A579OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A579OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A54FOFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A54FOFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A55BOFFSET2EE200000LENGTH1F40600000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A55BOFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A55BOFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A55BOFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A4A1OFFSET2EE200000LENGTH1F40600000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A4A1OFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A4A1OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available

STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A4A1OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A4B7OFFSET2EE200000LENGTH1F40600000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A4B7OFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A4B7OFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A4B7OFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A4BDOFFSET2EE200000LENGTH1F40600000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A4BDOFFSET1F4100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A4BDOFFSETFA100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE1272A4BDOFFSET100000LENGTHFA000000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE56847B56OFFSET23F100000LENGTH11F800000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE56847B56OFFSET11F900000LENGTH11F800000

Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006 Microsoft volume.inf Not Available

STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE56847B56OFFSET100000LENGTH11F700000

Volume Manager Yes SYSTEM 6.0.6001.18000 6/21/2006 (Standard system devices)
machine.inf Not Available ROOT\VOLMGR\0000

UMBus Enumerator Yes SYSTEM 6.0.6001.18000 6/21/2006 Microsoft
umbus.inf Not Available UMB\UMB\1&841921D&0&TSBUS

UMBus Root Bus Enumerator Yes SYSTEM 6.0.6001.18000 6/21/2006
Microsoft umbus.inf Not Available ROOT\UMBUS\0000

Microsoft System Management BIOS Driver Yes SYSTEM 6.0.6001.18000
6/21/2006 (Standard system devices) machine.inf Not Available ROOT\SYSTEM\0002

RAS Async Adapter Yes NET 6.0.6001.18000 6/21/2006 Microsoft
netrasa.inf Not Available SW\{EEAB7790-C514-11D1-B42B-00805FC1270E}\ASYNCMAC

Plug and Play Software Device Enumerator Yes SYSTEM 6.0.6001.18000 6/21/2006
(Standard system devices) machine.inf Not Available ROOT\SYSTEM\0000

Terminal Server Mouse Driver Yes SYSTEM 6.0.6001.18000 6/21/2006
(Standard system devices) machine.inf Not Available ROOT\RDP_MOU\0000

Terminal Server Keyboard Driver Yes SYSTEM 6.0.6001.18000 6/21/2006
(Standard system devices) machine.inf Not Available ROOT\RDP_KBD\0000

Terminal Server Device Redirector Yes SYSTEM 6.0.6001.18000 6/21/2006
(Standard system devices) machine.inf Not Available ROOT\RDPDR\0000

WAN Miniport (SSTP) Yes NET 6.0.6001.18000 6/21/2006 Microsoft
netsstpa.inf Not Available ROOT\MS_SSTPMINIPORT\0000

WAN Miniport (PPTP) Yes NET 6.0.6001.18000 6/21/2006 Microsoft
netrasa.inf Not Available ROOT\MS_PPTPMINIPORT\0000

WAN Miniport (PPPOE) Yes NET 6.0.6001.18000 6/21/2006 Microsoft
netrasa.inf Not Available ROOT\MS_PPPOEMINIPORT\0000

WAN Miniport (IPv6) Yes NET 6.0.6001.18000 6/21/2006 Microsoft
netrasa.inf Not Available ROOT\MS_NDISWANIPV6\0000

WAN Miniport (IP) Yes NET 6.0.6001.18000 6/21/2006 Microsoft
netrasa.inf Not Available ROOT\MS_NDISWANIP\0000

WAN Miniport (Network Monitor) Yes NET 6.0.6001.18000 6/21/2006 Microsoft
netrasa.inf Not Available ROOT\MS_NDISWANBH\0000

WAN Miniport (L2TP) Yes NET 6.0.6001.18000 6/21/2006 Microsoft
netrasa.inf Not Available ROOT\MS_L2TPMINIPORT\0000

Kernel Mode Driver Frameworks service Not Available LEGACYDRIVER Not Available
Not Available Not Available Not Available Not Available Not Available
ROOT\LEGACY_WDF01000\0000

Remote Access IPv6 ARP Driver Not Available LEGACYDRIVER Not Available Not Available Not Available Not Available Not Available ROOT\LEGACY_WANARPV6\0000

Storage volumes Not Available LEGACYDRIVER Not Available Not Available Not Available Not Available Not Available ROOT\LEGACY_VOLSNAP\0000

Dynamic Volume Manager Not Available LEGACYDRIVER Not Available Not Available Not Available Not Available Not Available ROOT\LEGACY_VOLMGRX\0000

VgaSave Not Available LEGACYDRIVER Not Available Not Available Not Available Not Available Not Available ROOT\LEGACY_VGASAVE\0000

Terminal Services Security Filter Driver Not Available LEGACYDRIVER Not Available Not Available Not Available Not Available Not Available ROOT\LEGACY_TSSECSRV\0000

NetIO Legacy TDI Support Driver Not Available LEGACYDRIVER Not Available Not Available Not Available Not Available Not Available ROOT\LEGACY_TDX\0000

TDTCP Not Available LEGACYDRIVER Not Available Not Available Not Available Not Available Not Available ROOT\LEGACY_TDTCP\0000

TCP/IP Registry Compatibility Not Available LEGACYDRIVER Not Available Not Available Not Available Not Available Not Available ROOT\LEGACY_TCPIPREG\0000

TCP/IP Protocol Driver Not Available LEGACYDRIVER Not Available Not Available Not Available Not Available Not Available ROOT\LEGACY_TCPIP\0000

Disk VMBUS Acceleration Filter Driver Not Available LEGACYDRIVER Not Available Not Available Not Available Not Available Not Available ROOT\LEGACY_STORFLT\0000

Security Processor Loader Driver Not Available LEGACYDRIVER Not Available Not Available Not Available Not Available Not Available ROOT\LEGACY_SPLDR\0000

Message-oriented TCP/IP and TCP/IPv6 Protocol (SMB session) Not Available LEGACYDRIVER Not Available Not Available Not Available Not Available Not Available ROOT\LEGACY_SMB\0000

Security Driver Not Available LEGACYDRIVER Not Available Not Available Not Available Not Available Not Available ROOT\LEGACY_SECDRV\0000

sacdrv Not Available LEGACYDRIVER Not Available Not Available Not Available Not Available Not Available ROOT\LEGACY_SACDRV\0000

Link-Layer Topology Discovery Responder Not Available LEGACYDRIVER Not Available Not Available Not Available Not Available Not Available ROOT\LEGACY_RSPNDR\0000

RDP Winstation Driver Not Available LEGACYDRIVER Not Available Not Available

Not Available Not Available Not Available ROOT\LEGACY_RDPWD\0000

RDP Encoder Mirror Driver Not Available LEGACYDRIVER Not Available Not Available Not Available Not Available Not Available ROOT\LEGACY_RDPENCDD\0000

RDPCDD Not Available LEGACYDRIVER Not Available Not Available Not Available Not Available Not Available ROOT\LEGACY_RDPCDD\0000

Remote Access Auto Connection Driver Not Available LEGACYDRIVER Not Available Not Available Not Available Not Available Not Available ROOT\LEGACY_RASACD\0000

QLogic Fibre Channel Miniport Driver Not Available LEGACYDRIVER Not Available Not Available Not Available Not Available Not Available ROOT\LEGACY_QL2300\0000

QoS Packet Scheduler Not Available LEGACYDRIVER Not Available Not Available Not Available Not Available Not Available ROOT\LEGACY_PSCHED\0000

PEAUTH Not Available LEGACYDRIVER Not Available Not Available Not Available Not Available Not Available ROOT\LEGACY_PEAUTH\0000

Null Not Available LEGACYDRIVER Not Available Not Available Not Available Not Available Not Available ROOT\LEGACY_NULL\0000

NSI proxy service Not Available LEGACYDRIVER Not Available Not Available Not Available Not Available Not Available ROOT\LEGACY_NSIPROXY\0000

NETBT Not Available LEGACYDRIVER Not Available Not Available Not Available Not Available Not Available ROOT\LEGACY_NETBT\0000

NDProxy Not Available LEGACYDRIVER Not Available Not Available Not Available Not Available Not Available ROOT\LEGACY_NDPROXY\0000

NDIS System Driver Not Available LEGACYDRIVER Not Available Not Available Not Available Not Available Not Available ROOT\LEGACY_NDIS\0000

ISA/EISA Class Driver Not Available LEGACYDRIVER Not Available Not Available Not Available Not Available Not Available ROOT\LEGACY_MSISADRV\0000

Windows Firewall Authorization Driver Not Available LEGACYDRIVER Not Available Not Available Not Available Not Available Not Available ROOT\LEGACY_MPSDRV\0000

Mount Point Manager Not Available LEGACYDRIVER Not Available Not Available Not Available Not Available Not Available ROOT\LEGACY_MOUNTMGR\0000

Link-Layer Topology Discovery Mapper I/O Driver Not Available LEGACYDRIVER Not Available Not Available Not Available Not Available Not Available ROOT\LEGACY_LLTDIO\0000

KSecDD Not Available LEGACYDRIVER Not Available Not Available Not Available Not Available Not Available ROOT\LEGACY_KSECDD\0000

HTTP Not Available LEGACYDRIVER Not Available Not Available Not Available Not Available Not Available ROOT\LEGACY_HTTP\0000

Crcdisk Filter Driver Not Available LEGACYDRIVER Not Available Not Available Not Available Not Available Not Available ROOT\LEGACY_CRCDISK\0000

Common Log (CLFS) Not Available LEGACYDRIVER Not Available Not Available Not Available Not Available Not Available ROOT\LEGACY_CLFS\0000

Adaptec SAS/SATA-II RAID Storport's Miniport Driver Not Available LEGACYDRIVER Not Available Not Available Not Available Not Available Not Available ROOT\LEGACY_ARCSAS\0000

Ancilliary Function Driver for Winsock Not Available LEGACYDRIVER Not Available Not Available Not Available Not Available Not Available ROOT\LEGACY_AFD\0000

Microsoft iSCSI Initiator Yes SCSIADAPTER 6.0.6001.18000 6/21/2006 Microsoft iscsi.inf Not Available ROOT\ISCSIPRT\0000

Emulex PLUS Yes ELXPLUS 7.2.1.1 12/10/2007 Emulex oem5.inf Not Available ROOT\ELXPLUS\0000

ACPI Fixed Feature Button Yes SYSTEM 6.0.6001.18000 6/21/2006 (Standard system devices) machine.inf Not Available ACPI\FIXEDBUTTON\2&DABA3FF&1

ACPI Power Button Yes SYSTEM 6.0.6001.18000 6/21/2006 (Standard system devices) machine.inf Not Available ACPI\PNP0C0C\AA

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives) disk.inf Not Available SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&3704E129&0&007F00

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives) disk.inf Not Available SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&3704E129&0&007E00

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives) disk.inf Not Available SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&3704E129&0&007D00

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives) disk.inf Not Available SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&3704E129&0&007C00

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives) disk.inf Not Available SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&3704E129&0&007B00

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives) disk.inf Not Available

SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&3704E129&0&007A00

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&3704E129&0&007900

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&3704E129&0&007800

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&3704E129&0&007700

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&3704E129&0&007600

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&3704E129&0&007500

Sun Storage J4200 Yes SYSTEM 1.0.6.0 10/14/2008 Sun Microsystems, Inc.
oem2.inf Not Available
SCSI\ENCLOSURE&VEN_SUN&PROD_STORAGE_J4200\5&3704E129&0&007400

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&3704E129&0&007300

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&3704E129&0&007200

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&3704E129&0&007100

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&3704E129&0&007000

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&3704E129&0&006F00

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&3704E129&0&006E00

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&3704E129&0&006D00

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)

disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&3704E129&0&006C00

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&3704E129&0&006B00

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&3704E129&0&006A00

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&3704E129&0&006900

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&3704E129&0&006800

Generic SCSI Enclosure Device Yes SYSTEM 6.0.6001.18000 6/21/2006
Microsoft scsidev.inf Not Available
SCSI\ENCLOSURE&VEN_SUN&PROD_STORAGE_J4200\5&3704E129&0&005B00

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&3704E129&0&005A00

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&3704E129&0&005900

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&3704E129&0&005800

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&3704E129&0&005700

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&3704E129&0&005600

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&3704E129&0&005500

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&3704E129&0&005400

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&3704E129&0&005300

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&3704E129&0&005200

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&3704E129&0&005100

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&3704E129&0&005000

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&3704E129&0&004F00

Sun Storage J4200 Yes SYSTEM 1.0.6.0 10/14/2008 Sun Microsystems, Inc.
oem2.inf Not Available
SCSI\ENCLOSURE&VEN_SUN&PROD_STORAGE_J4200\5&3704E129&0&000100

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&3704E129&0&000000

LSI Adapter, SAS 3000 series, 8-port with 1068E -StorPort Yes SCSIADAPTER 1.28.3.0 6/3/2008
LSI Corporation oem1.inf Not Available
PCI\VEN_1000&DEV_0058&SUBSYS_31501000&REV_08\4&2A3AB043&0&0070

PCI Express standard Root Port Yes SYSTEM 6.0.6001.18000 6/21/2006
(Standard system devices) machine.inf Not Available
PCI\VEN_10DE&DEV_005D&SUBSYS_00000000&REV_A3\3&1106BFD7&0&70

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&30239093&0&007F00

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&30239093&0&007C00

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&30239093&0&007B00

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&30239093&0&007A00

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&30239093&0&007900

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&30239093&0&007800

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&30239093&0&007700

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&30239093&0&007600

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&30239093&0&007500

Sun Storage J4200 Yes SYSTEM 1.0.6.0 10/14/2008 Sun Microsystems, Inc.
oem2.inf Not Available
SCSI\ENCLOSURE&VEN_SUN&PROD_STORAGE_J4200\5&30239093&0&007400

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&30239093&0&007300

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&30239093&0&007200

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&30239093&0&007100

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&30239093&0&007000

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&30239093&0&006F00

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&30239093&0&006E00

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&30239093&0&006D00

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&30239093&0&006C00

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&30239093&0&006B00

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&30239093&0&006A00

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&30239093&0&006900

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&30239093&0&006800

Sun Storage J4200 Yes SYSTEM 1.0.6.0 10/14/2008 Sun Microsystems, Inc.
oem2.inf Not Available
SCSI\ENCLOSURE&VEN_SUN&PROD_STORAGE_J4200\5&30239093&0&000300

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&30239093&0&000200

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&30239093&0&000100

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&30239093&0&000000

LSI Adapter, SAS 3000 series, 8-port with 1068E -StorPort Yes SCSIADAPTER 1.28.3.0 6/3/2008
LSI Corporation oem1.inf Not Available
PCI\VEN_1000&DEV_0058&SUBSYS_31501000&REV_08\4&D81C78F&0&0068

PCI Express standard Root Port Yes SYSTEM 6.0.6001.18000 6/21/2006
(Standard system devices) machine.inf Not Available
PCI\VEN_10DE&DEV_005D&SUBSYS_00000000&REV_F3\3&1106BFD7&0&68

Sun Storage J4200 Yes SYSTEM 1.0.6.0 10/14/2008 Sun Microsystems, Inc.
oem2.inf Not Available
SCSI\ENCLOSURE&VEN_SUN&PROD_STORAGE_J4200\5&3B64715B&0&007400

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&3B64715B&0&007300

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&3B64715B&0&007200

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&3B64715B&0&007100

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&3B64715B&0&007000

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&3B64715B&0&006F00

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&3B64715B&0&006E00

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&3B64715B&0&006D00

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&3B64715B&0&006C00

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&3B64715B&0&006B00

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&3B64715B&0&006A00

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&3B64715B&0&006900

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&3B64715B&0&006800

Generic SCSI Enclosure Device Yes SYSTEM 6.0.6001.18000 6/21/2006
Microsoft scsidev.inf Not Available
SCSI\ENCLOSURE&VEN_SUN&PROD_STORAGE_J4200\5&3B64715B&0&006700

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&3B64715B&0&006600

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&3B64715B&0&006500

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&3B64715B&0&006400

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&3B64715B&0&006300

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&3B64715B&0&006200

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&3B64715B&0&006100

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&3B64715B&0&006000

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&3B64715B&0&005F00

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&3B64715B&0&005E00

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&3B64715B&0&005D00

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&3B64715B&0&005C00

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&3B64715B&0&005B00

LSI Adapter, SAS 3000 series, 8-port with 1068E -StorPort Yes SCSIADAPTER 1.28.3.0 6/3/2008
LSI Corporation oem1.inf Not Available
PCI\VEN_1000&DEV_0058&SUBSYS_31501000&REV_08\4&1116298B&0&0060

PCI Express standard Root Port Yes SYSTEM 6.0.6001.18000 6/21/2006
(Standard system devices) machine.inf Not Available
PCI\VEN_10DE&DEV_005D&SUBSYS_00000000&REV_F3\3&1106BFD7&0&60

NVIDIA nForce4 Low Pin Count Controller Yes SYSTEM 6.0.6001.18000 6/21/2006
NVIDIA machine.inf Not Available
PCI\VEN_10DE&DEV_00D3&SUBSYS_CB8410DE&REV_F1\3&1106BFD7&0&08

NVIDIA nForce4 HyperTransport Bridge Yes SYSTEM 6.0.6001.18000 6/21/2006
NVIDIA machine.inf Not Available
PCI\VEN_10DE&DEV_005E&SUBSYS_00000000&REV_A4\3&1106BFD7&0&00

PCI bus Yes SYSTEM 6.0.6001.18000 6/21/2006 (Standard system devices)
machine.inf Not Available ACPI\PNP0A03\B

System board Yes SYSTEM 6.0.6001.18000 6/21/2006 (Standard system devices)
machine.inf Not Available ACPI\PNP0C01\1

Processor Yes PROCESSOR 6.0.6001.18000 6/21/2006 (Standard processor types)
cpu.inf Not Available ACPI\AUTHENTICAMD_-_AMD64_FAMILY_16_MODEL_4\31

Processor Yes PROCESSOR 6.0.6001.18000 6/21/2006 (Standard processor types)
cpu.inf Not Available ACPI\AUTHENTICAMD_-_AMD64_FAMILY_16_MODEL_4\30

Processor Yes PROCESSOR 6.0.6001.18000 6/21/2006 (Standard processor types)

cpu.inf Not Available ACPI\AUTHENTICAMD_-_AMD64_FAMILY_16_MODEL_4\29

Processor Yes PROCESSOR 6.0.6001.18000 6/21/2006 (Standard processor types)
cpu.inf Not Available ACPI\AUTHENTICAMD_-_AMD64_FAMILY_16_MODEL_4\28

Processor Yes PROCESSOR 6.0.6001.18000 6/21/2006 (Standard processor types)
cpu.inf Not Available ACPI\AUTHENTICAMD_-_AMD64_FAMILY_16_MODEL_4\27

Processor Yes PROCESSOR 6.0.6001.18000 6/21/2006 (Standard processor types)
cpu.inf Not Available ACPI\AUTHENTICAMD_-_AMD64_FAMILY_16_MODEL_4\26

Processor Yes PROCESSOR 6.0.6001.18000 6/21/2006 (Standard processor types)
cpu.inf Not Available ACPI\AUTHENTICAMD_-_AMD64_FAMILY_16_MODEL_4\25

Processor Yes PROCESSOR 6.0.6001.18000 6/21/2006 (Standard processor types)
cpu.inf Not Available ACPI\AUTHENTICAMD_-_AMD64_FAMILY_16_MODEL_4\24

Processor Yes PROCESSOR 6.0.6001.18000 6/21/2006 (Standard processor types)
cpu.inf Not Available ACPI\AUTHENTICAMD_-_AMD64_FAMILY_16_MODEL_4\23

Processor Yes PROCESSOR 6.0.6001.18000 6/21/2006 (Standard processor types)
cpu.inf Not Available ACPI\AUTHENTICAMD_-_AMD64_FAMILY_16_MODEL_4\22

Processor Yes PROCESSOR 6.0.6001.18000 6/21/2006 (Standard processor types)
cpu.inf Not Available ACPI\AUTHENTICAMD_-_AMD64_FAMILY_16_MODEL_4\21

Processor Yes PROCESSOR 6.0.6001.18000 6/21/2006 (Standard processor types)
cpu.inf Not Available ACPI\AUTHENTICAMD_-_AMD64_FAMILY_16_MODEL_4\20

Processor Yes PROCESSOR 6.0.6001.18000 6/21/2006 (Standard processor types)
cpu.inf Not Available ACPI\AUTHENTICAMD_-_AMD64_FAMILY_16_MODEL_4\19

Processor Yes PROCESSOR 6.0.6001.18000 6/21/2006 (Standard processor types)
cpu.inf Not Available ACPI\AUTHENTICAMD_-_AMD64_FAMILY_16_MODEL_4\18

Processor Yes PROCESSOR 6.0.6001.18000 6/21/2006 (Standard processor types)
cpu.inf Not Available ACPI\AUTHENTICAMD_-_AMD64_FAMILY_16_MODEL_4\17

Processor Yes PROCESSOR 6.0.6001.18000 6/21/2006 (Standard processor types)
cpu.inf Not Available ACPI\AUTHENTICAMD_-_AMD64_FAMILY_16_MODEL_4\16

Processor Yes PROCESSOR 6.0.6001.18000 6/21/2006 (Standard processor types)
cpu.inf Not Available ACPI\AUTHENTICAMD_-_AMD64_FAMILY_16_MODEL_4\15

Processor Yes PROCESSOR 6.0.6001.18000 6/21/2006 (Standard processor types)
cpu.inf Not Available ACPI\AUTHENTICAMD_-_AMD64_FAMILY_16_MODEL_4\14

Processor Yes PROCESSOR 6.0.6001.18000 6/21/2006 (Standard processor types)
cpu.inf Not Available ACPI\AUTHENTICAMD_-_AMD64_FAMILY_16_MODEL_4\13

Processor Yes PROCESSOR 6.0.6001.18000 6/21/2006 (Standard processor types)
cpu.inf Not Available ACPI\AUTHENTICAMD_-_AMD64_FAMILY_16_MODEL_4\12

Processor Yes PROCESSOR 6.0.6001.18000 6/21/2006 (Standard processor types)
cpu.inf Not Available ACPI\AUTHENTICAMD_-_AMD64_FAMILY_16_MODEL_4\11

Processor Yes PROCESSOR 6.0.6001.18000 6/21/2006 (Standard processor types)
cpu.inf Not Available ACPI\AUTHENTICAMD_-_AMD64_FAMILY_16_MODEL_4\10

Processor Yes PROCESSOR 6.0.6001.18000 6/21/2006 (Standard processor types)
cpu.inf Not Available ACPI\AUTHENTICAMD_-_AMD64_FAMILY_16_MODEL_4_9

Processor Yes PROCESSOR 6.0.6001.18000 6/21/2006 (Standard processor types)
cpu.inf Not Available ACPI\AUTHENTICAMD_-_AMD64_FAMILY_16_MODEL_4_8

Processor Yes PROCESSOR 6.0.6001.18000 6/21/2006 (Standard processor types)
cpu.inf Not Available ACPI\AUTHENTICAMD_-_AMD64_FAMILY_16_MODEL_4_7

Processor Yes PROCESSOR 6.0.6001.18000 6/21/2006 (Standard processor types)
cpu.inf Not Available ACPI\AUTHENTICAMD_-_AMD64_FAMILY_16_MODEL_4_6

Processor Yes PROCESSOR 6.0.6001.18000 6/21/2006 (Standard processor types)
cpu.inf Not Available ACPI\AUTHENTICAMD_-_AMD64_FAMILY_16_MODEL_4_5

Processor Yes PROCESSOR 6.0.6001.18000 6/21/2006 (Standard processor types)
cpu.inf Not Available ACPI\AUTHENTICAMD_-_AMD64_FAMILY_16_MODEL_4_4

Processor Yes PROCESSOR 6.0.6001.18000 6/21/2006 (Standard processor types)
cpu.inf Not Available ACPI\AUTHENTICAMD_-_AMD64_FAMILY_16_MODEL_4_3

Processor Yes PROCESSOR 6.0.6001.18000 6/21/2006 (Standard processor types)
cpu.inf Not Available ACPI\AUTHENTICAMD_-_AMD64_FAMILY_16_MODEL_4_2

Processor Yes PROCESSOR 6.0.6001.18000 6/21/2006 (Standard processor types) cpu.inf Not Available ACPI\AUTHENTICAMD_-_AMD64_FAMILY_16_MODEL_4_1

Processor Yes PROCESSOR 6.0.6001.18000 6/21/2006 (Standard processor types) cpu.inf Not Available ACPI\AUTHENTICAMD_-_AMD64_FAMILY_16_MODEL_4_0

Motherboard resources Yes SYSTEM 6.0.6001.18000 6/21/2006 (Standard system devices) machine.inf Not Available ACPI\PNP0C02\11

PCI standard host CPU bridge Yes SYSTEM 6.0.6001.18000 6/21/2006 (Standard system devices) machine.inf Not Available PCI\VEN_1022&DEV_1204&SUBSYS_00000000&REV_00\3&267A616A&0&FC

PCI standard host CPU bridge Yes SYSTEM 6.0.6001.18000 6/21/2006 (Standard system devices) machine.inf Not Available PCI\VEN_1022&DEV_1203&SUBSYS_00000000&REV_00\3&267A616A&0&FB

PCI standard host CPU bridge Yes SYSTEM 6.0.6001.18000 6/21/2006 (Standard system devices) machine.inf Not Available PCI\VEN_1022&DEV_1202&SUBSYS_00000000&REV_00\3&267A616A&0&FA

PCI standard host CPU bridge Yes SYSTEM 6.0.6001.18000 6/21/2006 (Standard system devices) machine.inf Not Available PCI\VEN_1022&DEV_1201&SUBSYS_00000000&REV_00\3&267A616A&0&F9

PCI standard host CPU bridge Yes SYSTEM 6.0.6001.18000 6/21/2006 (Standard system devices) machine.inf Not Available PCI\VEN_1022&DEV_1200&SUBSYS_00000000&REV_00\3&267A616A&0&F8

PCI standard host CPU bridge Yes SYSTEM 6.0.6001.18000 6/21/2006 (Standard system devices) machine.inf Not Available PCI\VEN_1022&DEV_1204&SUBSYS_00000000&REV_00\3&267A616A&0&F4

PCI standard host CPU bridge Yes SYSTEM 6.0.6001.18000 6/21/2006 (Standard system devices) machine.inf Not Available PCI\VEN_1022&DEV_1203&SUBSYS_00000000&REV_00\3&267A616A&0&F3

PCI standard host CPU bridge Yes SYSTEM 6.0.6001.18000 6/21/2006 (Standard system devices) machine.inf Not Available PCI\VEN_1022&DEV_1202&SUBSYS_00000000&REV_00\3&267A616A&0&F2

PCI standard host CPU bridge Yes SYSTEM 6.0.6001.18000 6/21/2006 (Standard system devices) machine.inf Not Available PCI\VEN_1022&DEV_1201&SUBSYS_00000000&REV_00\3&267A616A&0&F1

PCI standard host CPU bridge Yes SYSTEM 6.0.6001.18000 6/21/2006 (Standard system devices) machine.inf Not Available PCI\VEN_1022&DEV_1200&SUBSYS_00000000&REV_00\3&267A616A&0&F0

PCI standard host CPU bridge Yes SYSTEM 6.0.6001.18000 6/21/2006 (Standard system devices) machine.inf Not Available PCI\VEN_1022&DEV_1204&SUBSYS_00000000&REV_00\3&267A616A&0&EC

PCI standard host CPU bridge Yes SYSTEM 6.0.6001.18000 6/21/2006
(Standard system devices) machine.inf Not Available
PCI\VEN_1022&DEV_1203&SUBSYS_00000000&REV_00\3&267A616A&0&EB

PCI standard host CPU bridge Yes SYSTEM 6.0.6001.18000 6/21/2006
(Standard system devices) machine.inf Not Available
PCI\VEN_1022&DEV_1202&SUBSYS_00000000&REV_00\3&267A616A&0&EA

PCI standard host CPU bridge Yes SYSTEM 6.0.6001.18000 6/21/2006
(Standard system devices) machine.inf Not Available
PCI\VEN_1022&DEV_1201&SUBSYS_00000000&REV_00\3&267A616A&0&E9

PCI standard host CPU bridge Yes SYSTEM 6.0.6001.18000 6/21/2006
(Standard system devices) machine.inf Not Available
PCI\VEN_1022&DEV_1200&SUBSYS_00000000&REV_00\3&267A616A&0&E8

PCI standard host CPU bridge Yes SYSTEM 6.0.6001.18000 6/21/2006
(Standard system devices) machine.inf Not Available
PCI\VEN_1022&DEV_1204&SUBSYS_00000000&REV_00\3&267A616A&0&E4

PCI standard host CPU bridge Yes SYSTEM 6.0.6001.18000 6/21/2006
(Standard system devices) machine.inf Not Available
PCI\VEN_1022&DEV_1203&SUBSYS_00000000&REV_00\3&267A616A&0&E3

PCI standard host CPU bridge Yes SYSTEM 6.0.6001.18000 6/21/2006
(Standard system devices) machine.inf Not Available
PCI\VEN_1022&DEV_1202&SUBSYS_00000000&REV_00\3&267A616A&0&E2

PCI standard host CPU bridge Yes SYSTEM 6.0.6001.18000 6/21/2006
(Standard system devices) machine.inf Not Available
PCI\VEN_1022&DEV_1201&SUBSYS_00000000&REV_00\3&267A616A&0&E1

PCI standard host CPU bridge Yes SYSTEM 6.0.6001.18000 6/21/2006
(Standard system devices) machine.inf Not Available
PCI\VEN_1022&DEV_1200&SUBSYS_00000000&REV_00\3&267A616A&0&E0

PCI standard host CPU bridge Yes SYSTEM 6.0.6001.18000 6/21/2006
(Standard system devices) machine.inf Not Available
PCI\VEN_1022&DEV_1204&SUBSYS_00000000&REV_00\3&267A616A&0&DC

PCI standard host CPU bridge Yes SYSTEM 6.0.6001.18000 6/21/2006
(Standard system devices) machine.inf Not Available
PCI\VEN_1022&DEV_1203&SUBSYS_00000000&REV_00\3&267A616A&0&DB

PCI standard host CPU bridge Yes SYSTEM 6.0.6001.18000 6/21/2006
(Standard system devices) machine.inf Not Available
PCI\VEN_1022&DEV_1202&SUBSYS_00000000&REV_00\3&267A616A&0&DA

PCI standard host CPU bridge Yes SYSTEM 6.0.6001.18000 6/21/2006
(Standard system devices) machine.inf Not Available
PCI\VEN_1022&DEV_1201&SUBSYS_00000000&REV_00\3&267A616A&0&D9

PCI standard host CPU bridge Yes SYSTEM 6.0.6001.18000 6/21/2006
(Standard system devices) machine.inf Not Available
PCI\VEN_1022&DEV_1200&SUBSYS_00000000&REV_00\3&267A616A&0&D8

PCI standard host CPU bridge Yes SYSTEM 6.0.6001.18000 6/21/2006
(Standard system devices) machine.inf Not Available
PCI\VEN_1022&DEV_1204&SUBSYS_00000000&REV_00\3&267A616A&0&D4

PCI standard host CPU bridge Yes SYSTEM 6.0.6001.18000 6/21/2006
(Standard system devices) machine.inf Not Available
PCI\VEN_1022&DEV_1203&SUBSYS_00000000&REV_00\3&267A616A&0&D3

PCI standard host CPU bridge Yes SYSTEM 6.0.6001.18000 6/21/2006
(Standard system devices) machine.inf Not Available
PCI\VEN_1022&DEV_1202&SUBSYS_00000000&REV_00\3&267A616A&0&D2

PCI standard host CPU bridge Yes SYSTEM 6.0.6001.18000 6/21/2006
(Standard system devices) machine.inf Not Available
PCI\VEN_1022&DEV_1201&SUBSYS_00000000&REV_00\3&267A616A&0&D1

PCI standard host CPU bridge Yes SYSTEM 6.0.6001.18000 6/21/2006
(Standard system devices) machine.inf Not Available
PCI\VEN_1022&DEV_1200&SUBSYS_00000000&REV_00\3&267A616A&0&D0

PCI standard host CPU bridge Yes SYSTEM 6.0.6001.18000 6/21/2006
(Standard system devices) machine.inf Not Available
PCI\VEN_1022&DEV_1204&SUBSYS_00000000&REV_00\3&267A616A&0&CC

PCI standard host CPU bridge Yes SYSTEM 6.0.6001.18000 6/21/2006
(Standard system devices) machine.inf Not Available
PCI\VEN_1022&DEV_1203&SUBSYS_00000000&REV_00\3&267A616A&0&CB

PCI standard host CPU bridge Yes SYSTEM 6.0.6001.18000 6/21/2006
(Standard system devices) machine.inf Not Available
PCI\VEN_1022&DEV_1202&SUBSYS_00000000&REV_00\3&267A616A&0&CA

PCI standard host CPU bridge Yes SYSTEM 6.0.6001.18000 6/21/2006
(Standard system devices) machine.inf Not Available
PCI\VEN_1022&DEV_1201&SUBSYS_00000000&REV_00\3&267A616A&0&C9

PCI standard host CPU bridge Yes SYSTEM 6.0.6001.18000 6/21/2006
(Standard system devices) machine.inf Not Available
PCI\VEN_1022&DEV_1200&SUBSYS_00000000&REV_00\3&267A616A&0&C8

PCI standard host CPU bridge Yes SYSTEM 6.0.6001.18000 6/21/2006
(Standard system devices) machine.inf Not Available
PCI\VEN_1022&DEV_1204&SUBSYS_00000000&REV_00\3&267A616A&0&C4

PCI standard host CPU bridge Yes SYSTEM 6.0.6001.18000 6/21/2006
(Standard system devices) machine.inf Not Available
PCI\VEN_1022&DEV_1203&SUBSYS_00000000&REV_00\3&267A616A&0&C3

PCI standard host CPU bridge Yes SYSTEM 6.0.6001.18000 6/21/2006
(Standard system devices) machine.inf Not Available
PCI\VEN_1022&DEV_1202&SUBSYS_00000000&REV_00\3&267A616A&0&C2

PCI standard host CPU bridge Yes SYSTEM 6.0.6001.18000 6/21/2006
(Standard system devices) machine.inf Not Available
PCI\VEN_1022&DEV_1201&SUBSYS_00000000&REV_00\3&267A616A&0&C1

PCI standard host CPU bridge Yes SYSTEM 6.0.6001.18000 6/21/2006
(Standard system devices) machine.inf Not Available
PCI\VEN_1022&DEV_1200&SUBSYS_00000000&REV_00\3&267A616A&0&C0

AMD-8132 HyperTransport(tm) IOAPIC Controller Yes SYSTEM 6.0.6001.18000
6/21/2006 AMD machine.inf Not Available
PCI\VEN_1022&DEV_7459&SUBSYS_74591022&REV_12\3&267A616A&0&89

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST973451SSUN72G\5&2FF27C4&0&000300

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST973451SSUN72G\5&2FF27C4&0&000200

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST973451SSUN72G\5&2FF27C4&0&000000

LSI Adapter, SAS 3000 series, 4-port with 1064 Yes SCSIADAPTER 1.25.6.22
6/29/2007 LSI Logic lsi_sas.inf Not Available
PCI\VEN_1000&DEV_0050&SUBSYS_30601000&REV_02\4&2EB37306&0&2088

LSI Adapter, SAS 3000 series, 8-port with 1068 -StorPort Yes SCSIADAPTER 1.28.3.0 6/3/2008
LSI Corporation oem1.inf Not Available
PCI\VEN_1000&DEV_0054&SUBSYS_31601000&REV_01\4&2EB37306&0&1088

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SUN&PROD_UNIVERSAL_XPORT\5&2B2EAF49&0&00001F

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SUN&PROD_LCSM100_F\5&2B2EAF49&0&000000

Emulex LightPulse HBA - Storport Miniport Driver Yes SCSIADAPTER 7.2.1.4 2/7/2008
Emulex oem4.inf Not Available
PCI\VEN_10DF&DEV_FC10&SUBSYS_FC1210DF&REV_01\4&2EB37306&0&0988

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SUN&PROD_UNIVERSAL_XPORT\5&82D0CEC&0&00001F

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SUN&PROD_LCSM100_F\5&82D0CEC&0&000000

Emulex LightPulse HBA - Storport Miniport Driver Yes SCSIADAPTER 7.2.1.4 2/7/2008
Emulex oem4.inf Not Available
PCI\VEN_10DF&DEV_FC10&SUBSYS_FC1210DF&REV_01\4&2EB37306&0&0888

PCI standard PCI-to-PCI bridge Yes SYSTEM 6.0.6001.18000 6/21/2006
(Standard system devices) machine.inf Not Available
PCI\VEN_1022&DEV_7458&SUBSYS_00000000&REV_12\3&267A616A&0&88

AMD-8132 HyperTransport(tm) IOAPIC Controller Yes SYSTEM 6.0.6001.18000 6/21/2006 AMD machine.inf Not Available
PCI\VEN_1022&DEV_7459&SUBSYS_74591022&REV_12\3&267A616A&0&81

Intel(R) PRO/1000 MT Dual Port Server Adapter Yes NET 8.3.2.8 6/21/2006 Intel nete1g3e.inf Not Available
PCI\VEN_8086&DEV_1010&SUBSYS_10118086&REV_03\4&1BC235&0&1180

Intel(R) PRO/1000 MT Dual Port Server Adapter Yes NET 8.3.2.8 6/21/2006 Intel nete1g3e.inf Not Available
PCI\VEN_8086&DEV_1010&SUBSYS_10118086&REV_03\4&1BC235&0&1080

Intel(R) PRO/1000 MT Dual Port Server Adapter Yes NET 8.3.2.8 6/21/2006 Intel nete1g3e.inf Not Available
PCI\VEN_8086&DEV_1010&SUBSYS_10118086&REV_03\4&1BC235&0&0980

Intel(R) PRO/1000 MT Dual Port Server Adapter Yes NET 8.3.2.8 6/21/2006 Intel nete1g3e.inf Not Available
PCI\VEN_8086&DEV_1010&SUBSYS_10118086&REV_03\4&1BC235&0&0880

PCI standard PCI-to-PCI bridge Yes SYSTEM 6.0.6001.18000 6/21/2006 (Standard system devices) machine.inf Not Available
PCI\VEN_1022&DEV_7458&SUBSYS_00000000&REV_12\3&267A616A&0&80

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives) disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&2BFC78FF&0&006800

Generic SCSI Enclosure Device Yes SYSTEM 6.0.6001.18000 6/21/2006 Microsoft scsidev.inf Not Available
SCSI\ENCLOSURE&VEN_SUN&PROD_STORAGE_J4200\5&2BFC78FF&0&004D00

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives) disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&2BFC78FF&0&004C00

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives) disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&2BFC78FF&0&004B00

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives) disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&2BFC78FF&0&004A00

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives) disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&2BFC78FF&0&004900

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives) disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&2BFC78FF&0&004800

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives) disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&2BFC78FF&0&004700

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&2BFC78FF&0&004600

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&2BFC78FF&0&004500

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&2BFC78FF&0&004400

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&2BFC78FF&0&004300

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&2BFC78FF&0&004200

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&2BFC78FF&0&004100

Generic SCSI Enclosure Device Yes SYSTEM 6.0.6001.18000 6/21/2006
Microsoft scsidev.inf Not Available
SCSI\ENCLOSURE&VEN_SUN&PROD_STORAGE_J4200\5&2BFC78FF&0&004000

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&2BFC78FF&0&003E00

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&2BFC78FF&0&003C00

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&2BFC78FF&0&003B00

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&2BFC78FF&0&003A00

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&2BFC78FF&0&003900

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&2BFC78FF&0&003800

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&2BFC78FF&0&003700

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&2BFC78FF&0&003600

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&2BFC78FF&0&003500

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&2BFC78FF&0&003400

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&2BFC78FF&0&002F00

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&2BFC78FF&0&002B00

Generic SCSI Enclosure Device Yes SYSTEM 6.0.6001.18000 6/21/2006
Microsoft scsidev.inf Not Available
SCSI\ENCLOSURE&VEN_SUN&PROD_STORAGE_J4200\5&2BFC78FF&0&002600

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&2BFC78FF&0&002500

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&2BFC78FF&0&002400

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&2BFC78FF&0&002200

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&2BFC78FF&0&002100

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&2BFC78FF&0&002000

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&2BFC78FF&0&001F00

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&2BFC78FF&0&001E00

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&2BFC78FF&0&001D00

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&2BFC78FF&0&001C00

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&2BFC78FF&0&001B00

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&2BFC78FF&0&001A00

LSI Adapter, SAS 3000 series, 8-port with 1068E -StorPort Yes SCSIADAPTER 1.28.3.0 6/3/2008
LSI Corporation oem1.inf Not Available
PCI\VEN_1000&DEV_0058&SUBSYS_31501000&REV_08\4&5F83F54&0&0070

PCI Express standard Root Port Yes SYSTEM 6.0.6001.18000 6/21/2006
(Standard system devices) machine.inf Not Available
PCI\VEN_10DE&DEV_005D&SUBSYS_00000000&REV_A3\3&267A616A&0&70

Generic SCSI Enclosure Device Yes SYSTEM 6.0.6001.18000 6/21/2006
Microsoft scsidev.inf Not Available
SCSI\ENCLOSURE&VEN_SUN&PROD_STORAGE_J4200\5&29A325E&0&001900

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&29A325E&0&001800

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&29A325E&0&001700

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&29A325E&0&001600

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&29A325E&0&001500

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&29A325E&0&001400

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&29A325E&0&001300

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&29A325E&0&001200

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&29A325E&0&001100

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&29A325E&0&001000

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&29A325E&0&000F00

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&29A325E&0&000E00

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&29A325E&0&000D00

Generic SCSI Enclosure Device Yes SYSTEM 6.0.6001.18000 6/21/2006
Microsoft scsidev.inf Not Available
SCSI\ENCLOSURE&VEN_SUN&PROD_STORAGE_J4200\5&29A325E&0&000C00

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&29A325E&0&000B00

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&29A325E&0&000A00

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&29A325E&0&000900

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&29A325E&0&000800

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&29A325E&0&000700

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&29A325E&0&000600

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&29A325E&0&000500

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&29A325E&0&000400

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&29A325E&0&000300

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&29A325E&0&000200

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&29A325E&0&000100

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&29A325E&0&000000

LSI Adapter, SAS 3000 series, 8-port with 1068E -StorPort Yes SCSIADAPTER 1.28.3.0 6/3/2008
LSI Corporation oem1.inf Not Available
PCI\VEN_1000&DEV_0058&SUBSYS_31501000&REV_08\4&22B12808&0&0068

PCI Express standard Root Port Yes SYSTEM 6.0.6001.18000 6/21/2006
(Standard system devices) machine.inf Not Available
PCI\VEN_10DE&DEV_005D&SUBSYS_00000000&REV_F3\3&267A616A&0&68

Generic SCSI Enclosure Device Yes SYSTEM 6.0.6001.18000 6/21/2006
Microsoft scsidev.inf Not Available
SCSI\ENCLOSURE&VEN_SUN&PROD_STORAGE_J4200\5&5DFB45C&0&003300

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&5DFB45C&0&003200

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&5DFB45C&0&003100

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&5DFB45C&0&003000

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&5DFB45C&0&002F00

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&5DFB45C&0&002E00

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&5DFB45C&0&002D00

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&5DFB45C&0&002C00

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&5DFB45C&0&002B00

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&5DFB45C&0&002A00

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&5DFB45C&0&002900

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&5DFB45C&0&002800

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&5DFB45C&0&002700

Generic SCSI Enclosure Device Yes SYSTEM 6.0.6001.18000 6/21/2006
Microsoft scsidev.inf Not Available
SCSI\ENCLOSURE&VEN_SUN&PROD_STORAGE_J4200\5&5DFB45C&0&002600

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&5DFB45C&0&002500

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&5DFB45C&0&002400

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&5DFB45C&0&002300

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&5DFB45C&0&002200

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&5DFB45C&0&002100

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&5DFB45C&0&002000

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&5DFB45C&0&001F00

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&5DFB45C&0&001D00

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&5DFB45C&0&001C00

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&5DFB45C&0&001B00

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&5DFB45C&0&001A00

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006 (Standard disk drives)
disk.inf Not Available
SCSI\DISK&VEN_SEAGATE&PROD_ST314655SSUN146G\5&5DFB45C&0&000000

LSI Adapter, SAS 3000 series, 8-port with 1068E -StorPort Yes SCSIADAPTER 1.28.3.0 6/3/2008
LSI Corporation oem1.inf Not Available
PCI\VEN_1000&DEV_0058&SUBSYS_31501000&REV_08\4&BE688C9&0&0060

PCI Express standard Root Port Yes SYSTEM 6.0.6001.18000 6/21/2006
(Standard system devices) machine.inf Not Available
PCI\VEN_10DE&DEV_005D&SUBSYS_00000000&REV_F3\3&267A616A&0&60

Generic PnP Monitor Yes MONITOR 6.0.6001.18000 6/21/2006 (Standard
monitor types) monitor.inf Not Available
DISPLAY\SUN0587\5&82D318D&0&12345678&01&06

Standard VGA Graphics Adapter Yes DISPLAY 6.0.6001.18000 6/21/2006
(Standard display types) display.inf Not Available
PCI\VEN_1002&DEV_4752&SUBSYS_4732108E&REV_27\4&33FEE7F9&0&3048

PCI standard PCI-to-PCI bridge Yes SYSTEM 6.0.6001.18000 6/21/2006
(Standard system devices) machine.inf Not Available
PCI\VEN_10DE&DEV_005C&SUBSYS_00000000&REV_F2\3&267A616A&0&48

IDE Channel Yes HDC 6.0.6001.18000 6/21/2006 (Standard IDE ATA/ATAPI
controllers) mshdc.inf Not Available PCIIDE\IDECHANNEL\4&113AB1F1&0&1

CD-ROM Drive Yes CDROM 6.0.6001.18000 6/21/2006 (Standard CD-ROM
drives) cdrom.inf Not Available IDE\CDROMTEAC_DV-
28SL_____1.0A____\5&4F316C2&0&0.0.0

IDE Channel Yes HDC 6.0.6001.18000 6/21/2006 (Standard IDE ATA/ATAPI
controllers) mshdc.inf Not Available PCIIDE\IDECHANNEL\4&113AB1F1&0&0

Standard Dual Channel PCI IDE Controller Yes HDC 6.0.6001.18000 6/21/2006
(Standard IDE ATA/ATAPI controllers) mshdc.inf Not Available
PCI\VEN_10DE&DEV_0053&SUBSYS_CB8410DE&REV_F3\3&267A616A&0&30

HID Keyboard Device Yes KEYBOARD 6.0.6001.18000 6/21/2006 (Standard
keyboards) keyboard.inf Not Available
HID\VID_0430&PID_0005\7&2D545DCC&0&0000

USB Human Interface Device Yes HIDCLASS 6.0.6001.18000 6/21/2006
(Standard system devices) input.inf Not Available
USB\VID_0430&PID_0005\6&1217A9&0&2

Generic USB Hub Yes USB 6.0.6001.18000 6/21/2006 (Generic USB Hub)
usb.inf Not Available USB\VID_04B4&PID_6560\5&E4C4883&0&6

USB Root Hub Yes USB 6.0.6001.18000 6/21/2006 (Standard USB Host Controller)
usbport.inf Not Available USB\ROOT_HUB20\4&EF06856&0

Standard Enhanced PCI to USB Host Controller Yes USB 6.0.6001.18000 6/21/2006
(Standard USB Host Controller) usbport.inf Not Available
PCI\VEN_10DE&DEV_005B&SUBSYS_CB84108E&REV_A4\3&267A616A&0&11

HID-compliant mouse Yes MOUSE 6.0.6001.18000 6/21/2006 Microsoft
msmouse.inf Not Available HID\VID_046B&PID_FF10&MI_01\7&669D034&0&0000

USB Human Interface Device Yes HIDCLASS 6.0.6001.18000 6/21/2006
(Standard system devices) input.inf Not Available
USB\VID_046B&PID_FF10&MI_01\6&296F595A&0&0001

HID Keyboard Device Yes KEYBOARD 6.0.6001.18000 6/21/2006 (Standard
keyboards) keyboard.inf Not Available
HID\VID_046B&PID_FF10&MI_00\7&1E2D5C79&0&0000

USB Human Interface Device Yes HIDCLASS 6.0.6001.18000 6/21/2006
(Standard system devices) input.inf Not Available
USB\VID_046B&PID_FF10&MI_00\6&296F595A&0&0000

USB Composite Device Yes USB 6.0.6001.18000 6/21/2006 (Standard USB Host
Controller) usb.inf Not Available USB\VID_046B&PID_FF10\5&337C4EEC&0&3

USB Root Hub Yes USB 6.0.6001.18000 6/21/2006 (Standard USB Host Controller)
usbport.inf Not Available USB\ROOT_HUB\4&34026DF3&0

Standard OpenHCD USB Host Controller Yes USB 6.0.6001.18000 6/21/2006
(Standard USB Host Controller) usbport.inf Not Available
PCI\VEN_10DE&DEV_005A&SUBSYS_CB84108E&REV_A2\3&267A616A&0&10

NVIDIA nForce PCI System Management Yes SYSTEM 6.0.6001.18000 6/21/2006
NVIDIA machine.inf Not Available
PCI\VEN_10DE&DEV_0052&SUBSYS_CB8410DE&REV_A2\3&267A616A&0&09

Motherboard resources Yes SYSTEM 6.0.6001.18000 6/21/2006 (Standard system
devices) machine.inf Not Available ACPI\PNP0C02\2E

Motherboard resources Yes SYSTEM 6.0.6001.18000 6/21/2006 (Standard system
devices) machine.inf Not Available ACPI\PNP0C02\0

Microsoft Generic IPMI Compliant Device Yes SYSTEM 6.0.6001.18000 6/21/2006
Microsoft ipmidrv.inf Not Available ACPI\IPI0001\0

High precision event timer Yes SYSTEM 6.0.6001.18000 6/21/2006
(Standard system devices) machine.inf Not Available ACPI\PNP0103\80

High precision event timer Yes SYSTEM 6.0.6001.18000 6/21/2006
(Standard system devices) machine.inf Not Available ACPI\PNP0103\0

Motherboard resources Yes SYSTEM 6.0.6001.18000 6/21/2006 (Standard system devices) machine.inf Not Available ACPI\PNP0C02\10

Numeric data processor Yes SYSTEM 6.0.6001.18000 6/21/2006 (Standard system devices) machine.inf Not Available ACPI\PNP0C04\4&22644519&0

System speaker Yes SYSTEM 6.0.6001.18000 6/21/2006 (Standard system devices) machine.inf Not Available ACPI\PNP0800\4&22644519&0

System CMOS/real time clock Yes SYSTEM 6.0.6001.18000 6/21/2006 (Standard system devices) machine.inf Not Available ACPI\PNP0B00\4&22644519&0

System timer Yes SYSTEM 6.0.6001.18000 6/21/2006 (Standard system devices) machine.inf Not Available ACPI\PNP0100\4&22644519&0

Direct memory access controller Yes SYSTEM 6.0.6001.18000 6/21/2006 (Standard system devices) machine.inf Not Available ACPI\PNP0200\4&22644519&0

Programmable interrupt controller Yes SYSTEM 6.0.6001.18000 6/21/2006 (Standard system devices) machine.inf Not Available ACPI\PNP0000\4&22644519&0

PCI standard ISA bridge Yes SYSTEM 6.0.6001.18000 6/21/2006 (Standard system devices) machine.inf Not Available PCI\VEN_10DE&DEV_0051&SUBSYS_CB8410DE&REV_F1\3&267A616A&0&08

NVIDIA nForce4 HyperTransport Bridge Yes SYSTEM 6.0.6001.18000 6/21/2006 NVIDIA machine.inf Not Available PCI\VEN_10DE&DEV_005E&SUBSYS_00000000&REV_A4\3&267A616A&0&00

PCI bus Yes SYSTEM 6.0.6001.18000 6/21/2006 (Standard system devices) machine.inf Not Available ACPI\PNP0A03\0

Microsoft ACPI-Compliant System Yes SYSTEM 6.0.6001.18000 6/21/2006 Microsoft acpi.inf Not Available ACPI_HAL\PNP0C08\0

ACPI x64-based PC Yes COMPUTER 6.0.6001.18000 6/21/2006 (Standard computers) hal.inf Not Available ROOT\ACPI_HAL\0000

Microsoft Tun Miniport Adapter Yes NET 6.0.6001.18000 6/21/2006 Microsoft nettun.inf Not Available ROOT*TUNMP\0000

Microsoft ISATAP Adapter Yes NET 6.0.6001.18000 6/21/2006 Microsoft nettun.inf Not Available ROOT*ISATAP\0003

Microsoft ISATAP Adapter Yes NET 6.0.6001.18000 6/21/2006 Microsoft nettun.inf Not Available ROOT*ISATAP\0002

Microsoft ISATAP Adapter Yes NET 6.0.6001.18000 6/21/2006 Microsoft nettun.inf Not Available ROOT*ISATAP\0001

Microsoft ISATAP Adapter Yes NET 6.0.6001.18000 6/21/2006 Microsoft nettun.inf Not Available ROOT*ISATAP\0000

Not Available Not Available Not Available Not Available Not Available Not Available Not Available Not Available HTREE\ROOT\0

Not Available Yes Not Available 2:6.0 Not Available Not Available Not Available
Not Available Microsoft XPS Document Writer

[Environment Variables]

Variable Value User Name

ComSpec %SystemRoot%\system32\cmd.exe <SYSTEM>

FP_NO_HOST_CHECK NO <SYSTEM>

NUMBER_OF_PROCESSORS 32 <SYSTEM>

OS Windows_NT <SYSTEM>

Path C:\Program Files (x86)\Windows Resource Kits\Tools\;%SystemRoot%\system32;%SystemRoot%;%SystemRoot%\System32\Wbem;C:\Program Files (x86)\Microsoft SQL Server\100\Tools\Binn\;C:\Program Files\Microsoft SQL Server\100\Tools\Binn\;C:\Program Files\Microsoft SQL Server\100\DTS\Binn\;C:\Program Files (x86)\Microsoft SQL Server\100\Tools\Binn\VSShell\Common7\IDE\;C:\Program Files (x86)\Microsoft SQL Server\100\DTS\Binn\;%SYSTEMROOT%\System32\WindowsPowerShell\v1.0\;C:\Program Files (x86)\Java\jre6\bin;C:\sun\xperf\;c:\Program Files\Java\jdk1.6.0_12\bin;\Program Files\Microsoft SQL Server\MSSQL10.MSSQLSERVER\MSSQL\BINN <SYSTEM>

PATHEXT .COM;.EXE;.BAT;.CMD;.VBS;.VBE;.JS;.JSE;.WSF;.WSH;.MSC <SYSTEM>

PROCESSOR_ARCHITECTURE AMD64 <SYSTEM>

PROCESSOR_IDENTIFIER AMD64 Family 16 Model 4 Stepping 2, AuthenticAMD <SYSTEM>

PROCESSOR_LEVEL 16 <SYSTEM>

PROCESSOR_REVISION 0402 <SYSTEM>

TEMP %SystemRoot%\TEMP <SYSTEM>

TMP %SystemRoot%\TEMP <SYSTEM>

USERNAME SYSTEM <SYSTEM>

windir %SystemRoot% <SYSTEM>

TEMP %USERPROFILE%\AppData\Local\Temp NT AUTHORITY\SYSTEM

TMP %USERPROFILE%\AppData\Local\Temp NT AUTHORITY\SYSTEM

TEMP %USERPROFILE%\AppData\Local\Temp NT AUTHORITY\LOCAL SERVICE

TMP %USERPROFILE%\AppData\Local\Temp NT AUTHORITY\LOCAL SERVICE

TEMP %USERPROFILE%\AppData\Local\Temp NT AUTHORITY\NETWORK SERVICE

TMP %USERPROFILE%\AppData\Local\Temp NT AUTHORITY\NETWORK SERVICE

TEMP %USERPROFILE%\AppData\Local\Temp WIN-3Q8F83BVFVF\Administrator

TMP %USERPROFILE%\AppData\Local\Temp WIN-3Q8F83BVFVF\Administrator

[Print Jobs]

Document Size Owner Notify Status Time Submitted Start Time Until Time
Elapsed Time Pages Printed Job ID Priority Parameters Driver Print Processor
Host Print Queue Data Type Name

[Network Connections]

Local Name Remote Name Type Status User Name

y: \\129.148.93.100\wgsperf Disk Persistent Connection 129.148.93.100\sr158094

[Running Tasks]

Name Path Process ID Priority Min Working Set Max Working Set Start Time
Version Size File Date

system idle process Not Available 0 0 Not Available Not Available Not Available Not Available Not Available Not Available

system Not Available 4 8 Not Available Not Available 7/1/2009 1:19 PM
Not Available Not Available Not Available

smss.exe Not Available 596 11 200 1380 7/1/2009 1:19 PM Not Available Not Available Not Available

csrss.exe c:\windows\system32\csrss.exe 664 13 200 1380 7/1/2009 1:20 PM 6.0.6001.18000 7.50 KB (7,680 bytes) 1/18/2008 9:59 PM

wininit.exe c:\windows\system32\wininit.exe 708 13 200 1380 7/1/2009 1:20 PM 6.0.6001.18000 121.00 KB (123,904 bytes) 1/18/2008 10:17 PM

csrss.exe c:\windows\system32\csrss.exe 720 13 200 1380 7/1/2009 1:20 PM 6.0.6001.18000 7.50 KB (7,680 bytes) 1/18/2008 9:59 PM

services.exe c:\windows\system32\services.exe 752 9 200 1380 7/1/2009 1:20

PM 6.0.6001.18000 375.50 KB (384,512 bytes) 1/18/2008 10:03 PM

lsass.exe c:\windows\system32\lsass.exe 764 9 200 1380 7/1/2009 1:20 PM 6.0.6001.18000 11.00 KB (11,264 bytes) 1/18/2008 10:16 PM

lsm.exe c:\windows\system32\lsm.exe 772 8 200 1380 7/1/2009 1:20 PM 6.0.6001.18000 258.50 KB (264,704 bytes) 1/18/2008 10:43 PM

winlogon.exe c:\windows\system32\winlogon.exe 808 13 200 1380 7/1/2009 1:20 PM 6.0.6001.18000 396.50 KB (406,016 bytes) 1/18/2008 10:18 PM

svchost.exe c:\windows\system32\svchost.exe 968 8 200 1380 7/1/2009 1:20 PM 6.0.6001.18000 27.00 KB (27,648 bytes) 1/18/2008 10:02 PM

svchost.exe c:\windows\system32\svchost.exe 412 8 200 1380 7/1/2009 1:20 PM 6.0.6001.18000 27.00 KB (27,648 bytes) 1/18/2008 10:02 PM

svchost.exe c:\windows\system32\svchost.exe 608 8 200 1380 7/1/2009 1:20 PM 6.0.6001.18000 27.00 KB (27,648 bytes) 1/18/2008 10:02 PM

svchost.exe c:\windows\system32\svchost.exe 724 8 200 1380 7/1/2009 1:20 PM 6.0.6001.18000 27.00 KB (27,648 bytes) 1/18/2008 10:02 PM

svchost.exe c:\windows\system32\svchost.exe 744 8 200 1380 7/1/2009 1:20 PM 6.0.6001.18000 27.00 KB (27,648 bytes) 1/18/2008 10:02 PM

slsvc.exe c:\windows\system32\slsvc.exe 960 8 200 1380 7/1/2009 1:20 PM 6.0.6001.18000 2.06 MB (2,161,664 bytes) 1/18/2008 11:33 PM

svchost.exe c:\windows\system32\svchost.exe 1028 8 200 1380 7/1/2009 1:20 PM 6.0.6001.18000 27.00 KB (27,648 bytes) 1/18/2008 10:02 PM

svchost.exe c:\windows\system32\svchost.exe 1104 8 200 1380 7/1/2009 1:20 PM 6.0.6001.18000 27.00 KB (27,648 bytes) 1/18/2008 10:02 PM

svchost.exe c:\windows\system32\svchost.exe 1132 8 200 1380 7/1/2009 1:20 PM 6.0.6001.18000 27.00 KB (27,648 bytes) 1/18/2008 10:02 PM

svchost.exe c:\windows\system32\svchost.exe 1264 8 200 1380 7/1/2009 1:20 PM 6.0.6001.18000 27.00 KB (27,648 bytes) 1/18/2008 10:02 PM

spoolsv.exe c:\windows\system32\spoolsv.exe 1808 8 200 1380 7/1/2009 1:20 PM 6.0.6001.18000 261.00 KB (267,264 bytes) 1/18/2008 11:11 PM

rmserver.exe c:\program files (x86)\emulex\util\common\rmserver.exe 1952 8 200 1380 7/1/2009 1:20 PM 31.1.1.9 780.00 KB (798,720 bytes) 4/1/2009 1:58 PM

hbahsmgr.exe c:\program files (x86)\emulex\util\common\hbahsmgr.exe 1984 8 200 1380 7/1/2009 1:20 PM 31.1.1.9 444.00 KB (454,656 bytes) 4/1/2009 1:58 PM

svchost.exe c:\windows\system32\svchost.exe 1096 8 200 1380 7/1/2009 1:20 PM 6.0.6001.18000 27.00 KB (27,648 bytes) 1/18/2008 10:02 PM

svchost.exe c:\windows\system32\svchost.exe 1148 8 200 1380 7/1/2009 1:20

PM 6.0.6001.18000 27.00 KB (27,648 bytes) 1/18/2008 10:02 PM

storserv.exe c:\program files\sun\sun storagetek raid manager\storserv.exe 1276 8 200 1380 7/1/2009 1:20 PM 5.50.0.0 116.50 KB (119,296 bytes) 6/20/2008 7:21 AM

svchost.exe c:\windows\system32\svchost.exe 2084 8 200 1380 7/1/2009 1:20 PM 6.0.6001.18000 27.00 KB (27,648 bytes) 1/18/2008 10:02 PM

taskeng.exe c:\windows\system32\taskeng.exe 3420 6 200 1380 7/1/2009 1:21 PM 6.0.6001.18000 259.00 KB (265,216 bytes) 1/18/2008 10:13 PM

dwm.exe c:\windows\system32\dwm.exe 3740 8 200 1380 7/1/2009 1:23 PM 6.0.6001.18000 96.50 KB (98,816 bytes) 1/18/2008 10:10 PM

taskeng.exe c:\windows\system32\taskeng.exe 3760 8 200 1380 7/1/2009 1:23 PM 6.0.6001.18000 259.00 KB (265,216 bytes) 1/18/2008 10:13 PM

explorer.exe c:\windows\explorer.exe 3824 8 200 1380 7/1/2009 1:23 PM 6.0.6001.18000 2.94 MB (3,080,704 bytes) 1/18/2008 10:22 PM

msdtc.exe c:\windows\system32\msdtc.exe 3888 8 200 1380 7/1/2009 1:23 PM 2001.12.6931.18000 104.00 KB (106,496 bytes) 1/18/2008 10:27 PM

jusched.exe c:\program files (x86)\java\jre6\bin\jusched.exe 916 8 200 1380 7/1/2009 1:23 PM 6.0.110.3 133.40 KB (136,600 bytes) 12/10/2008 5:51 PM

mmc.exe c:\windows\system32\mmc.exe 1036 8 200 1380 7/1/2009 1:23 PM 6.0.6001.18000 2.59 MB (2,715,136 bytes) 1/18/2008 10:14 PM

vds.exe c:\windows\system32\vds.exe 3492 8 200 1380 7/1/2009 1:24 PM 6.0.6001.18000 442.50 KB (453,120 bytes) 1/18/2008 10:29 PM

cmd.exe c:\windows\system32\cmd.exe 3956 8 200 1380 7/1/2009 1:24 PM 6.0.6001.18000 354.50 KB (363,008 bytes) 1/18/2008 10:05 PM

wuauclt.exe c:\windows\system32\wuauclt.exe 1292 8 200 1380 7/1/2009 1:24 PM 7.0.6001.18000 44.50 KB (45,568 bytes) 1/18/2008 11:09 PM

jucheck.exe c:\program files (x86)\java\jre6\bin\jucheck.exe 4104 8 200 1380 7/1/2009 1:28 PM 6.0.110.3 373.42 KB (382,384 bytes) 12/10/2008 5:51 PM

svchost.exe c:\windows\system32\svchost.exe 4136 8 200 1380 7/1/2009 1:28 PM 6.0.6001.18000 27.00 KB (27,648 bytes) 1/18/2008 10:02 PM

sqlservr.exe c:\program files\microsoft sql server\mssql10.mssqlserver\mssql\binn\sqlservr.exe 4740 8 200 1380 7/1/2009 2:02 PM 2007.100.1600.17 55.24 MB (57,922,048 bytes) 7/4/2008 6:39 AM

cmd.exe c:\windows\system32\cmd.exe 4800 8 200 1380 7/1/2009 2:06 PM 6.0.6001.18000 354.50 KB (363,008 bytes) 1/18/2008 10:05 PM

stepmaster.exe c:\program files (x86)\stepmaster\stepmaster.exe 4972 8 200 1380 7/1/2009 2:06 PM 2.7.0.1004 960.00 KB (983,040 bytes) 7/30/2008 1:23

PM

trustedinstaller.exe c:\windows\servicing\trustedinstaller.exe 7976 8 200 1380 7/1/2009 2:26 PM 6.0.6001.18000 41.50 KB (42,496 bytes) 1/18/2008 10:06 PM

msinfo32.exe c:\windows\system32\msinfo32.exe 8056 8 200 1380 7/1/2009 2:26 PM 6.0.6001.18000 477.50 KB (488,960 bytes) 1/18/2008 10:03 PM

wmiprvse.exe c:\windows\system32\wbem\wmiprvse.exe 8084 8 200 1380 7/1/2009 2:26 PM 6.0.6001.18000 340.50 KB (348,672 bytes) 1/18/2008 10:13 PM

wmiprvse.exe c:\windows\system32\wbem\wmiprvse.exe 8160 8 200 1380 7/1/2009 2:26 PM 6.0.6001.18000 340.50 KB (348,672 bytes) 1/18/2008 10:13 PM

[Loaded Modules]

Name Version Size File Date Manufacturer Path

csrss 6.0.6001.18000 7.50 KB (7,680 bytes) 1/18/2008 9:59 PM Microsoft Corporation c:\windows\system32\csrss.exe

ntdll 6.0.6001.18000 1.49 MB (1,559,696 bytes) 1/19/2008 1:50 AM Microsoft Corporation c:\windows\system32\ntdll.dll

csrsrv 6.0.6001.18000 83.50 KB (85,504 bytes) 1/18/2008 9:59 PM Microsoft Corporation c:\windows\system32\csrsrv.dll

basesrv 6.0.6001.18000 78.50 KB (80,384 bytes) 1/18/2008 9:59 PM Microsoft Corporation c:\windows\system32\basesrv.dll

winsrv 6.0.6001.18000 439.50 KB (450,048 bytes) 1/18/2008 10:08 PM Microsoft Corporation c:\windows\system32\winsrv.dll

user32 6.0.6001.18000 801.00 KB (820,224 bytes) 1/18/2008 10:08 PM Microsoft Corporation c:\windows\system32\user32.dll

kernel32 6.0.6001.18000 1.16 MB (1,213,952 bytes) 1/18/2008 10:01 PM Microsoft Corporation c:\windows\system32\kernel32.dll

gdi32 6.0.6001.18000 379.00 KB (388,096 bytes) 1/18/2008 10:08 PM Microsoft Corporation c:\windows\system32\gdi32.dll

advapi32 6.0.6001.18000 1.01 MB (1,062,400 bytes) 1/18/2008 11:13 PM Microsoft Corporation c:\windows\system32\advapi32.dll

rpcrt4 6.0.6001.18000 1.22 MB (1,281,024 bytes) 1/18/2008 10:28 PM Microsoft Corporation c:\windows\system32\rpcrt4.dll

lpk 6.0.6001.18000 32.00 KB (32,768 bytes) 1/18/2008 10:08 PM Microsoft Corporation c:\windows\system32\lpk.dll

usp10 1.626.6001.18000 607.50 KB (622,080 bytes) 1/18/2008 10:08 PM Microsoft Corporation c:\windows\system32\usp10.dll

msvcrt 7.0.6001.18000 606.50 KB (621,056 bytes) 1/18/2008 9:52 PM Microsoft Corporation c:\windows\system32\msvcrt.dll

sxs 6.0.6001.18000 560.50 KB (573,952 bytes) 1/18/2008 10:00 PM Microsoft Corporation c:\windows\system32\sxs.dll

wininit 6.0.6001.18000 121.00 KB (123,904 bytes) 1/18/2008 10:17 PM Microsoft Corporation c:\windows\system32\wininit.exe

userenv 6.0.6001.18000 134.00 KB (137,216 bytes) 1/18/2008 10:16 PM Microsoft Corporation c:\windows\system32\userenv.dll

secur32 6.0.6001.18000 92.00 KB (94,208 bytes) 1/18/2008 10:16 PM Microsoft Corporation c:\windows\system32\secur32.dll

imm32 6.0.6001.18000 160.00 KB (163,840 bytes) 1/18/2008 10:07 PM Microsoft Corporation c:\windows\system32\imm32.dll

msctf 6.0.6001.18000 1,016.00 KB (1,040,384 bytes) 1/18/2008 10:09 PM Microsoft Corporation c:\windows\system32\msctf.dll

apphelp 6.0.6001.18000 195.50 KB (200,192 bytes) 1/18/2008 9:52 PM Microsoft Corporation c:\windows\system32\apphelp.dll

ws2_32 6.0.6001.18000 259.00 KB (265,216 bytes) 1/18/2008 10:38 PM Microsoft Corporation c:\windows\system32\ws2_32.dll

nsi 6.0.6001.18000 11.00 KB (11,264 bytes) 1/18/2008 10:36 PM Microsoft Corporation c:\windows\system32\nsi.dll

mswsock 6.0.6001.18000 297.00 KB (304,128 bytes) 1/18/2008 10:38 PM Microsoft Corporation c:\windows\system32\mswsock.dll

wshtcpip 6.0.6001.18000 12.50 KB (12,800 bytes) 1/18/2008 10:36 PM Microsoft Corporation c:\windows\system32\wshtcpip.dll

wship6 6.0.6001.18000 11.00 KB (11,264 bytes) 1/18/2008 10:36 PM Microsoft Corporation c:\windows\system32\wship6.dll

credssp 6.0.6001.18000 18.00 KB (18,432 bytes) 1/18/2008 10:16 PM Microsoft Corporation c:\windows\system32\credssp.dll

crypt32 6.0.6001.18000 1.20 MB (1,254,400 bytes) 1/18/2008 10:15 PM Microsoft Corporation c:\windows\system32\crypt32.dll

msasn1 6.0.6001.18000 79.00 KB (80,896 bytes) 1/18/2008 10:57 PM Microsoft Corporation c:\windows\system32\msasn1.dll

schannel 6.0.6001.18000 326.50 KB (334,336 bytes) 1/18/2008 10:16 PM Microsoft Corporation c:\windows\system32\schannel.dll

netapi32 6.0.6001.18000 633.50 KB (648,704 bytes) 1/18/2008 10:19 PM Microsoft Corporation c:\windows\system32\netapi32.dll

psapi 6.0.6001.18000 16.50 KB (16,896 bytes) 1/18/2008 10:40 PM Microsoft Corporation c:\windows\system32\psapi.dll

services 6.0.6001.18000 375.50 KB (384,512 bytes) 1/18/2008 10:03 PM Microsoft Corporation c:\windows\system32\services.exe

scesrv 6.0.6001.18000 390.00 KB (399,360 bytes) 1/18/2008 10:15 PM Microsoft Corporation c:\windows\system32\scesrv.dll

authz 6.0.6001.18000 139.50 KB (142,848 bytes) 1/18/2008 10:16 PM Microsoft Corporation c:\windows\system32\authz.dll

ncobjapi 6.0.6001.18000 68.50 KB (70,144 bytes) 1/18/2008 10:13 PM Microsoft Corporation c:\windows\system32\ncobjapi.dll

ntmarta 6.0.6001.18000 155.50 KB (159,232 bytes) 1/18/2008 10:16 PM Microsoft Corporation c:\windows\system32\ntmarta.dll

wldap32 6.0.6001.18000 321.00 KB (328,704 bytes) 1/18/2008 10:20 PM Microsoft Corporation c:\windows\system32\wldap32.dll

samlib 6.0.6001.18000 97.00 KB (99,328 bytes) 1/18/2008 10:19 PM Microsoft Corporation c:\windows\system32\samlib.dll

ole32 6.0.6001.18000 1.83 MB (1,923,072 bytes) 1/18/2008 10:30 PM Microsoft Corporation c:\windows\system32\ole32.dll

lsass 6.0.6001.18000 11.00 KB (11,264 bytes) 1/18/2008 10:16 PM Microsoft Corporation c:\windows\system32\lsass.exe

lsasrv 6.0.6001.18000 1.61 MB (1,692,160 bytes) 1/18/2008 11:21 PM Microsoft Corporation c:\windows\system32\lsasrv.dll

samsrv 6.0.6001.18000 651.00 KB (666,624 bytes) 1/18/2008 10:19 PM Microsoft Corporation c:\windows\system32\samsrv.dll

cryptdll 6.0.6001.18000 63.50 KB (65,024 bytes) 1/18/2008 10:15 PM Microsoft Corporation c:\windows\system32\cryptdll.dll

dnsapi 6.0.6001.18000 214.50 KB (219,648 bytes) 1/18/2008 10:20 PM Microsoft Corporation c:\windows\system32\dnsapi.dll

ntdsapi 6.0.6001.18000 143.00 KB (146,432 bytes) 1/18/2008 10:20 PM Microsoft Corporation c:\windows\system32\ntdsapi.dll

feclient 6.0.6001.18000 67.00 KB (68,608 bytes) 1/18/2008 10:18 PM Microsoft Corporation c:\windows\system32\feclient.dll

mpr 6.0.6001.18000 83.50 KB (85,504 bytes) 1/18/2008 10:38 PM Microsoft Corporation c:\windows\system32\mpr.dll

slc 6.0.6001.18000 146.50 KB (150,016 bytes) 1/18/2008 11:32 PM Microsoft Corporation c:\windows\system32\slc.dll

sysntfy 6.0.6000.16386 21.00 KB (21,504 bytes) 1/18/2008 10:17 PM Microsoft Corporation c:\windows\system32\sysntfy.dll

wevtapi 6.0.6001.18000 384.50 KB (393,728 bytes) 1/18/2008 10:12 PM Microsoft Corporation c:\windows\system32\wevtapi.dll

iphlpapi 6.0.6001.18000 124.00 KB (126,976 bytes) 1/18/2008 10:36 PM Microsoft Corporation c:\windows\system32\iphlpapi.dll

dhcpcsvc 6.0.6001.18000 262.00 KB (268,288 bytes) 1/18/2008 10:35 PM Microsoft Corporation c:\windows\system32\dhcpcsvc.dll

winnsi 6.0.6001.18000 21.50 KB (22,016 bytes) 1/18/2008 10:36 PM Microsoft Corporation c:\windows\system32\winnsi.dll

dhcpcsvc6 6.0.6001.18000 155.00 KB (158,720 bytes) 1/18/2008 10:35 PM Microsoft Corporation c:\windows\system32\dhcpcsvc6.dll

cngaudit 6.0.6000.16386 14.50 KB (14,848 bytes) 1/18/2008 10:15 PM Microsoft Corporation c:\windows\system32\cngaudit.dll

ncrypt 6.0.6001.18000 247.50 KB (253,440 bytes) 1/18/2008 10:15 PM Microsoft Corporation c:\windows\system32\ncrypt.dll

bcrypt 6.0.6001.18000 299.50 KB (306,688 bytes) 1/18/2008 10:15 PM Microsoft Corporation c:\windows\system32\bcrypt.dll

msprivs 6.0.6000.16386 2.00 KB (2,048 bytes) 1/18/2008 10:16 PM Microsoft Corporation c:\windows\system32\msprivs.dll

kerberos 6.0.6001.18000 639.50 KB (654,848 bytes) 1/18/2008 10:17 PM Microsoft Corporation c:\windows\system32\kerberos.dll

msv1_0 6.0.6001.18000 259.50 KB (265,728 bytes) 1/18/2008 10:16 PM Microsoft Corporation c:\windows\system32\msv1_0.dll

netlogon 6.0.6001.18000 700.00 KB (716,800 bytes) 1/18/2008 10:19 PM Microsoft Corporation c:\windows\system32\netlogon.dll

winbrand 6.0.6001.18000 851.00 KB (871,424 bytes) 1/18/2008 10:02 PM Microsoft Corporation c:\windows\system32\winbrand.dll

wdigest 6.0.6001.18000 193.00 KB (197,632 bytes) 1/18/2008 10:16 PM Microsoft Corporation c:\windows\system32\wdigest.dll

rsaenh 6.0.6001.18000 283.05 KB (289,848 bytes) 1/18/2008 10:18 PM Microsoft Corporation c:\windows\system32\rsaenh.dll

tspkg 6.0.6001.18000 77.00 KB (78,848 bytes) 1/18/2008 10:16 PM Microsoft Corporation c:\windows\system32\tspkg.dll

gpapi 6.0.6001.18000 82.50 KB (84,480 bytes) 1/18/2008 10:20 PM Microsoft Corporation c:\windows\system32\gpapi.dll

setupapi 6.0.6001.18000 1.83 MB (1,921,536 bytes) 1/18/2008 10:00 PM Microsoft Corporation c:\windows\system32\setupapi.dll

oleaut32 6.0.6001.18000 828.00 KB (847,872 bytes) 1/18/2008 10:27 PM Microsoft Corporation c:\windows\system32\oleaut32.dll

scecli 6.0.6001.18000 230.00 KB (235,520 bytes) 1/18/2008 10:15 PM Microsoft Corporation c:\windows\system32\scecli.dll

rassfm 6.0.6001.18000 25.50 KB (26,112 bytes) 1/19/2008 5:51 AM Microsoft Corporation c:\windows\system32\rassfm.dll

dssenh 6.0.6001.18000 197.55 KB (202,296 bytes) 1/18/2008 10:18 PM Microsoft Corporation c:\windows\system32\dssenh.dll

winsta 6.0.6001.18000 200.50 KB (205,312 bytes) 1/18/2008 10:43 PM Microsoft Corporation c:\windows\system32\winsta.dll

cryptnet 6.0.6001.18000 127.00 KB (130,048 bytes) 1/18/2008 10:15 PM Microsoft Corporation c:\windows\system32\cryptnet.dll

sensapi 6.0.6001.18000 12.50 KB (12,800 bytes) 1/18/2008 10:27 PM Microsoft Corporation c:\windows\system32\sensapi.dll

shlwapi 6.0.6001.18000 443.50 KB (454,144 bytes) 1/18/2008 10:21 PM Microsoft Corporation c:\windows\system32\shlwapi.dll

comctl32 6.10.6001.18000 1.95 MB (2,049,024 bytes) 1/19/2008 1:51 AM Microsoft Corporation c:\windows\winsxs\amd64_microsoft.windows.common-controls_6595b64144ccf1df_6.0.6001.18000_none_152e7382f3bd50c6\comctl32.dll

lsm 6.0.6001.18000 258.50 KB (264,704 bytes) 1/18/2008 10:43 PM Microsoft Corporation c:\windows\system32\lsm.exe

wmsgapi 6.0.6000.16386 14.00 KB (14,336 bytes) 1/18/2008 10:17 PM Microsoft Corporation c:\windows\system32\wmsgapi.dll

clbcatq 2001.12.6931.18000 597.00 KB (611,328 bytes) 1/18/2008 10:28 PM Microsoft Corporation c:\windows\system32\clbcatq.dll

lsmproxy 6.0.6001.18000 43.50 KB (44,544 bytes) 1/18/2008 10:42 PM Microsoft Corporation c:\windows\system32\lsmproxy.dll

winlogon 6.0.6001.18000 396.50 KB (406,016 bytes) 1/18/2008 10:18 PM Microsoft Corporation c:\windows\system32\winlogon.exe

shsvcs 6.0.6001.18000 294.50 KB (301,568 bytes) 1/18/2008 10:21 PM Microsoft Corporation c:\windows\system32\shsvcs.dll

drprov 6.0.6001.18000 23.50 KB (24,064 bytes) 1/18/2008 10:43 PM Microsoft Corporation c:\windows\system32\drprov.dll

ntlanman 6.0.6001.18000 116.00 KB (118,784 bytes) 1/18/2008 10:14 PM Microsoft Corporation c:\windows\system32\ntlanman.dll

cscapi 6.0.6001.18000 38.00 KB (38,912 bytes) 1/18/2008 9:55 PM Microsoft Corporation c:\windows\system32\cscapi.dll

svchost 6.0.6001.18000 27.00 KB (27,648 bytes) 1/18/2008 10:02 PM Microsoft Corporation c:\windows\system32\svchost.exe

umpnpmgr 6.0.6001.18000 304.50 KB (311,808 bytes) 1/18/2008 9:59 PM

Microsoft Corporation c:\windows\system32\umpnpmgr.dll

powrprof 6.0.6001.18000 118.50 KB (121,344 bytes) 1/18/2008 10:23 PM Microsoft Corporation c:\windows\system32\powrprof.dll

rpcss 6.0.6001.18000 697.00 KB (713,728 bytes) 1/18/2008 10:27 PM Microsoft Corporation c:\windows\system32\rpcss.dll

FirewallAPI 6.0.6001.18000 685.00 KB (701,440 bytes) 1/18/2008 10:35 PM Microsoft Corporation c:\windows\system32\firewallapi.dll

version 6.0.6001.18000 26.50 KB (27,136 bytes) 1/18/2008 10:24 PM Microsoft Corporation c:\windows\system32\version.dll

cabinet 6.0.6001.18000 91.00 KB (93,184 bytes) 1/18/2008 10:23 PM Microsoft Corporation c:\windows\system32\cabinet.dll

wtsapi32 6.0.6001.18000 30.50 KB (31,232 bytes) 1/18/2008 10:42 PM Microsoft Corporation c:\windows\system32\wtsapi32.dll

fwpuclnt 6.0.6001.18000 761.50 KB (779,776 bytes) 1/18/2008 10:36 PM Microsoft Corporation c:\windows\system32\fwpuclnt.dll

wevtsvc 6.0.6001.18000 1.42 MB (1,486,336 bytes) 1/18/2008 10:13 PM Microsoft Corporation c:\windows\system32\wevtsvc.dll

lmhsvc 6.0.6001.18000 23.50 KB (24,064 bytes) 1/18/2008 10:36 PM Microsoft Corporation c:\windows\system32\lmhsvc.dll

gpsvc 6.0.6001.18000 701.50 KB (718,336 bytes) 1/18/2008 10:20 PM Microsoft Corporation c:\windows\system32\gpsvc.dll

nlaapi 6.0.6001.18000 60.00 KB (61,440 bytes) 1/18/2008 10:36 PM Microsoft Corporation c:\windows\system32\nlaapi.dll

profsvc 6.0.6001.18000 174.50 KB (178,688 bytes) 1/18/2008 10:16 PM Microsoft Corporation c:\windows\system32\profsvc.dll

atl 3.5.2284.0 85.50 KB (87,552 bytes) 1/18/2008 11:09 PM Microsoft Corporation c:\windows\system32\atl.dll

sens 6.0.6001.18000 60.50 KB (61,952 bytes) 1/18/2008 10:27 PM Microsoft Corporation c:\windows\system32\sens.dll

schedsvc 6.0.6001.18000 824.00 KB (843,776 bytes) 1/18/2008 10:13 PM Microsoft Corporation c:\windows\system32\schedsvc.dll

ktmw32 6.0.6001.18000 14.50 KB (14,848 bytes) 1/18/2008 9:52 PM Microsoft Corporation c:\windows\system32\ktmw32.dll

comctl32 5.82.6001.18000 619.00 KB (633,856 bytes) 1/19/2008 1:48 AM Microsoft Corporation c:\windows\winsxs\amd64_microsoft.windows.common-controls_6595b64144ccf1df_5.82.6001.18000_none_40ba501d3c2b20ff\comctl32.dll

taskcomp 6.0.6001.18000 400.00 KB (409,600 bytes) 1/18/2008 10:13 PM Microsoft Corporation c:\windows\system32\taskcomp.dll

wintrust 6.0.6001.18000 213.00 KB (218,112 bytes) 1/18/2008 10:15 PM Microsoft Corporation c:\windows\system32\wintrust.dll

imagehlp 6.0.6001.18000 72.50 KB (74,240 bytes) 1/18/2008 10:40 PM Microsoft Corporation c:\windows\system32\imagehlp.dll

aelupsvc 6.0.6000.16386 26.00 KB (26,624 bytes) 1/18/2008 9:52 PM Microsoft Corporation c:\windows\system32\aelupsvc.dll

ikeext 6.0.6001.18000 444.00 KB (454,656 bytes) 1/18/2008 10:36 PM Microsoft Corporation c:\windows\system32\ikeext.dll

sacsvr 6.0.6001.18000 14.50 KB (14,848 bytes) 1/19/2008 5:51 AM Microsoft Corporation c:\windows\system32\sacsvr.dll

seclogon 6.0.6001.18000 28.00 KB (28,672 bytes) 1/18/2008 10:18 PM Microsoft Corporation c:\windows\system32\seclogon.dll

wmisvc 6.0.6001.18000 216.50 KB (221,696 bytes) 1/18/2008 10:13 PM Microsoft Corporation c:\windows\system32\wbem\wmisvc.dll

wbemcomn 6.0.6001.18000 516.00 KB (528,384 bytes) 1/18/2008 10:13 PM Microsoft Corporation c:\windows\system32\wbemcomn.dll

iphlpsvc 6.0.6001.18000 218.00 KB (223,232 bytes) 1/18/2008 10:36 PM Microsoft Corporation c:\windows\system32\iphlpsvc.dll

rtutils 6.0.6001.18000 49.50 KB (50,688 bytes) 1/18/2008 10:37 PM Microsoft Corporation c:\windows\system32\rtutils.dll

sqmapi 6.0.6001.18000 172.00 KB (176,128 bytes) 1/18/2008 10:11 PM Microsoft Corporation c:\windows\system32\sqmapi.dll

srvsvc 6.0.6001.18000 172.50 KB (176,640 bytes) 1/18/2008 10:18 PM Microsoft Corporation c:\windows\system32\srvsvc.dll

sscore 6.0.6000.16386 12.00 KB (12,288 bytes) 1/18/2008 10:18 PM Microsoft Corporation c:\windows\system32\sscore.dll

clusapi 6.0.6001.18000 237.50 KB (243,200 bytes) 1/18/2008 10:05 PM Microsoft Corporation c:\windows\system32\clusapi.dll

activeds 6.0.6001.18000 259.50 KB (265,728 bytes) 1/18/2008 10:19 PM Microsoft Corporation c:\windows\system32\activeds.dll

adsldpc 6.0.6001.18000 224.00 KB (229,376 bytes) 1/18/2008 10:19 PM Microsoft Corporation c:\windows\system32\adsldpc.dll

credui 6.0.6001.18000 186.50 KB (190,976 bytes) 1/18/2008 10:18 PM Microsoft Corporation c:\windows\system32\credui.dll

shell32 6.0.6001.18000 12.30 MB (12,895,744 bytes) 1/18/2008 11:32 PM Microsoft Corporation c:\windows\system32\shell32.dll

resutils 6.0.6001.18000 76.00 KB (77,824 bytes) 1/18/2008 10:04 PM Microsoft Corporation c:\windows\system32\resutils.dll

vssapi 6.0.6001.18000 1.43 MB (1,494,528 bytes) 1/18/2008 10:30 PM Microsoft Corporation c:\windows\system32\vssapi.dll

vsstrace 6.0.6001.18000 90.00 KB (92,160 bytes) 1/18/2008 10:29 PM Microsoft Corporation c:\windows\system32\vsstrace.dll

xmllite 1.2.1009.0 176.00 KB (180,224 bytes) 1/18/2008 11:13 PM Microsoft Corporation c:\windows\system32\xmllite.dll

propsys 6.0.6001.18000 895.50 KB (916,992 bytes) 1/18/2008 10:21 PM Microsoft Corporation c:\windows\system32\propsys.dll

wbemcore 6.0.6001.18000 1.12 MB (1,171,456 bytes) 1/18/2008 10:14 PM Microsoft Corporation c:\windows\system32\wbem\wbemcore.dll

esscli 6.0.6001.18000 418.00 KB (428,032 bytes) 1/18/2008 10:12 PM Microsoft Corporation c:\windows\system32\wbem\esscli.dll

fastprox 6.0.6001.18000 869.50 KB (890,368 bytes) 1/18/2008 10:13 PM Microsoft Corporation c:\windows\system32\wbem\fastprox.dll

wbemsvc 6.0.6001.18000 121.00 KB (123,904 bytes) 1/18/2008 10:12 PM Microsoft Corporation c:\windows\system32\wbem\wbemsvc.dll

wmiutils 6.0.6001.18000 128.50 KB (131,584 bytes) 1/18/2008 10:12 PM Microsoft Corporation c:\windows\system32\wbem\wmiutils.dll

repdrvfs 6.0.6001.18000 372.50 KB (381,440 bytes) 1/18/2008 10:13 PM Microsoft Corporation c:\windows\system32\wbem\repdrvfs.dll

wmiprvsd 6.0.6001.18000 671.50 KB (687,616 bytes) 1/18/2008 10:13 PM Microsoft Corporation c:\windows\system32\wbem\wmiprvsd.dll

wbemess 6.0.6001.18000 501.00 KB (513,024 bytes) 1/18/2008 10:13 PM Microsoft Corporation c:\windows\system32\wbem\wbemess.dll

winrnr 6.0.6001.18000 27.00 KB (27,648 bytes) 1/18/2008 10:19 PM Microsoft Corporation c:\windows\system32\winrnr.dll

napinsp 6.0.6001.18000 61.50 KB (62,976 bytes) 1/18/2008 10:37 PM Microsoft Corporation c:\windows\system32\napinsp.dll

ncprov 6.0.6001.18000 77.50 KB (79,360 bytes) 1/18/2008 10:13 PM Microsoft Corporation c:\windows\system32\wbem\ncprov.dll

rasadhlp 6.0.6001.18000 13.00 KB (13,312 bytes) 1/18/2008 10:37 PM Microsoft Corporation c:\windows\system32\rasadhlp.dll

certprop 6.0.6001.18000 48.00 KB (49,152 bytes) 1/18/2008 10:15 PM Microsoft Corporation c:\windows\system32\certprop.dll

winscard 6.0.6001.18000 186.00 KB (190,464 bytes) 1/18/2008 10:15 PM Microsoft Corporation c:\windows\system32\winscard.dll

sessenv 6.0.6001.18000 73.00 KB (74,752 bytes) 1/18/2008 10:43 PM Microsoft Corporation c:\windows\system32\sessenv.dll

TSChannel 6.0.6000.16386 18.50 KB (18,944 bytes) 1/18/2008 10:12 PM Microsoft Corporation c:\windows\system32\tschannel.dll

qmgr 7.0.6001.18000 1.03 MB (1,082,368 bytes) 1/18/2008 10:12 PM Microsoft Corporation c:\windows\system32\qmgr.dll

shfolder 6.0.6001.18000 10.00 KB (10,240 bytes) 1/18/2008 10:22 PM Microsoft Corporation c:\windows\system32\shfolder.dll

winhttp 6.0.6001.18000 429.50 KB (439,808 bytes) 1/18/2008 10:26 PM Microsoft Corporation c:\windows\system32\winhttp.dll

bitsperf 7.0.6000.16386 22.50 KB (23,040 bytes) 1/18/2008 10:11 PM Microsoft Corporation c:\windows\system32\bitsperf.dll

bitsigd 7.0.6001.18000 45.50 KB (46,592 bytes) 1/18/2008 10:11 PM Microsoft Corporation c:\windows\system32\bitsigd.dll

wuaueng 7.0.6001.18000 2.06 MB (2,156,544 bytes) 1/18/2008 11:11 PM Microsoft Corporation c:\windows\system32\wuaueng.dll

esent 6.0.6001.18000 2.41 MB (2,522,624 bytes) 1/18/2008 10:17 PM Microsoft Corporation c:\windows\system32\esent.dll

winspool 6.0.6001.18000 333.50 KB (341,504 bytes) 1/18/2008 11:11 PM Microsoft Corporation c:\windows\system32\winspool.drv

mspatcha 6.0.6001.18000 45.50 KB (46,592 bytes) 1/18/2008 10:05 PM Microsoft Corporation c:\windows\system32\mspatcha.dll

wups2 7.0.6001.18000 33.00 KB (33,792 bytes) 1/18/2008 11:09 PM Microsoft Corporation c:\windows\system32\wups2.dll

rasmans 6.0.6001.18000 301.00 KB (308,224 bytes) 1/18/2008 10:37 PM Microsoft Corporation c:\windows\system32\rasmans.dll

rastapi 6.0.6001.18000 79.50 KB (81,408 bytes) 1/18/2008 10:37 PM Microsoft Corporation c:\windows\system32\rastapi.dll

tapi32 6.0.6000.16386 238.00 KB (243,712 bytes) 1/18/2008 11:13 PM Microsoft Corporation c:\windows\system32\tapi32.dll

winmm 6.0.6001.18000 207.00 KB (211,968 bytes) 1/18/2008 10:44 PM Microsoft Corporation c:\windows\system32\winmm.dll

oleacc 4.2.5406.0 300.50 KB (307,712 bytes) 1/18/2008 10:08 PM Microsoft Corporation c:\windows\system32\oleacc.dll

rasppp 6.0.6001.18000 299.00 KB (306,176 bytes) 1/18/2008 10:37 PM Microsoft Corporation c:\windows\system32\rasppp.dll

mprapi 6.0.6001.18000 126.50 KB (129,536 bytes) 1/18/2008 10:37 PM Microsoft Corporation c:\windows\system32\mprapi.dll

rasapi32 6.0.6001.18000 329.50 KB (337,408 bytes) 1/18/2008 10:37 PM Microsoft Corporation c:\windows\system32\rasapi32.dll

rasman 6.0.6001.18000 90.50 KB (92,672 bytes) 1/18/2008 10:37 PM Microsoft Corporation c:\windows\system32\rasman.dll

rasqec 6.0.6001.18000 72.00 KB (73,728 bytes) 1/18/2008 10:37 PM Microsoft Corporation c:\windows\system32\rasqec.dll

qutil 6.0.6001.18000 97.00 KB (99,328 bytes) 1/18/2008 10:34 PM Microsoft Corporation c:\windows\system32\qutil.dll

raschap 6.0.6001.18000 289.50 KB (296,448 bytes) 1/18/2008 10:37 PM Microsoft Corporation c:\windows\system32\raschap.dll

rastls 6.0.6001.18000 274.00 KB (280,576 bytes) 1/18/2008 10:37 PM Microsoft Corporation c:\windows\system32\rastls.dll

cryptui 6.0.6001.18000 1,010.50 KB (1,034,752 bytes) 1/18/2008 10:15 PM Microsoft Corporation c:\windows\system32\cryptui.dll

msimg32 6.0.6001.18000 8.00 KB (8,192 bytes) 1/18/2008 10:07 PM Microsoft Corporation c:\windows\system32\msimg32.dll

actxprxy 6.0.6001.18000 979.00 KB (1,002,496 bytes) 1/18/2008 11:13 PM Microsoft Corporation c:\windows\system32\actxprxy.dll

wbemcons 6.0.6001.18000 69.50 KB (71,168 bytes) 1/18/2008 10:12 PM Microsoft Corporation c:\windows\system32\wbem\wbemcons.dll

slsvc 6.0.6001.18000 2.06 MB (2,161,664 bytes) 1/18/2008 11:33 PM Microsoft Corporation c:\windows\system32\slsvc.exe

es 2001.12.6931.18000 346.00 KB (354,304 bytes) 1/18/2008 10:27 PM Microsoft Corporation c:\windows\system32\es.dll

nsisvc 6.0.6001.18000 24.00 KB (24,576 bytes) 1/18/2008 10:36 PM Microsoft Corporation c:\windows\system32\nsisvc.dll

wkssvc 6.0.6001.18000 198.00 KB (202,752 bytes) 1/18/2008 10:18 PM Microsoft Corporation c:\windows\system32\wkssvc.dll

fdrespub 6.0.6000.16386 32.50 KB (33,280 bytes) 1/18/2008 10:06 PM Microsoft Corporation c:\windows\system32\fdrespub.dll

wsdapi 6.0.6001.18000 427.00 KB (437,248 bytes) 1/18/2008 10:07 PM Microsoft Corporation c:\windows\system32\wsdapi.dll

httpapi 6.0.6001.18000 32.50 KB (33,280 bytes) 1/18/2008 10:35 PM Microsoft Corporation c:\windows\system32\httpapi.dll

fundisc 6.0.6001.18000 162.50 KB (166,400 bytes) 1/18/2008 10:06 PM Microsoft Corporation c:\windows\system32\fundisc.dll

msxml3 8.100.1043.0 1.72 MB (1,807,360 bytes) 1/18/2008 11:14 PM Microsoft Corporation c:\windows\system32\msxml3.dll

w32time 6.0.6001.18000 364.00 KB (372,736 bytes) 1/18/2008 10:15 PM Microsoft Corporation c:\windows\system32\w32time.dll

netprofm 6.0.6001.18000 297.00 KB (304,128 bytes) 1/18/2008 10:38 PM Microsoft Corporation c:\windows\system32\netprofm.dll

npmproxy 6.0.6000.16386 31.50 KB (32,256 bytes) 1/18/2008 10:38 PM Microsoft Corporation c:\windows\system32\npmproxy.dll

sstpsvc 6.0.6001.18000 138.00 KB (141,312 bytes) 1/18/2008 10:37 PM Microsoft Corporation c:\windows\system32\sstpsvc.dll

normaliz 6.0.6000.16386 3.00 KB (3,072 bytes) 1/18/2008 9:59 PM Microsoft Corporation c:\windows\system32\normaliz.dll

uxsms 6.0.6001.18000 32.00 KB (32,768 bytes) 1/18/2008 10:10 PM Microsoft Corporation c:\windows\system32\uxsms.dll

trkwks 6.0.6001.18000 114.50 KB (117,248 bytes) 1/18/2008 10:27 PM Microsoft Corporation c:\windows\system32\trkwks.dll

umrdp 6.0.6001.18000 247.00 KB (252,928 bytes) 1/19/2008 5:52 AM Microsoft Corporation c:\windows\system32\umrdp.dll

umb 6.0.6001.18000 58.50 KB (59,904 bytes) 1/18/2008 10:06 PM Microsoft Corporation c:\windows\system32\umb.dll

netman 6.0.6001.18000 340.00 KB (348,160 bytes) 1/18/2008 10:35 PM Microsoft Corporation c:\windows\system32\netman.dll

netshell 6.0.6001.18000 3.19 MB (3,341,312 bytes) 1/18/2008 10:35 PM Microsoft Corporation c:\windows\system32\netshell.dll

hnetcfg 6.0.6001.18000 423.50 KB (433,664 bytes) 1/18/2008 10:35 PM Microsoft Corporation c:\windows\system32\hnetcfg.dll

netcfgx 6.0.6001.18000 492.00 KB (503,808 bytes) 1/18/2008 10:35 PM Microsoft Corporation c:\windows\system32\netcfgx.dll

wbemprox 6.0.6001.18000 42.50 KB (43,520 bytes) 1/18/2008 10:12 PM Microsoft Corporation c:\windows\system32\wbem\wbemprox.dll

rasdlg 6.0.6001.18000 890.00 KB (911,360 bytes) 1/18/2008 10:37 PM Microsoft Corporation c:\windows\system32\rasdlg.dll

wdi 6.0.6001.18000 80.00 KB (81,920 bytes) 1/18/2008 10:03 PM Microsoft Corporation c:\windows\system32\wdi.dll

radardt 6.0.6000.16386 77.50 KB (79,360 bytes) 1/19/2008 5:52 AM Microsoft Corporation c:\windows\system32\radardt.dll

dnsrslvr 6.0.6001.18000 115.00 KB (117,760 bytes) 1/18/2008 10:20 PM Microsoft Corporation c:\windows\system32\dnsrslvr.dll

cryptsvc 6.0.6001.18000 161.50 KB (165,376 bytes) 1/18/2008 10:15 PM Microsoft Corporation c:\windows\system32\cryptsvc.dll

nlasvc 6.0.6001.18000 201.50 KB (206,336 bytes) 1/18/2008 10:36 PM Microsoft Corporation c:\windows\system32\nlasvc.dll

ncsi 6.0.6001.18000 106.50 KB (109,056 bytes) 1/18/2008 10:35 PM Microsoft Corporation c:\windows\system32\ncsi.dll

cfgmgr32 6.0.6001.18000 17.50 KB (17,920 bytes) 1/18/2008 9:59 PM Microsoft Corporation c:\windows\system32\cfgmgr32.dll

ssdpapi 6.0.6000.16386 49.00 KB (50,176 bytes) 1/18/2008 10:38 PM Microsoft Corporation c:\windows\system32\ssdpapi.dll

termsrv 6.0.6001.18000 534.00 KB (546,816 bytes) 1/18/2008 10:43 PM Microsoft Corporation c:\windows\system32\termsrv.dll

icaapi 6.0.6000.16386 20.00 KB (20,480 bytes) 1/18/2008 10:42 PM Microsoft Corporation c:\windows\system32\icaapi.dll

regapi 6.0.6001.18000 87.00 KB (89,088 bytes) 1/18/2008 10:42 PM Microsoft Corporation c:\windows\system32\regapi.dll

rdpwsx 6.0.6001.18000 115.00 KB (117,760 bytes) 1/18/2008 10:42 PM Microsoft Corporation c:\windows\system32\rdpwsx.dll

mstlsapi 6.0.6001.18000 135.00 KB (138,240 bytes) 1/18/2008 10:42 PM Microsoft Corporation c:\windows\system32\mstlsapi.dll

msdtckrm 2001.12.6931.18000 386.00 KB (395,264 bytes) 1/18/2008 10:27 PM Microsoft Corporation c:\windows\system32\msdtckrm.dll

wsmsvc 6.0.6001.18000 1.04 MB (1,091,072 bytes) 1/18/2008 10:14 PM Microsoft Corporation c:\windows\system32\wsmsvc.dll

wsmprov 6.0.6001.18000 71.50 KB (73,216 bytes) 1/18/2008 10:13 PM Microsoft Corporation c:\windows\system32\wsmprov.dll

winrsmgr 6.0.6001.18000 294.00 KB (301,056 bytes) 1/18/2008 10:14 PM Microsoft Corporation c:\windows\system32\winrsmgr.dll

wsmres 6.0.6001.18000 13.00 KB (13,312 bytes) 1/18/2008 10:13 PM Microsoft Corporation c:\windows\system32\wsmres.dll

wevtfwd 6.0.6001.18000 104.50 KB (107,008 bytes) 1/18/2008 10:12 PM Microsoft Corporation c:\windows\system32\wevtfwd.dll

bfe 6.0.6001.18000 447.50 KB (458,240 bytes) 1/18/2008 10:36 PM Microsoft Corporation c:\windows\system32\bfe.dll

mpssvc 6.0.6001.18000 587.00 KB (601,088 bytes) 1/18/2008 10:35 PM Microsoft Corporation c:\windows\system32\mpssvc.dll

wfapigp 6.0.6001.18000 20.00 KB (20,480 bytes) 1/18/2008 10:35 PM Microsoft Corporation c:\windows\system32\wfapigp.dll

dps 6.0.6001.18000 136.00 KB (139,264 bytes) 1/18/2008 10:03 PM Microsoft Corporation c:\windows\system32\dps.dll

taskschd 6.0.6001.18000 640.50 KB (655,872 bytes) 1/18/2008 10:13 PM Microsoft Corporation c:\windows\system32\taskschd.dll

whealogr 6.0.6001.18000 32.50 KB (33,280 bytes) 1/18/2008 10:03 PM Microsoft Corporation c:\windows\system32\whealogr.dll

tdh 6.0.6001.18000 528.50 KB (541,184 bytes) 1/18/2008 10:03 PM Microsoft Corporation c:\windows\system32\tdh.dll

spoolsv 6.0.6001.18000 261.00 KB (267,264 bytes) 1/18/2008 11:11 PM Microsoft Corporation c:\windows\system32\spoolsv.exe

spoolss 6.0.6001.18000 236.00 KB (241,664 bytes) 1/18/2008 11:34 PM Microsoft Corporation c:\windows\system32\spoolss.dll

localspl 6.0.6001.18000 770.00 KB (788,480 bytes) 1/18/2008 11:20 PM Microsoft Corporation c:\windows\system32\localspl.dll

sfc 6.0.6000.16386 6.00 KB (6,144 bytes) 1/18/2008 9:59 PM Microsoft Corporation c:\windows\system32\sfc.dll

tcpmon 6.0.6001.18000 165.00 KB (168,960 bytes) 1/18/2008 11:11 PM Microsoft Corporation c:\windows\system32\tcpmon.dll

snmpapi 6.0.6000.16386 27.00 KB (27,648 bytes) 1/18/2008 10:37 PM Microsoft Corporation c:\windows\system32\snmpapi.dll

wsnmp32 6.0.6001.18000 60.50 KB (61,952 bytes) 1/18/2008 10:37 PM Microsoft Corporation c:\windows\system32\wsnmp32.dll

msxml6 6.20.1076.0 1.65 MB (1,728,512 bytes) 1/18/2008 11:14 PM Microsoft Corporation c:\windows\system32\msxml6.dll

tcpmib 6.0.6000.16386 33.50 KB (34,304 bytes) 1/18/2008 11:11 PM Microsoft Corporation c:\windows\system32\tcpmib.dll

mgmtapi 6.0.6000.16386 22.00 KB (22,528 bytes) 1/18/2008 10:37 PM Microsoft Corporation c:\windows\system32\mgmtapi.dll

usbmon 6.0.6001.18000 43.00 KB (44,032 bytes) 1/18/2008 11:11 PM Microsoft Corporation c:\windows\system32\usbmon.dll

wls0wndh 6.0.6000.16386 9.50 KB (9,728 bytes) 1/18/2008 10:17 PM Microsoft Corporation c:\windows\system32\wls0wndh.dll

wsdmon 6.0.6001.18000 209.00 KB (214,016 bytes) 1/18/2008 11:11 PM Microsoft Corporation c:\windows\system32\wsdmon.dll

win32spl 6.0.6001.18000 641.50 KB (656,896 bytes) 1/18/2008 11:12 PM Microsoft Corporation c:\windows\system32\win32spl.dll

netrap 6.0.6001.18000 21.00 KB (21,504 bytes) 1/18/2008 10:18 PM Microsoft Corporation c:\windows\system32\netrap.dll

printcom 6.0.6001.18000 43.50 KB (44,544 bytes) 1/18/2008 11:10 PM Microsoft Corporation c:\windows\system32\printcom.dll

rmserver 31.1.1.9 780.00 KB (798,720 bytes) 4/1/2009 1:58 PM Emulex Corporation c:\program files (x86)\emulex\util\common\rmserver.exe

wow64 6.0.6001.18000 229.00 KB (234,496 bytes) 1/18/2008 9:59 PM Microsoft Corporation c:\windows\system32\wow64.dll

wow64win 6.0.6001.18000 294.50 KB (301,568 bytes) 1/18/2008 10:08 PM Microsoft Corporation c:\windows\system32\wow64win.dll

wow64cpu 6.0.6001.18000 17.00 KB (17,408 bytes) 1/18/2008 9:59 PM Microsoft Corporation c:\windows\system32\wow64cpu.dll

hbahsmgr 31.1.1.9 444.00 KB (454,656 bytes) 4/1/2009 1:58 PM Emulex Corporation c:\program files (x86)\emulex\util\common\hbahsmgr.exe

ipsecsvc 6.0.6001.18000 519.00 KB (531,456 bytes) 1/18/2008 10:36 PM Microsoft Corporation c:\windows\system32\ipsecsvc.dll

FwRemoteSvr 6.0.6001.18000 49.00 KB (50,176 bytes) 1/18/2008 10:35 PM Microsoft Corporation c:\windows\system32\fwremotesvr.dll

regsvc 6.0.6001.18000 201.50 KB (206,336 bytes) 1/18/2008 10:03 PM Microsoft Corporation c:\windows\system32\regsvc.dll

storserv 5.50.0.0 116.50 KB (119,296 bytes) 6/20/2008 7:21 AM Sun Microsystems, Inc. c:\program files\sun\sun storagetek raid manager\storserv.exe

jvm 5.0.110.3 5.23 MB (5,486,080 bytes) 12/15/2006 1:40 AM Sun Microsystems, Inc. c:\program files\sun\sun storagetek raid manager\jre\bin\server\jvm.dll

hpi 5.0.110.3 23.50 KB (24,064 bytes) 12/15/2006 1:40 AM Sun Microsystems, Inc. c:\program files\sun\sun storagetek raid manager\jre\bin\hpi.dll

verify 5.0.110.3 51.00 KB (52,224 bytes) 12/15/2006 1:40 AM Sun Microsystems, Inc. c:\program files\sun\sun storagetek raid manager\jre\bin\verify.dll

java 5.0.110.3 162.50 KB (166,400 bytes) 12/15/2006 1:40 AM Sun Microsystems, Inc. c:\program files\sun\sun storagetek raid manager\jre\bin\java.dll

zip 5.0.110.3 66.50 KB (68,096 bytes) 12/15/2006 1:40 AM Sun Microsystems, Inc. c:\program files\sun\sun storagetek raid manager\jre\bin\zip.dll

storutil 5.50.0.0 82.50 KB (84,480 bytes) 6/20/2008 7:04 AM Adaptec Incorporated c:\program files\sun\sun storagetek raid manager\storutil.dll

net 5.0.110.3 90.50 KB (92,672 bytes) 12/15/2006 1:40 AM Sun Microsystems, Inc. c:\program files\sun\sun storagetek raid manager\jre\bin\net.dll

wersvc 6.0.6001.18000 118.00 KB (120,832 bytes) 1/18/2008 10:11 PM Microsoft Corporation c:\windows\system32\wersvc.dll

taskeng 6.0.6001.18000 259.00 KB (265,216 bytes) 1/18/2008 10:13 PM Microsoft Corporation c:\windows\system32\taskeng.exe

dimsjob 6.0.6001.18000 43.00 KB (44,032 bytes) 1/18/2008 10:18 PM Microsoft Corporation c:\windows\system32\dimsjob.dll

pautoenr 6.0.6000.16386 46.00 KB (47,104 bytes) 1/18/2008 10:18 PM Microsoft Corporation c:\windows\system32\pautoenr.dll

certcli 6.0.6001.18000 434.00 KB (444,416 bytes) 1/18/2008 10:16 PM Microsoft Corporation c:\windows\system32\certcli.dll

CertEnroll 6.0.6001.18000 1.58 MB (1,658,368 bytes) 1/18/2008 10:19 PM Microsoft Corporation c:\windows\system32\certenroll.dll

wininet 7.0.6001.18000 988.00 KB (1,011,712 bytes) 1/18/2008 10:27 PM Microsoft Corporation c:\windows\system32\wininet.dll

iertutil 7.0.6001.18000 366.00 KB (374,784 bytes) 1/18/2008 10:25 PM Microsoft Corporation c:\windows\system32\iertutil.dll

dwm 6.0.6001.18000 96.50 KB (98,816 bytes) 1/18/2008 10:10 PM Microsoft Corporation c:\windows\system32\dwm.exe

uxtheme 6.0.6001.18000 310.00 KB (317,440 bytes) 1/18/2008 10:21 PM Microsoft Corporation c:\windows\system32\uxtheme.dll

dwmredir 6.0.6001.18000 100.00 KB (102,400 bytes) 1/18/2008 10:10 PM Microsoft Corporation c:\windows\system32\dwmredir.dll

slwga 6.0.6001.18000 14.00 KB (14,336 bytes) 1/18/2008 10:17 PM Microsoft Corporation c:\windows\system32\slwga.dll

urlmon 7.0.6001.18000 1.35 MB (1,417,728 bytes) 1/18/2008 10:27 PM Microsoft Corporation c:\windows\system32\urlmon.dll

milcore 6.0.6001.18000 2.45 MB (2,570,240 bytes) 1/18/2008 10:12 PM Microsoft Corporation c:\windows\system32\milcore.dll

dwmapi 6.0.6001.18000 38.50 KB (39,424 bytes) 1/18/2008 10:10 PM Microsoft Corporation c:\windows\system32\dwmapi.dll

MsCtfMonitor 6.0.6000.16386 25.50 KB (26,112 bytes) 1/18/2008 10:08 PM Microsoft Corporation c:\windows\system32\msctfmonitor.dll

msutb 6.0.6001.18000 222.50 KB (227,840 bytes) 1/18/2008 10:08 PM Microsoft Corporation c:\windows\system32\msutb.dll

PlaySndSrv 6.0.6000.16386 74.50 KB (76,288 bytes) 1/18/2008 10:43 PM Microsoft Corporation c:\windows\system32\playsndsrv.dll

mmdevapi 6.0.6001.18000 197.50 KB (202,240 bytes) 1/18/2008 10:44 PM Microsoft Corporation c:\windows\system32\mmdevapi.dll

qagent 6.0.6001.18000 245.00 KB (250,880 bytes) 1/18/2008 10:35 PM Microsoft Corporation c:\windows\system32\qagent.dll

explorer 6.0.6001.18000 2.94 MB (3,080,704 bytes) 1/18/2008 10:22 PM Microsoft Corporation c:\windows\explorer.exe

shdocvw 6.0.6001.18000 1.14 MB (1,195,008 bytes) 1/18/2008 10:22 PM Microsoft Corporation c:\windows\system32\shdocvw.dll

gdiplus 5.2.6001.18000 2.09 MB (2,190,848 bytes) 1/19/2008 1:50 AM Microsoft Corporation

c:\windows\winsxs\amd64_microsoft.windows.gdiplus_6595b64144ccf1df_1.0.6001.18000_none_56c7f783b549f0ed\gdiplus.dll

browseui 6.0.6001.18000 1.58 MB (1,654,784 bytes) 1/18/2008 10:22 PM Microsoft Corporation c:\windows\system32\browseui.dll

duser 6.0.6001.18000 244.50 KB (250,368 bytes) 1/18/2008 10:09 PM Microsoft Corporation c:\windows\system32\duser.dll

WindowsCodecs 6.0.6001.18000 821.50 KB (841,216 bytes) 1/18/2008 10:11 PM Microsoft Corporation c:\windows\system32\windowscodecs.dll

iconcodecservice 6.0.6000.16386 12.50 KB (12,800 bytes) 1/19/2008 5:51 AM Microsoft Corporation c:\windows\system32\iconcodecservice.dll

timedate 6.0.6001.18000 860.50 KB (881,152 bytes) 1/18/2008 10:23 PM Microsoft Corporation c:\windows\system32\timedate.cpl

shacct 6.0.6001.18000 96.00 KB (98,304 bytes) 1/18/2008 10:22 PM Microsoft Corporation c:\windows\system32\shacct.dll

msshsq 6.0.6001.18000 336.50 KB (344,576 bytes) 1/18/2008 10:58 PM Microsoft Corporation c:\windows\system32\msshsq.dll

NaturalLanguage6 6.0.6001.18000 1.30 MB (1,361,920 bytes) 1/18/2008 11:08 PM Microsoft Corporation c:\windows\system32\naturallanguage6.dll

NlsData0009 6.0.6001.18000 6.05 MB (6,347,776 bytes) 1/18/2008 10:59 PM Microsoft Corporation c:\windows\system32\nlsdata0009.dll

NlsLexicons0009 6.0.6000.16386 2.51 MB (2,628,608 bytes) 1/18/2008 11:06 PM Microsoft Corporation c:\windows\system32\nlslexicons0009.dll

authui 6.0.6001.18000 2.17 MB (2,271,744 bytes) 1/18/2008 10:25 PM Microsoft Corporation c:\windows\system32\authui.dll

ieframe 7.0.6001.18000 6.68 MB (7,004,672 bytes) 1/18/2008 10:32 PM Microsoft Corporation c:\windows\system32\ieframe.dll

ExplorerFrame 6.0.6001.18000 39.00 KB (39,936 bytes) 1/18/2008 10:21 PM Microsoft Corporation c:\windows\system32\explorerframe.dll

stobject 6.0.6001.18000 731.00 KB (748,544 bytes) 1/18/2008 10:23 PM Microsoft Corporation c:\windows\system32\stobject.dll

batmeter 6.0.6001.18000 727.50 KB (744,960 bytes) 1/18/2008 10:23 PM Microsoft Corporation c:\windows\system32\batmeter.dll

SndVolSSO 6.0.6000.16386 173.50 KB (177,664 bytes) 1/18/2008 10:44 PM Microsoft Corporation c:\windows\system32\sndvolsso.dll

pnidui 6.0.6001.18000 1.93 MB (2,024,960 bytes) 1/18/2008 10:35 PM Microsoft Corporation c:\windows\system32\pnidui.dll

wlanutil 6.0.6000.16386 10.00 KB (10,240 bytes) 1/18/2008 10:34 PM Microsoft Corporation c:\windows\system32\wlanutil.dll

cscui 6.0.6001.18000 656.50 KB (672,256 bytes) 1/19/2008 5:51 AM Microsoft Corporation c:\windows\system32\cscui.dll

cscdll 6.0.6001.18000 28.00 KB (28,672 bytes) 1/18/2008 9:55 PM Microsoft Corporation c:\windows\system32\cscdll.dll

srchadmin 6.0.6001.18000 292.00 KB (299,008 bytes) 1/18/2008 10:23 PM Microsoft Corporation c:\windows\system32\srchadmin.dll

webcheck 7.0.6001.18000 284.00 KB (290,816 bytes) 1/18/2008 10:26 PM Microsoft Corporation c:\windows\system32\webcheck.dll

bthprops 6.0.6001.18000 993.50 KB (1,017,344 bytes) 1/18/2008 10:23 PM Microsoft Corporation c:\windows\system32\bthprops.cpl

imapi2 6.0.6001.18000 396.00 KB (405,504 bytes) 1/18/2008 10:29 PM Microsoft Corporation c:\windows\system32\imapi2.dll

thumbcache 6.0.6001.18000 102.00 KB (104,448 bytes) 1/18/2008 10:22 PM Microsoft Corporation c:\windows\system32\thumbcache.dll

ntshrui 6.0.6001.18000 347.00 KB (355,328 bytes) 1/18/2008 10:24 PM Microsoft Corporation c:\windows\system32\ntshrui.dll

networkexplorer 6.0.6001.18000 2.14 MB (2,247,168 bytes) 1/18/2008 10:35 PM Microsoft Corporation c:\windows\system32\networkexplorer.dll

msdtc 2001.12.6931.18000 104.00 KB (106,496 bytes) 1/18/2008 10:27 PM Microsoft Corporation c:\windows\system32\msdtc.exe

msdtctm 2001.12.6931.18000 1.43 MB (1,497,088 bytes) 1/18/2008 10:28 PM Microsoft Corporation c:\windows\system32\msdtctm.dll

msdtcprx 2001.12.6931.18000 708.50 KB (725,504 bytes) 1/18/2008 10:27 PM Microsoft Corporation c:\windows\system32\msdtcprx.dll

mtxclu 2001.12.6931.18000 350.50 KB (358,912 bytes) 1/18/2008 10:27 PM Microsoft Corporation c:\windows\system32\mtxclu.dll

msdtclog 2001.12.6931.18000 113.00 KB (115,712 bytes) 1/18/2008 10:27 PM Microsoft Corporation c:\windows\system32\msdtclog.dll

xolehlp 2001.12.6931.18000 47.00 KB (48,128 bytes) 1/18/2008 10:27 PM Microsoft Corporation c:\windows\system32\xolehlp.dll

comres 2001.12.6931.18000 1.23 MB (1,291,264 bytes) 1/18/2008 10:27 PM Microsoft Corporation c:\windows\system32\comres.dll

msdtcVSp1res 2001.12.6931.18000 20.50 KB (20,992 bytes) 1/18/2008 10:27 PM Microsoft Corporation c:\windows\system32\msdtcvsp1res.dll

mtxoci 2001.12.6931.18000 148.00 KB (151,552 bytes) 1/18/2008 10:27 PM Microsoft Corporation c:\windows\system32\mtxoci.dll

jusched 6.0.110.3 133.40 KB (136,600 bytes) 12/10/2008 5:51 PM Sun Microsystems, Inc. c:\program files (x86)\java\jre6\bin\jusched.exe

mmc 6.0.6001.18000 2.59 MB (2,715,136 bytes) 1/18/2008 10:14 PM Microsoft Corporation c:\windows\system32\mmc.exe

mfc42u 6.6.8063.0 1.29 MB (1,357,824 bytes) 1/18/2008 11:09 PM Microsoft Corporation c:\windows\system32\mfc42u.dll

odbc32 6.0.6001.18000 448.00 KB (458,752 bytes) 1/18/2008 10:56 PM Microsoft Corporation c:\windows\system32\odbc32.dll

comdlg32 6.0.6001.18000 536.50 KB (549,376 bytes) 1/18/2008 10:21 PM Microsoft Corporation c:\windows\system32\comdlg32.dll

mmcbase 6.0.6001.18000 342.00 KB (350,208 bytes) 1/18/2008 10:11 PM Microsoft Corporation c:\windows\system32\mmcbase.dll

odbcint 6.0.6000.16386 224.00 KB (229,376 bytes) 1/18/2008 10:56 PM Microsoft Corporation c:\windows\system32\odbcint.dll

mmcndmgr 6.0.6001.18000 3.11 MB (3,264,000 bytes) 1/18/2008 10:14 PM Microsoft Corporation c:\windows\system32\mmcndmgr.dll

mlang 6.0.6001.18000 232.50 KB (238,080 bytes) 1/18/2008 10:22 PM Microsoft Corporation c:\windows\system32\mlang.dll

mscoree 2.0.50727.3053 397.00 KB (406,528 bytes) 3/3/2009 6:30 PM Microsoft Corporation c:\windows\system32\mscoree.dll

mscorwks 2.0.50727.3053 9.61 MB (10,079,744 bytes) 3/3/2009 6:30 PM Microsoft Corporation c:\windows\microsoft.net\framework64\v2.0.50727\mscorwks.dll

msvcr80 8.0.50727.3053 787.00 KB (805,888 bytes) 3/3/2009 6:30 PM Microsoft Corporation c:\windows\winsxs\amd64_microsoft.vc80.crt_1fc8b3b9a1e18e3b_8.0.50727.3053_none_88e044e32fae7230\msvcr80.dll

mscorlib.ni 2.0.50727.3053 14.84 MB (15,559,168 bytes) 3/5/2009 11:44 AM Microsoft Corporation c:\windows\assembly\nativeimages_v2.0.50727_64\mscorlib\98aadc9fdc23838915e17d6cd8e74a0e\mscorlib.ni.dll

mmcex 6.0.6001.18000 408.00 KB (417,792 bytes) 1/19/2008 1:48 AM Not Available c:\windows\assembly\gac_msil\mmcex\3.0.0.0__31bf3856ad364e35\mmcex.dll

mscorjit 2.0.50727.3053 1.51 MB (1,580,032 bytes) 3/3/2009 6:30 PM Microsoft Corporation c:\windows\microsoft.net\framework64\v2.0.50727\mscorjit.dll

mmcfxcommon 6.0.6000.16386 108.00 KB (110,592 bytes) 1/19/2008 1:49 AM Not Available c:\windows\assembly\gac_msil\mmcfxcommon\3.0.0.0__31bf3856ad364e35\mmcfxcommon.dll

System.ni 2.0.50727.3053 10.00 MB (10,485,248 bytes) 3/5/2009 11:44 AM Microsoft Corporation c:\windows\assembly\nativeimages_v2.0.50727_64\system\4e9471d59537aa8f029522db9ce794ba\system.ni.dll

system.configuration 2.0.50727.3053 416.00 KB (425,984 bytes) 3/3/2009 6:30 PM Microsoft Corporation c:\windows\assembly\gac_msil\system.configuration\2.0.0.0__b03f5f7f11d50a3a\system.configuration.dll

System.Xml.ni 2.0.50727.3053 6.63 MB (6,947,840 bytes) 3/5/2009 11:46 AM Microsoft Corporation c:\windows\assembly\nativeimages_v2.0.50727_64\system.xml\710115eea0dcd066d64b77c2fd255569\system.xml.ni.dll

System.Drawing.ni 2.0.50727.3053 2.21 MB (2,312,704 bytes) 3/5/2009 11:46 AM Microsoft Corporation c:\windows\assembly\nativeimages_v2.0.50727_64\system.drawing\0d5fcf8d993b1871bdc66e1e3c1c7d79\system.drawing.ni.dll

System.Windows.Forms.ni 2.0.50727.3053 16.57 MB (17,375,744 bytes) 3/5/2009 11:46 AM Microsoft Corporation c:\windows\assembly\nativeimages_v2.0.50727_64\system.windows.forms\7ab935b5a79bceac20c2e617509759de\system.windows.forms.ni.dll

diasymreader 8.0.50727.3053 781.01 KB (799,752 bytes) 3/3/2009 6:30 PM Microsoft Corporation c:\windows\microsoft.net\framework64\v2.0.50727\diasymreader.dll

microsoft.managementconsole 6.0.6001.18000 184.00 KB (188,416 bytes) 1/19/2008 1:47 AM Not Available c:\windows\assembly\gac_msil\microsoft.managementconsole\3.0.0.0__31bf3856ad364e35\microsoft.managementconsole.dll

microsoft.windows.servermanager 6.0.6001.18000 7.25 MB (7,606,272 bytes) 1/19/2008 5:52 AM Microsoft Corporation c:\windows\assembly\gac_msil\microsoft.windows.servermanager\6.0.0.0__31bf3856ad364e35\microsoft.windows.servermanager.dll

dciman32 6.0.6001.18000 14.00 KB (14,336 bytes) 1/18/2008 10:07 PM Microsoft Corporation c:\windows\system32\dciman32.dll

wuapi 7.0.6001.18000 640.50 KB (655,872 bytes) 1/18/2008 11:09 PM Microsoft Corporation c:\windows\system32\wuapi.dll

miguicontrols 6.0.6001.18000 3.21 MB (3,371,008 bytes) 1/19/2008 1:48 AM Not Available c:\windows\assembly\gac_msil\miguicontrols\1.0.0.0__31bf3856ad364e35\miguicontrols.dll

system.serviceprocess 2.0.50727.3053 112.00 KB (114,688 bytes) 3/3/2009 6:30 PM Microsoft Corporation c:\windows\assembly\gac_msil\system.serviceprocess\2.0.0.0__b03f5f7f11d50a3a\system.serviceprocess.dll

accessibility 2.0.50727.3053 10.50 KB (10,752 bytes) 3/3/2009 6:30 PM Microsoft Corporation c:\windows\assembly\gac_msil\accessibility\2.0.0.0__b03f5f7f11d50a3a\accessibility.dll

system.configuration.install 2.0.50727.3053 80.00 KB (81,920 bytes) 3/3/2009 6:30 PM Microsoft Corporation c:\windows\assembly\gac_msil\system.configuration.install\2.0.0.0__b03f5f7f11d50a3a\system.configuratio

n.install.dll

rmconfighelper 6.0.6001.18000 1.18 MB (1,236,992 bytes) 1/19/2008 5:52 AM Not Available
c:\windows\assembly\gac_msil\rmconfighelper\6.0.0.0__31bf3856ad364e35\rmconfighelper.dll

svrmgrnc 6.0.6001.18000 192.00 KB (196,608 bytes) 1/19/2008 5:52 AM
Microsoft Corporation c:\windows\system32\svrmgrnc.dll

osbaseln 6.0.6001.18000 25.00 KB (25,600 bytes) 1/18/2008 10:07 PM Microsoft
Corporation c:\windows\system32\osbaseln.dll

cbsapi 6.0.6000.16386 16.00 KB (16,384 bytes) 1/18/2008 10:06 PM Microsoft Corporation
c:\windows\servicing\cbsapi.dll

dmdskmgr 6.0.6001.18000 255.00 KB (261,120 bytes) 1/18/2008 10:29 PM
Microsoft Corporation c:\windows\system32\dmdskmgr.dll

dmutil 6.0.6000.16386 22.00 KB (22,528 bytes) 1/18/2008 10:29 PM Microsoft Corporation
c:\windows\system32\dmutil.dll

dmdskres 6.0.6000.16386 524.00 KB (536,576 bytes) 1/18/2008 10:29 PM
Microsoft Corporation c:\windows\system32\dmdskres.dll

dmdskres2 6.0.6001.18000 2.00 KB (2,048 bytes) 1/18/2008 10:29 PM Microsoft
Corporation c:\windows\system32\dmdskres2.dll

blbmmc 6.0.6001.18000 2.06 MB (2,162,688 bytes) 1/19/2008 5:52 AM Not Available
c:\windows\assembly\gac_msil\blbmmc\6.0.0.0__31bf3856ad364e35\blbmmc.dll

blbproxy 6.0.6001.18000 250.50 KB (256,512 bytes) 1/19/2008 5:52 AM
Microsoft Corporation
c:\windows\assembly\gac_64\blbproxy\6.0.0.0__31bf3856ad364e35\blbproxy.dll

dmdlgs 6.0.6001.18000 471.50 KB (482,816 bytes) 1/18/2008 10:29 PM Microsoft
Corporation c:\windows\system32\dmdlgs.dll

dmview 6.0.6001.18000 113.00 KB (115,712 bytes) 1/18/2008 10:29 PM Microsoft
Corporation c:\windows\system32\dmview.ocx

vds_ps 6.0.6001.18000 95.00 KB (97,280 bytes) 1/18/2008 10:29 PM Microsoft Corporation
c:\windows\system32\vds_ps.dll

dmvdsitf 6.0.6001.18000 198.00 KB (202,752 bytes) 1/18/2008 10:29 PM
Microsoft Corporation c:\windows\system32\dmvdsitf.dll

vds 6.0.6001.18000 442.50 KB (453,120 bytes) 1/18/2008 10:29 PM Microsoft
Corporation c:\windows\system32\vds.exe

osuninst 6.0.6000.16386 8.00 KB (8,192 bytes) 1/18/2008 10:02 PM Microsoft Corporation
c:\windows\system32\osuninst.dll

vdsutil 6.0.6001.18000 153.50 KB (157,184 bytes) 1/18/2008 10:29 PM Microsoft
Corporation c:\windows\system32\vdsutil.dll

uexfat 6.0.6001.18000 69.50 KB (71,168 bytes) 1/18/2008 9:57 PM Microsoft Corporation

c:\windows\system32\uexfat.dll

ulib 6.0.6001.18000 125.00 KB (128,000 bytes) 1/18/2008 9:57 PM Microsoft Corporation c:\windows\system32\ulib.dll

ifsutil 6.0.6001.18000 143.50 KB (146,944 bytes) 1/18/2008 9:57 PM Microsoft Corporation c:\windows\system32\ifsutil.dll

uudf 6.0.6001.18000 159.50 KB (163,328 bytes) 1/18/2008 9:57 PM Microsoft Corporation c:\windows\system32\uudf.dll

untfs 6.0.6001.18000 362.50 KB (371,200 bytes) 1/18/2008 9:57 PM Microsoft Corporation c:\windows\system32\untfs.dll

ufat 6.0.6000.16386 119.50 KB (122,368 bytes) 1/18/2008 9:57 PM Microsoft Corporation c:\windows\system32\ufat.dll

fmifs 6.0.6001.18000 28.50 KB (29,184 bytes) 1/18/2008 9:57 PM Microsoft Corporation c:\windows\system32\fmifs.dll

vdsdyn 6.0.6001.18000 558.00 KB (571,392 bytes) 1/18/2008 10:29 PM Microsoft Corporation c:\windows\system32\vdsdyn.dll

vdsbas 6.0.6001.18000 178.50 KB (182,784 bytes) 1/18/2008 10:29 PM Microsoft Corporation c:\windows\system32\vdsbas.dll

hbaapi 6.0.6001.18000 50.00 KB (51,200 bytes) 1/18/2008 10:30 PM Microsoft Corporation c:\windows\system32\hbaapi.dll

iscsidsc 6.0.6000.16386 71.50 KB (73,216 bytes) 1/18/2008 10:30 PM Microsoft Corporation c:\windows\system32\iscsidsc.dll

iscsium 6.0.6001.18000 36.00 KB (36,864 bytes) 1/18/2008 10:30 PM Microsoft Corporation c:\windows\system32\iscsium.dll

cmd 6.0.6001.18000 354.50 KB (363,008 bytes) 1/18/2008 10:05 PM Microsoft Corporation c:\windows\system32\cmd.exe

wuauclt 7.0.6001.18000 44.50 KB (45,568 bytes) 1/18/2008 11:09 PM Microsoft Corporation c:\windows\system32\wuauclt.exe

wucltux 7.0.6001.18000 1.64 MB (1,717,248 bytes) 1/18/2008 11:09 PM Microsoft Corporation c:\windows\system32\wucltux.dll

jucheck 6.0.110.3 373.42 KB (382,384 bytes) 12/10/2008 5:51 PM Sun Microsystems, Inc. c:\program files (x86)\java\jre6\bin\jucheck.exe

tapisrv 6.0.6001.18000 311.00 KB (318,464 bytes) 1/18/2008 11:13 PM Microsoft Corporation c:\windows\system32\tapisrv.dll

unimdm 6.0.6001.18000 312.00 KB (319,488 bytes) 1/18/2008 10:38 PM Microsoft Corporation c:\windows\system32\unimdm.tsp

uniplat 6.0.6001.18000 21.00 KB (21,504 bytes) 1/18/2008 10:38 PM Microsoft Corporation c:\windows\system32\uniplat.dll

kmddsp 6.0.6000.16386 45.50 KB (46,592 bytes) 1/18/2008 10:37 PM Microsoft Corporation c:\windows\system32\kmddsp.tsp

ndptsp 6.0.6000.16386 58.00 KB (59,392 bytes) 1/18/2008 10:37 PM Microsoft Corporation c:\windows\system32\ndptsp.tsp

hidphone 6.0.6000.16386 38.50 KB (39,424 bytes) 1/18/2008 11:13 PM Microsoft Corporation c:\windows\system32\hidphone.tsp

hid 6.0.6001.18000 28.50 KB (29,184 bytes) 1/18/2008 10:33 PM Microsoft Corporation c:\windows\system32\hid.dll

sqlservr 2007.100.1600.17 55.24 MB (57,922,048 bytes) 7/4/2008 6:39 AM Microsoft Corporation c:\program files\microsoft sql server\mssql10.mssqlserver\mssql\binn\sqlservr.exe

msvcp80 8.0.50727.3053 1.02 MB (1,071,616 bytes) 3/3/2009 6:30 PM Microsoft Corporation c:\windows\winsxs\amd64_microsoft.vc80.crt_1fc8b3b9a1e18e3b_8.0.50727.3053_none_88e044e32fae7230\msvcp80.dll

sqlos 2007.100.1600.17 9.00 KB (9,216 bytes) 7/3/2008 11:34 PM Microsoft Corporation c:\program files\microsoft sql server\mssql10.mssqlserver\mssql\binn\sqlos.dll

pdh 6.0.6001.18000 301.50 KB (308,736 bytes) 1/18/2008 10:03 PM Microsoft Corporation c:\windows\system32\pdh.dll

opends60 2007.100.1600.17 14.50 KB (14,848 bytes) 7/3/2008 11:34 PM Microsoft Corporation c:\program files\microsoft sql server\mssql10.mssqlserver\mssql\binn\opends60.dll

batchparser 2007.100.1600.17 161.50 KB (165,376 bytes) 7/3/2008 11:33 PM Microsoft Corporation c:\program files\microsoft sql server\mssql10.mssqlserver\mssql\binn\batchparser.dll

instapi10 2007.100.1600.17 33.50 KB (34,304 bytes) 7/4/2008 12:37 AM Microsoft Corporation c:\program files\microsoft sql server\100\shared\instapi10.dll

sqlevn70 2007.100.1600.17 1.98 MB (2,080,768 bytes) 7/3/2008 10:45 PM Microsoft Corporation c:\program files\microsoft sql server\mssql10.mssqlserver\mssql\binn\resources\1033\sqlevn70.rll

security 6.0.6000.16386 5.50 KB (5,632 bytes) 1/18/2008 10:16 PM Microsoft Corporation c:\windows\system32\security.dll

sqlncli10 2007.100.1600.17 3.00 MB (3,149,312 bytes) 7/4/2008 7:48 AM Microsoft Corporation c:\windows\system32\sqlncli10.dll

sqlnclir10 2007.100.1600.17 215.00 KB (220,160 bytes) 7/3/2008 11:45 PM Microsoft Corporation c:\windows\system32\1033\sqlnclir10.rll

StepMaster 2.7.0.1004 960.00 KB (983,040 bytes) 7/30/2008 1:23 PM Microsoft Corporation c:\program files (x86)\stepmaster\stepmaster.exe

TrustedInstaller 6.0.6001.18000 41.50 KB (42,496 bytes) 1/18/2008 10:06 PM Microsoft

Corporation c:\windows\servicing\trustedinstaller.exe

cbscore 6.0.6001.18000 627.50 KB (642,560 bytes) 1/19/2008 1:49 AM Microsoft Corporation c:\windows\winsxs\amd64_microsoft-windows-servicingstack_31bf3856ad364e35_6.0.6001.18000_none_657dfccc7fa7eb9a\cbscore.dll

wdscore 6.0.6001.18000 287.00 KB (293,888 bytes) 1/19/2008 1:49 AM Microsoft Corporation c:\windows\winsxs\amd64_microsoft-windows-servicingstack_31bf3856ad364e35_6.0.6001.18000_none_657dfccc7fa7eb9a\wdscore.dll

dbghelp 6.0.6001.18000 989.00 KB (1,012,736 bytes) 1/18/2008 10:40 PM Microsoft Corporation c:\windows\system32\dbghelp.dll

dpx 6.0.6001.18000 394.50 KB (403,968 bytes) 1/18/2008 10:05 PM Microsoft Corporation c:\windows\system32\dpx.dll

wcp 6.0.6001.18000 2.50 MB (2,623,488 bytes) 1/19/2008 1:49 AM Microsoft Corporation c:\windows\winsxs\amd64_microsoft-windows-servicingstack_31bf3856ad364e35_6.0.6001.18000_none_657dfccc7fa7eb9a\wcp.dll

drupdate 6.0.6001.18000 114.50 KB (117,248 bytes) 1/19/2008 1:49 AM Microsoft Corporation c:\windows\winsxs\amd64_microsoft-windows-servicingstack_31bf3856ad364e35_6.0.6001.18000_none_657dfccc7fa7eb9a\drupdate.dll

wrpint 6.0.6001.18000 56.50 KB (57,856 bytes) 1/19/2008 1:49 AM Microsoft Corporation c:\windows\winsxs\amd64_microsoft-windows-servicingstack_31bf3856ad364e35_6.0.6001.18000_none_657dfccc7fa7eb9a\wrpint.dll

sxsstore 6.0.6001.18000 26.50 KB (27,136 bytes) 1/18/2008 9:59 PM Microsoft Corporation c:\windows\system32\sxsstore.dll

msinfo32 6.0.6001.18000 477.50 KB (488,960 bytes) 1/18/2008 10:03 PM Microsoft Corporation c:\windows\system32\msinfo32.exe

wmiprvse 6.0.6001.18000 340.50 KB (348,672 bytes) 1/18/2008 10:13 PM Microsoft Corporation c:\windows\system32\wbem\wmiprvse.exe

cimwin32 6.0.6001.18000 1.99 MB (2,082,304 bytes) 1/18/2008 10:14 PM Microsoft Corporation c:\windows\system32\wbem\cimwin32.dll

framedynos 6.0.6001.18000 275.00 KB (281,600 bytes) 1/18/2008 10:13 PM Microsoft Corporation c:\windows\system32\framedynos.dll

wmi 6.0.6001.18000 5.50 KB (5,632 bytes) 1/18/2008 11:13 PM Microsoft Corporation c:\windows\system32\wmi.dll

ntevt 6.0.6001.18000 250.00 KB (256,000 bytes) 1/18/2008 10:13 PM Microsoft Corporation c:\windows\system32\wbem\ntevt.dll

provthrd 6.0.6001.18000 327.50 KB (335,360 bytes) 1/18/2008 10:13 PM Microsoft Corporation c:\windows\system32\provthrd.dll

msvcirt 7.0.6000.16386 78.50 KB (80,384 bytes) 1/18/2008 9:52 PM Microsoft Corporation c:\windows\system32\msvcirt.dll

wsock32 6.0.6001.18000 18.00 KB (18,432 bytes) 1/18/2008 10:37 PM Microsoft

Corporation c:\windows\system32\wsock32.dll

unidrvui 0.3.6001.18000 863.50 KB (884,224 bytes) 1/19/2008 1:38 AM Microsoft Corporation c:\windows\system32\spool\drivers\x64\3\unidrvui.dll

signdrv 6.0.6000.16386 53.50 KB (54,784 bytes) 1/18/2008 10:03 PM Microsoft Corporation c:\windows\system32\signdrv.dll

riched32 6.0.6001.18000 10.50 KB (10,752 bytes) 1/18/2008 10:08 PM Microsoft Corporation c:\windows\system32\riched32.dll

riched20 5.31.23.1228 592.00 KB (606,208 bytes) 1/18/2008 10:08 PM Microsoft Corporation c:\windows\system32\riched20.dll

WmiPerfClass 6.0.6001.18000 134.00 KB (137,216 bytes) 1/18/2008 10:03 PM Microsoft Corporation c:\windows\system32\wbem\wmiperfclass.dll

[Services]

Display Name Name State Start Mode Service Type Path Error Control Start Name Tag ID

Application Experience AeLookupSvc Running Auto Share Process c:\windows\system32\svchost.exe -k netsvcs Normal localSystem 0

Application Layer Gateway Service ALG Stopped Manual Own Process c:\windows\system32\alg.exe Normal NT AUTHORITY\LocalService 0

Application Information Appinfo Stopped Manual Share Process c:\windows\system32\svchost.exe -k netsvcs Normal LocalSystem 0

Application Management AppMgmt Stopped Manual Share Process c:\windows\system32\svchost.exe -k netsvcs Normal LocalSystem 0

Windows Audio Endpoint Builder AudioEndpointBuilder Stopped Manual Share Process c:\windows\system32\svchost.exe -k localsystemnetworkrestricted Normal LocalSystem 0

Windows Audio AudioSrv Stopped Manual Share Process c:\windows\system32\svchost.exe -k localservicenetworkrestricted Normal NT AUTHORITY\LocalService 0

Base Filtering Engine BFE Running Auto Share Process c:\windows\system32\svchost.exe -k localservicenonetwork Normal NT AUTHORITY\LocalService 0

Background Intelligent Transfer Service BITS Running Auto Share Process c:\windows\system32\svchost.exe -k netsvcs Normal LocalSystem 0

Computer Browser Browser Stopped Disabled Share Process c:\windows\system32\svchost.exe -k netsvcs Normal LocalSystem 0

Certificate Propagation CertPropSvc Running Manual Share Process

c:\windows\system32\svchost.exe -k netsvcs Normal LocalSystem 0

Microsoft .NET Framework NGEN v2.0.50727_X86 clr_optimization_v2.0.50727_32 Stopped Manual Own Process c:\windows\microsoft.net\framework\v2.0.50727\mscorsvw.exe Ignore LocalSystem 0

Microsoft .NET Framework NGEN v2.0.50727_X64 clr_optimization_v2.0.50727_64 Stopped Manual Own Process c:\windows\microsoft.net\framework64\v2.0.50727\mscorsvw.exe Ignore LocalSystem 0

COM+ System Application COMSysApp Stopped Manual Own Process c:\windows\system32\dllhost.exe /processid:{02d4b3f1-fd88-11d1-960d-00805fc79235} Normal LocalSystem 0

Cryptographic Services CryptSvc Running Auto Share Process c:\windows\system32\svchost.exe -k networkservice Normal NT Authority\NetworkService 0

Offline Files CscService Stopped Disabled Share Process c:\windows\system32\svchost.exe -k localsystemnetworkrestricted Normal LocalSystem 0

DCOM Server Process Launcher DcomLaunch Running Auto Share Process c:\windows\system32\svchost.exe -k dcomlaunch Normal LocalSystem 0

DHCP Client Dhcp Running Auto Share Process c:\windows\system32\svchost.exe -k localservicenetworkrestricted Normal NT Authority\LocalService 0

DNS Client Dnscache Running Auto Share Process c:\windows\system32\svchost.exe -k networkservice Normal NT AUTHORITY\NetworkService 0

Wired AutoConfig dot3svc Stopped Manual Share Process c:\windows\system32\svchost.exe -k localsystemnetworkrestricted Normal localSystem 0

Diagnostic Policy Service DPS Running Auto Share Process c:\windows\system32\svchost.exe -k localservicenonetwork Normal NT AUTHORITY\LocalService 0

Extensible Authentication Protocol EapHost Stopped Manual Share Process c:\windows\system32\svchost.exe -k netsvcs Normal localSystem 0

Emulex HBA Discovery Emulex HBA Discovery Stopped Manual Own Process c:\program files (x86)\emulex\util\common\hbadiscsrvr.exe Normal LocalSystem 0

Emulex HBA Management Emulex HBA Management Running Auto Own Process c:\program files (x86)\emulex\util\common\rmserver.exe Normal LocalSystem 0

Emulex SvcMgr Emulex SvcMgr Running Auto Own Process c:\program files (x86)\emulex\util\common\hbahsmgr.exe Normal LocalSystem 0

Windows Event Log EventLog Running Auto Share Process c:\windows\system32\svchost.exe -k localservicenetworkrestricted Normal NT AUTHORITY\LocalService 0

COM+ Event System EventSystem Running Auto Share Process
c:\windows\system32\svchost.exe -k localservice Normal NT AUTHORITY\LocalService 0

Microsoft Fibre Channel Platform Registration Service FCRegSvc Stopped Manual Share
Process c:\windows\system32\svchost.exe -k localservicenetworkrestricted Normal NT
AUTHORITY\LocalService 0

Function Discovery Provider Host fdPHost Stopped Manual Share Process
c:\windows\system32\svchost.exe -k localservice Normal NT AUTHORITY\LocalService 0

Function Discovery Resource Publication FDResPub Running Auto Share Process
c:\windows\system32\svchost.exe -k localservice Normal NT AUTHORITY\LocalService
0

Windows Presentation Foundation Font Cache 3.0.0.0 FontCache3.0.0.0 Stopped Manual
Own Process c:\windows\microsoft.net\framework64\v3.0\wpf\presentationfontcache.exe
Normal NT Authority\LocalService 0

Group Policy Client gpsvc Running Auto Own Process
c:\windows\system32\svchost.exe -k gpsvcgroup Normal LocalSystem 0

Human Interface Device Access hidserv Stopped Manual Share Process
c:\windows\system32\svchost.exe -k localsystemnetworkrestricted Normal LocalSystem 0

Health Key and Certificate Management hkmsvc Stopped Manual Share Process
c:\windows\system32\svchost.exe -k netsvcs Normal localSystem 0

Windows CardSpace idsvc Stopped Manual Share Process
"c:\windows\microsoft.net\framework64\v3.0\windows communication foundation\infocard.exe"
Normal LocalSystem 0

IKE and AuthIP IPsec Keying Modules IKEEXT Running Auto Share Process
c:\windows\system32\svchost.exe -k netsvcs Normal LocalSystem 0

PnP-X IP Bus Enumerator IPBusEnum Stopped Disabled Share Process
c:\windows\system32\svchost.exe -k localsystemnetworkrestricted Normal LocalSystem 0

IP Helper iphlpsvc Running Auto Share Process
c:\windows\system32\svchost.exe -k netsvcs Normal LocalSystem 0

CNG Key Isolation KeyIso Stopped Manual Share Process c:\windows\system32\lsass.exe
Normal LocalSystem 0

KtmRm for Distributed Transaction Coordinator KtmRm Running Auto Share Process
c:\windows\system32\svchost.exe -k networkservice Normal NT AUTHORITY\NetworkService
0

Server LanmanServer Running Auto Share Process c:\windows\system32\svchost.exe -
k netsvcs Normal LocalSystem 0

Workstation LanmanWorkstation Running Auto Share Process

c:\windows\system32\svchost.exe -k localservice Normal NT AUTHORITY\LocalService 0

Link-Layer Topology Discovery Mapper lltdsvc Stopped Manual Share Process
c:\windows\system32\svchost.exe -k localservice Normal NT AUTHORITY\LocalService 0

TCP/IP NetBIOS Helper lmhosts Running Auto Share Process
c:\windows\system32\svchost.exe -k localservicenetworkrestricted Normal NT
AUTHORITY\LocalService 0

Multimedia Class Scheduler MMCSS Stopped Manual Share Process
c:\windows\system32\svchost.exe -k netsvcs Normal LocalSystem 0

Windows Firewall MpsSvc Running Auto Share Process
c:\windows\system32\svchost.exe -k localservicenonetwork Normal NT Authority\LocalService
0

Distributed Transaction Coordinator MSDTC Running Auto Own Process
c:\windows\system32\msdtc.exe Normal NT AUTHORITY\NetworkService 0

Microsoft iSCSI Initiator Service MSiSCSI Stopped Manual Share Process
c:\windows\system32\svchost.exe -k netsvcs Normal LocalSystem 0

Windows Installer msiserver Stopped Manual Own Process
c:\windows\system32\msiexec /v Normal LocalSystem 0

SQL Server (MSSQLSERVER) MSSQLSERVER Stopped Manual Own Process
"c:\program files\microsoft sql server\mssql10.mssqlserver\mssql\binn\sqlservr.exe" -smssqlserver
Normal LocalSystem 0

SQL Active Directory Helper Service MSSQLServerADHelper100 Stopped Disabled
Own Process "c:\program files\microsoft sql server\100\shared\sqladhlp.exe" Normal
NT AUTHORITY\NETWORK SERVICE 0

Network Access Protection Agent napagent Stopped Manual Share Process
c:\windows\system32\svchost.exe -k networkservice Normal NT AUTHORITY\NetworkService 0

Netlogon Netlogon Stopped Manual Share Process c:\windows\system32\lsass.exe
Normal LocalSystem 0

Network Connections Netman Running Manual Share Process
c:\windows\system32\svchost.exe -k localsystemnetworkrestricted Normal LocalSystem 0

Network List Service netprofm Running Auto Share Process
c:\windows\system32\svchost.exe -k localservice Normal NT AUTHORITY\LocalService 0

Net.Tcp Port Sharing Service NetTcpPortSharing Stopped Disabled Share Process
"c:\windows\microsoft.net\framework64\v3.0\windows communication foundation\smsvchost.exe"
Normal NT AUTHORITY\LocalService 0

Network Location Awareness NlaSvc Running Auto Share Process

c:\windows\system32\svchost.exe -k networkservice Normal NT AUTHORITY\NetworkService 0

Network Store Interface Service nsi Running Auto Share Process
c:\windows\system32\svchost.exe -k localservice Normal NT Authority\LocalService 0

Performance Counter DLL Host PerfHost Stopped Manual Own Process
c:\windows\syswow64\perfhost.exe Normal NT AUTHORITY\LocalService 0

Performance Logs & Alerts pla Stopped Manual Share Process
c:\windows\system32\svchost.exe -k localservicenonetwork Normal NT AUTHORITY\LocalService
0

Plug and Play PlugPlay Running Auto Share Process
c:\windows\system32\svchost.exe -k dcomlaunch Normal LocalSystem 0

IPsec Policy Agent PolicyAgent Running Auto Share Process
c:\windows\system32\svchost.exe -k networkservicenetworkrestricted Normal NT
Authority\NetworkService 0

User Profile Service ProfSvc Running Auto Share Process
c:\windows\system32\svchost.exe -k netsvcs Normal LocalSystem 0

Protected Storage ProtectedStorage Stopped Manual Share Process
c:\windows\system32\lsass.exe Normal LocalSystem 0

Remote Access Auto Connection Manager RasAuto Stopped Manual Share Process
c:\windows\system32\svchost.exe -k netsvcs Normal localSystem 0

Remote Access Connection Manager RasMan Running Manual Share Process
c:\windows\system32\svchost.exe -k netsvcs Normal localSystem 0

Routing and Remote Access RemoteAccess Stopped Disabled Share Process
c:\windows\system32\svchost.exe -k netsvcs Normal localSystem 0

Remote Registry RemoteRegistry Running Auto Share Process
c:\windows\system32\svchost.exe -k regsvc Normal NT AUTHORITY\LocalService 0

Remote Procedure Call (RPC) Locator RpcLocator Stopped Manual Own Process
c:\windows\system32\locator.exe Normal NT AUTHORITY\NetworkService 0

Remote Procedure Call (RPC) RpcSs Running Auto Share Process
c:\windows\system32\svchost.exe -k rpcss Normal NT AUTHORITY\NetworkService 0

Resultant Set of Policy Provider RSoPProv Stopped Manual Share Process
c:\windows\system32\rsopprov.exe Normal LocalSystem 0

Special Administration Console Helper sacsvr Running Manual Share Process
c:\windows\system32\svchost.exe -k netsvcs Normal LocalSystem 0

Security Accounts Manager SamSs Running Auto Share Process
c:\windows\system32\lsass.exe Normal LocalSystem 0

Smart Card SCardSvr Stopped Manual Share Process c:\windows\system32\svchost.exe -
k localservice Normal NT AUTHORITY\LocalService 0

Task Scheduler Schedule Running Auto Share Process
c:\windows\system32\svchost.exe -k netsvcs Normal LocalSystem 0

Smart Card Removal Policy SCPolicySvc Stopped Manual Share Process
c:\windows\system32\svchost.exe -k netsvcs Normal LocalSystem 0

Secondary Logon seclogon Running Auto Share Process
c:\windows\system32\svchost.exe -k netsvcs Normal LocalSystem 0

System Event Notification Service SENS Running Auto Share Process
c:\windows\system32\svchost.exe -k netsvcs Normal LocalSystem 0

Terminal Services Configuration SessionEnv Running Manual Share Process
c:\windows\system32\svchost.exe -k netsvcs Normal localSystem 0

Internet Connection Sharing (ICS) SharedAccess Stopped Manual Share Process
c:\windows\system32\svchost.exe -k netsvcs Normal LocalSystem 0

Shell Hardware Detection ShellHWDetection Running Auto Share Process
c:\windows\system32\svchost.exe -k netsvcs Ignore LocalSystem 0

Software Licensing slsvc Running Auto Own Process
c:\windows\system32\slsvc.exe Normal NT AUTHORITY\NetworkService 0

SL UI Notification Service SLUINotify Stopped Manual Share Process
c:\windows\system32\svchost.exe -k localservice Normal NT AUTHORITY\LocalService 0

SNMP Trap SNMPTRAP Stopped Manual Own Process c:\windows\system32\snmptrap.exe
Normal NT AUTHORITY\LocalService 0

Print Spooler Spooler Running Auto Own Process c:\windows\system32\spoolsv.exe
Normal LocalSystem 0

SQL Server Browser SQLBrowser Stopped Manual Own Process "c:\program files
(x86)\microsoft sql server\90\shared\sqlbrowser.exe" Normal NT AUTHORITY\LOCAL SERVICE
0

SQL Server Agent (MSSQLSERVER) SQLSERVERAGENT Stopped Manual Own Process
"c:\program files\microsoft sql server\mssql10.mssqlserver\mssql\binn\sqlagent.exe" -i mssqlserver
Normal LocalSystem 0

SQL Server VSS Writer SQLWriter Stopped Manual Own Process "c:\program
files\microsoft sql server\90\shared\sqlwriter.exe" Normal LocalSystem 0

SSDP Discovery SSDPSRV Stopped Disabled Share Process
c:\windows\system32\svchost.exe -k localservice Normal NT AUTHORITY\LocalService 0

Secure Socket Tunneling Protocol Service SstpSvc Running Manual Share Process
c:\windows\system32\svchost.exe -k localservice Normal NT Authority\LocalService 0

Sun StorageTek Raid Manager Agent SunStorageManagerAgent Running Auto Own
Process "c:\program files\sun\sun storagetek raid manager\storserv.exe" Normal LocalSystem

0

Microsoft Software Shadow Copy Provider swprv Stopped Manual Own Process
c:\windows\system32\svchost.exe -k swprv Normal LocalSystem 0

Superfetch SysMain Stopped Disabled Share Process
c:\windows\system32\svchost.exe -k localsystemnetworkrestricted Ignore LocalSystem 0

Telephony TapiSrv Running Manual Own Process c:\windows\system32\svchost.exe -
k tapisrv Normal NT AUTHORITY\NetworkService 0

TPM Base Services TBS Stopped Auto Share Process c:\windows\system32\svchost.exe -
k localservice Normal NT AUTHORITY\LocalService 0

Terminal Services TermService Running Auto Share Process
c:\windows\system32\svchost.exe -k networkservice Normal NT Authority\NetworkService 0

Themes Themes Stopped Disabled Share Process c:\windows\system32\svchost.exe -k netsvcs
Normal LocalSystem 0

Thread Ordering Server THREADORDER Stopped Manual Share Process
c:\windows\system32\svchost.exe -k localservice Normal NT AUTHORITY\LocalService 0

Distributed Link Tracking Client TrkWks Running Auto Share Process
c:\windows\system32\svchost.exe -k localsystemnetworkrestricted Normal LocalSystem 0

Windows Modules Installer TrustedInstaller Running Manual Own Process
c:\windows\servicing\trustedinstaller.exe Normal localSystem 0

Interactive Services Detection UI0Detect Stopped Manual Own Process
c:\windows\system32\ui0detect.exe Normal LocalSystem 0

Terminal Services UserMode Port Redirector UmRdpService Running Manual Share
Process c:\windows\system32\svchost.exe -k localsystemnetworkrestricted Normal localSystem
0

UPnP Device Host upnphost Stopped Disabled Share Process
c:\windows\system32\svchost.exe -k localservice Normal NT AUTHORITY\LocalService 0

Desktop Window Manager Session Manager UxSms Running Auto Share Process
c:\windows\system32\svchost.exe -k localsystemnetworkrestricted Normal localSystem
0

Virtual Disk vds Running Manual Own Process c:\windows\system32\vds.exe
Normal LocalSystem 0

Volume Shadow Copy VSS Stopped Manual Own Process c:\windows\system32\vssvc.exe
Normal LocalSystem 0

Windows Time W32Time Running Auto Share Process

c:\windows\system32\svchost.exe -k localservice Normal NT AUTHORITY\LocalService 0

Windows Color System WcsPlugInService Stopped Manual Share Process
c:\windows\system32\svchost.exe -k wcssvc Normal NT AUTHORITY\LocalService 0

Diagnostic Service Host WdiServiceHost Stopped Manual Share Process
c:\windows\system32\svchost.exe -k wdisvc Normal NT AUTHORITY\LocalService 0

Diagnostic System Host WdiSystemHost Running Manual Share Process
c:\windows\system32\svchost.exe -k localsystemnetworkrestricted Normal LocalSystem 0

Windows Event Collector Wecsvc Stopped Manual Share Process c:\windows\system32\svchost.exe -
k networkservice Normal NT AUTHORITY\NetworkService 0

Problem Reports and Solutions Control Panel Support wercplsupport Stopped Manual Share
Process c:\windows\system32\svchost.exe -k netsvcs Normal localSystem 0

Windows Error Reporting Service WerSvc Running Auto Share Process
c:\windows\system32\svchost.exe -k wersvcgroup Ignore localSystem 0

WinHTTP Web Proxy Auto-Discovery Service WinHttpAutoProxySvc Stopped Manual Share
Process c:\windows\system32\svchost.exe -k localservice Normal NT AUTHORITY\LocalService
0

Windows Management Instrumentation Winmgmt Running Auto Share Process
c:\windows\system32\svchost.exe -k netsvcs Ignore localSystem 0

Windows Remote Management (WS-Management) WinRM Running Auto Share Process
c:\windows\system32\svchost.exe -k networkservice Normal NT AUTHORITY\NetworkService
0

WMI Performance Adapter wmiApSrv Stopped Manual Own Process
c:\windows\system32\wbem\wmiapsrv.exe Normal localSystem 0

Portable Device Enumerator Service WPDBusEnum Stopped Manual Share Process
c:\windows\system32\svchost.exe -k localsystemnetworkrestricted Normal LocalSystem 0

Windows Update wuauserv Running Auto Share Process
c:\windows\system32\svchost.exe -k netsvcs Normal LocalSystem 0

Windows Driver Foundation - User-mode Driver Framework wudfsvc Stopped Manual Share Process
c:\windows\system32\svchost.exe -k localsystemnetworkrestricted Normal LocalSystem
0

[Program Groups]

Group Name Name User Name

Start Menu Default:Start Menu Default

Start Menu\Programs Default:Start Menu\Programs Default

Start Menu\Programs\Accessories Default:Start Menu\Programs\Accessories Default

Start Menu\Programs\Accessories\Accessibility Default:Start Menu\Programs\Accessories\Accessibility Default

Start Menu\Programs\Accessories\System Tools Default:Start Menu\Programs\Accessories\System Tools Default

Start Menu\Programs\Maintenance Default:Start Menu\Programs\Maintenance Default

Start Menu Public:Start Menu Public

Start Menu\Programs Public:Start Menu\Programs Public

Start Menu\Programs\Accessories Public:Start Menu\Programs\Accessories Public

Start Menu\Programs\Accessories\Accessibility Public:Start Menu\Programs\Accessories\Accessibility Public

Start Menu\Programs\Accessories\System Tools Public:Start Menu\Programs\Accessories\System Tools Public

Start Menu\Programs\Administrative Tools Public:Start Menu\Programs\Administrative Tools Public

Start Menu\Programs\Administrative Tools\Terminal Services Public:Start Menu\Programs\Administrative Tools\Terminal Services Public

Start Menu\Programs\Debugging Tools for Windows (x64) Public:Start Menu\Programs\Debugging Tools for Windows (x64) Public

Start Menu\Programs\Emulex Public:Start Menu\Programs\Emulex Public

Start Menu\Programs\Extras and Upgrades Public:Start Menu\Programs\Extras and Upgrades Public

Start Menu\Programs\Maintenance Public:Start Menu\Programs\Maintenance Public

Start Menu\Programs\Microsoft SQL Server 2008 Public:Start Menu\Programs\Microsoft SQL Server 2008 Public

Start Menu\Programs\Microsoft SQL Server 2008\Analysis Services Public:Start Menu\Programs\Microsoft SQL Server 2008\Analysis Services Public

Start Menu\Programs\Microsoft SQL Server 2008\Configuration Tools Public:Start Menu\Programs\Microsoft SQL Server 2008\Configuration Tools Public

Start Menu\Programs\Microsoft SQL Server 2008\Documentation and Tutorials Public:Start Menu\Programs\Microsoft SQL Server 2008\Documentation and Tutorials Public

Start Menu\Programs\Microsoft SQL Server 2008\Integration Services Public:Start Menu\Programs\Microsoft SQL Server 2008\Integration Services Public

Start Menu\Programs\Microsoft SQL Server 2008\Performance Tools Public:Start

Menu\Programs\Microsoft SQL Server 2008\Performance Tools Public

Start Menu\Programs\Mozilla Firefox Public:Start Menu\Programs\Mozilla Firefox Public

Start Menu\Programs\Startup Public:Start Menu\Programs\Startup Public

Start Menu\Programs\Sun StorageTek Raid Manager Public:Start Menu\Programs\Sun StorageTek Raid Manager Public

Start Menu\Programs\Vim 7.2 Public:Start Menu\Programs\Vim 7.2 Public

Start Menu\Programs\Windows PowerShell 1.0 Public:Start Menu\Programs\Windows PowerShell 1.0 Public

Start Menu\Programs\Windows Resource Kit Tools Public:Start Menu\Programs\Windows Resource Kit Tools Public

Start Menu\Programs\WinRAR Public:Start Menu\Programs\WinRAR Public

Start Menu WIN-3Q8F83BVFVF\Administrator:Start Menu WIN-3Q8F83BVFVF\Administrator

Start Menu\Programs WIN-3Q8F83BVFVF\Administrator:Start Menu\Programs WIN-3Q8F83BVFVF\Administrator

Start Menu\Programs\Accessories WIN-3Q8F83BVFVF\Administrator:Start Menu\Programs\Accessories WIN-3Q8F83BVFVF\Administrator

Start Menu\Programs\Accessories\Accessibility WIN-3Q8F83BVFVF\Administrator:Start Menu\Programs\Accessories\Accessibility WIN-3Q8F83BVFVF\Administrator

Start Menu\Programs\Accessories\System Tools WIN-3Q8F83BVFVF\Administrator:Start Menu\Programs\Accessories\System Tools WIN-3Q8F83BVFVF\Administrator

Start Menu\Programs\Administrative Tools WIN-3Q8F83BVFVF\Administrator:Start Menu\Programs\Administrative Tools WIN-3Q8F83BVFVF\Administrator

Start Menu\Programs\Maintenance WIN-3Q8F83BVFVF\Administrator:Start Menu\Programs\Maintenance WIN-3Q8F83BVFVF\Administrator

Start Menu\Programs\Microsoft Windows Performance Toolkit WIN-3Q8F83BVFVF\Administrator:Start Menu\Programs\Microsoft Windows Performance Toolkit WIN-3Q8F83BVFVF\Administrator

Start Menu\Programs\Startup WIN-3Q8F83BVFVF\Administrator:Start Menu\Programs\Startup WIN-3Q8F83BVFVF\Administrator

Start Menu\Programs\StepMaster WIN-3Q8F83BVFVF\Administrator:Start Menu\Programs\StepMaster WIN-3Q8F83BVFVF\Administrator

Start Menu\Programs\WinRAR WIN-3Q8F83BVFVF\Administrator:Start Menu\Programs\WinRAR WIN-3Q8F83BVFVF\Administrator

[Startup Programs]

Program Command User Name Location

SunJavaUpdateSched "c:\program files\java\jre6\bin\jusched.exe" Public HKLM\SOFTWARE\Microsoft\Windows\CurrentVersion\Run

[OLE Registration]

Object Local Server

WordPad Document "%programfiles%\windows nt\accessories\wordpad.exe"

Package Not Available

[Windows Error Reporting]

Time Type Details

4/10/2009 7:41 PM Application Error Faulting application StepMaster.exe, version 2.7.0.1004, time stamp 0x4890bfbf, faulting module ntdll.dll, version 6.0.6001.18000, time stamp 0x4791a783, exception code 0xc0000005, fault offset 0x00023592, process id 0xd48, application start time 0x01c9ba0ff0e5a1cd.

4/10/2009 9:04 PM Application Error Faulting application StepMaster.exe, version 2.7.0.1004, time stamp 0x4890bfbf, faulting module ntdll.dll, version 6.0.6001.18000, time stamp 0x4791a783, exception code 0xc0000005, fault offset 0x00023592, process id 0xd48, application start time 0x01c9ba0ff0e5a1cd.

4/11/2009 2:23 PM Application Error Faulting application StepMaster.exe, version 2.7.0.1004, time stamp 0x4890bfbf, faulting module ntdll.dll, version 6.0.6001.18000, time stamp 0x4791a783, exception code 0xc0000005, fault offset 0x00023592, process id 0x148, application start time 0x01c9baac37f736db.

4/11/2009 3:04 PM Application Error Faulting application StepMaster.exe, version 2.7.0.1004, time stamp 0x4890bfbf, faulting module ntdll.dll, version 6.0.6001.18000, time stamp 0x4791a783, exception code 0xc0000005, fault offset 0x00023592, process id 0x148, application start time 0x01c9baac37f736db.

4/13/2009 4:34 AM Application Error Faulting application StepMaster.exe, version 2.7.0.1004, time stamp 0x4890bfbf, faulting module ntdll.dll, version 6.0.6001.18000, time stamp 0x4791a783, exception code 0xc0000005, fault offset 0x00023592, process id 0x1024, application start time 0x01c9bbd718368db8.

4/13/2009 12:37 PM Application Error Faulting application StepMaster.exe, version 2.7.0.1004, time stamp 0x4890bfbf, faulting module ntdll.dll, version 6.0.6001.18000, time stamp

0x4791a783, exception code 0xc0000005, fault offset 0x00023592, process id 0x1024, application start time 0x01c9bbd718368db8.

4/13/2009 8:20 PM Application Error Faulting application StepMaster.exe, version 2.7.0.1004, time stamp 0x4890bfbf, faulting module ntdll.dll, version 6.0.6001.18000, time stamp 0x4791a783, exception code 0xc0000005, fault offset 0x00023592, process id 0x1090, application start time 0x01c9bc711b70c715.

4/21/2009 7:41 PM Application Error Faulting application fseek.exe, version 0.0.0.0, time stamp 0x497e0ce6, faulting module fseek.exe, version 0.0.0.0, time stamp 0x497e0ce6, exception code 0xc0000094, fault offset 0x00004474, process id 0x2b54, application start time 0x01c9c2b92054b390.

6/3/2009 3:51 AM Application Error Faulting application flock.exe, version 0.0.0.0, time stamp 0x4a25f8cb, faulting module flock.exe, version 0.0.0.0, time stamp 0x4a25f8cb, exception code 0xc000000d, fault offset 0x0000000000001c34, process id 0x388c, application start time 0x01c9e3fe89c3aaf0.

6/12/2009 2:11 PM Application Error Faulting application taskeng.exe, version 6.0.6001.18000, time stamp 0x479194ee, faulting module ole32.dll, version 6.0.6001.18000, time stamp 0x4791ad88, exception code 0xc0000005, fault offset 0x0000000000029084, process id 0x2338, application start time 0x01c9eb66c7330150.

SQL Server

Engine Version: Microsoft SQL Server 2008 (RTM) - 10.0.1600.17 (X64)

SQL install: The installation followed the default options. For the sort order Latin1_General_binary was chosen. Mixed mode authentication was used.

SQL Startup parameters:

-x Disable the keeping of CPU time and cache-hit ratio statistics

-c Start SQL Server independently of Windows NT Service Control Manager

-E Increase the number of consecutive extents allocated per file to 4

-T2301 Trace flag to enable more accurate query run-time behavior modeling in the SQL Server query optimizer typically only needed for large data set decision support processing.

-T834 On systems with 8GB or more, this trace flag causes the buffer pool to use large pages. These are allocated at startup and are kept throughout the lifetime of the process. This trace flag can only be set on 64-bit installations of SQL Server.

The following parameters were changed from their default values:

Name	***Minimum***	***Maximum***	***Config_Value***	***Run_Value***
affinity mask	-2147483648	-2147483648	-1	-1
allow updates	0	1	1	1
lightweight pooling	0	1	1	1
max worker threads	128	32767	2048	2048
max server memory (MB)	16	2147483647	248000	248000
min server memory (MB)	0	2147483647	240000	240000
network packet size (B)	512	32767	32767	32767
recovery interval (min)	0	32767	32767	32767
show advanced options	0	1	1	1
query wait	-1	2147483647	2147483647	2147483647

```
if exists (select name from sysdatabases where name = '%DBNAME%')
  drop database %DBNAME%

CREATE DATABASE %DBNAME%
ON PRIMARY
( NAME       = tpch_root,
  FILENAME   = 'C:\tpch\tpch_root.mdf',
  SIZE       = 10MB,
  FILEGROWTH = 10MB),
FILEGROUP DATA_FG
( NAME       = tpch_data0,
  FILENAME   = 'C:\tpch\data\fs0\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data1,
  FILENAME   = 'C:\tpch\data\fs12\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data2,
  FILENAME   = 'C:\tpch\data\fs24\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data3,
  FILENAME   = 'C:\tpch\data\fs36\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data4,
  FILENAME   = 'C:\tpch\data\fs48\',
  SIZE       = 3750MB,
```

```
  FILEGROWTH = 0),
( NAME      = tpch_data5,
  FILENAME  = 'C:\tpch\data\fs60\',
  SIZE      = 3750MB,
  FILEGROWTH = 0),
( NAME      = tpch_data6,
  FILENAME  = 'C:\tpch\data\fs72\',
  SIZE      = 3750MB,
  FILEGROWTH = 0),
( NAME      = tpch_data7,
  FILENAME  = 'C:\tpch\data\fs87\',
  SIZE      = 3750MB,
  FILEGROWTH = 0),
( NAME      = tpch_data8,
  FILENAME  = 'C:\tpch\data\fs99\',
  SIZE      = 3750MB,
  FILEGROWTH = 0),
( NAME      = tpch_data9,
  FILENAME  = 'C:\tpch\data\fs111\',
  SIZE      = 3750MB,
  FILEGROWTH = 0),
( NAME      = tpch_data10,
  FILENAME  = 'C:\tpch\data\fs123\',
  SIZE      = 3750MB,
  FILEGROWTH = 0),
( NAME      = tpch_data11,
  FILENAME  = 'C:\tpch\data\fs135\',
  SIZE      = 3750MB,
  FILEGROWTH = 0),
( NAME      = tpch_data12,
  FILENAME  = 'C:\tpch\data\fs147\',
```

```
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data13,
  FILENAME   = 'C:\tpch\data\fs159\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data14,
  FILENAME   = 'C:\tpch\data\fs1\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data15,
  FILENAME   = 'C:\tpch\data\fs13\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data16,
  FILENAME   = 'C:\tpch\data\fs25\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data17,
  FILENAME   = 'C:\tpch\data\fs37\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data18,
  FILENAME   = 'C:\tpch\data\fs49\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data19,
  FILENAME   = 'C:\tpch\data\fs61\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data20,
```

```
  FILENAME   = 'C:\tpch\data\fs73\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data21,
  FILENAME   = 'C:\tpch\data\fs88\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data22,
  FILENAME   = 'C:\tpch\data\fs100\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data23,
  FILENAME   = 'C:\tpch\data\fs112\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data24,
  FILENAME   = 'C:\tpch\data\fs124\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data25,
  FILENAME   = 'C:\tpch\data\fs136\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data26,
  FILENAME   = 'C:\tpch\data\fs148\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data27,
  FILENAME   = 'C:\tpch\data\fs160\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
```

```
( NAME       = tpch_data28,
  FILENAME   = 'C:\tpch\data\fs2\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data29,
  FILENAME   = 'C:\tpch\data\fs14\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data30,
  FILENAME   = 'C:\tpch\data\fs26\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data31,
  FILENAME   = 'C:\tpch\data\fs38\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data32,
  FILENAME   = 'C:\tpch\data\fs50\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data33,
  FILENAME   = 'C:\tpch\data\fs62\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data34,
  FILENAME   = 'C:\tpch\data\fs74\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data35,
  FILENAME   = 'C:\tpch\data\fs89\',
  SIZE       = 3750MB,
```

```
  FILEGROWTH = 0),
( NAME      = tpch_data36,
  FILENAME  = 'C:\tpch\data\fs101\',
  SIZE      = 3750MB,
  FILEGROWTH = 0),
( NAME      = tpch_data37,
  FILENAME  = 'C:\tpch\data\fs113\',
  SIZE      = 3750MB,
  FILEGROWTH = 0),
( NAME      = tpch_data38,
  FILENAME  = 'C:\tpch\data\fs125\',
  SIZE      = 3750MB,
  FILEGROWTH = 0),
( NAME      = tpch_data39,
  FILENAME  = 'C:\tpch\data\fs137\',
  SIZE      = 3750MB,
  FILEGROWTH = 0),
( NAME      = tpch_data40,
  FILENAME  = 'C:\tpch\data\fs149\',
  SIZE      = 3750MB,
  FILEGROWTH = 0),
( NAME      = tpch_data41,
  FILENAME  = 'C:\tpch\data\fs161\',
  SIZE      = 3750MB,
  FILEGROWTH = 0),
( NAME      = tpch_data42,
  FILENAME  = 'C:\tpch\data\fs3\',
  SIZE      = 3750MB,
  FILEGROWTH = 0),
( NAME      = tpch_data43,
  FILENAME  = 'C:\tpch\data\fs15\',
```

```
    SIZE       = 3750MB,
    FILEGROWTH = 0),
( NAME       = tpch_data44,
    FILENAME   = 'C:\tpch\data\fs27\',
    SIZE       = 3750MB,
    FILEGROWTH = 0),
( NAME       = tpch_data45,
    FILENAME   = 'C:\tpch\data\fs39\',
    SIZE       = 3750MB,
    FILEGROWTH = 0),
( NAME       = tpch_data46,
    FILENAME   = 'C:\tpch\data\fs51\',
    SIZE       = 3750MB,
    FILEGROWTH = 0),
( NAME       = tpch_data47,
    FILENAME   = 'C:\tpch\data\fs63\',
    SIZE       = 3750MB,
    FILEGROWTH = 0),
( NAME       = tpch_data48,
    FILENAME   = 'C:\tpch\data\fs75\',
    SIZE       = 3750MB,
    FILEGROWTH = 0),
( NAME       = tpch_data49,
    FILENAME   = 'C:\tpch\data\fs90\',
    SIZE       = 3750MB,
    FILEGROWTH = 0),
( NAME       = tpch_data50,
    FILENAME   = 'C:\tpch\data\fs102\',
    SIZE       = 3750MB,
    FILEGROWTH = 0),
( NAME       = tpch_data51,
```

```
  FILENAME   = 'C:\tpch\data\fs114\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data52,
  FILENAME   = 'C:\tpch\data\fs126\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data53,
  FILENAME   = 'C:\tpch\data\fs138\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data54,
  FILENAME   = 'C:\tpch\data\fs150\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data55,
  FILENAME   = 'C:\tpch\data\fs162\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data56,
  FILENAME   = 'C:\tpch\data\fs4\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data57,
  FILENAME   = 'C:\tpch\data\fs16\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data58,
  FILENAME   = 'C:\tpch\data\fs28\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
```

```
( NAME       = tpch_data59,
  FILENAME   = 'C:\tpch\data\fs40\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data60,
  FILENAME   = 'C:\tpch\data\fs52\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data61,
  FILENAME   = 'C:\tpch\data\fs64\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data62,
  FILENAME   = 'C:\tpch\data\fs76\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data63,
  FILENAME   = 'C:\tpch\data\fs91\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data64,
  FILENAME   = 'C:\tpch\data\fs103\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data65,
  FILENAME   = 'C:\tpch\data\fs115\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data66,
  FILENAME   = 'C:\tpch\data\fs127\',
  SIZE       = 3750MB,
```

```
  FILEGROWTH = 0),
( NAME      = tpch_data67,
  FILENAME  = 'C:\tpch\data\fs139\',
  SIZE      = 3750MB,
  FILEGROWTH = 0),
( NAME      = tpch_data68,
  FILENAME  = 'C:\tpch\data\fs151\',
  SIZE      = 3750MB,
  FILEGROWTH = 0),
( NAME      = tpch_data69,
  FILENAME  = 'C:\tpch\data\fs163\',
  SIZE      = 3750MB,
  FILEGROWTH = 0),
( NAME      = tpch_data70,
  FILENAME  = 'C:\tpch\data\fs5\',
  SIZE      = 3750MB,
  FILEGROWTH = 0),
( NAME      = tpch_data71,
  FILENAME  = 'C:\tpch\data\fs17\',
  SIZE      = 3750MB,
  FILEGROWTH = 0),
( NAME      = tpch_data72,
  FILENAME  = 'C:\tpch\data\fs29\',
  SIZE      = 3750MB,
  FILEGROWTH = 0),
( NAME      = tpch_data73,
  FILENAME  = 'C:\tpch\data\fs41\',
  SIZE      = 3750MB,
  FILEGROWTH = 0),
( NAME      = tpch_data74,
  FILENAME  = 'C:\tpch\data\fs53\',
```

```
    SIZE       = 3750MB,
    FILEGROWTH = 0),
( NAME       = tpch_data75,
    FILENAME   = 'C:\tpch\data\fs65\',
    SIZE       = 3750MB,
    FILEGROWTH = 0),
( NAME       = tpch_data76,
    FILENAME   = 'C:\tpch\data\fs77\',
    SIZE       = 3750MB,
    FILEGROWTH = 0),
( NAME       = tpch_data77,
    FILENAME   = 'C:\tpch\data\fs92\',
    SIZE       = 3750MB,
    FILEGROWTH = 0),
( NAME       = tpch_data78,
    FILENAME   = 'C:\tpch\data\fs104\',
    SIZE       = 3750MB,
    FILEGROWTH = 0),
( NAME       = tpch_data79,
    FILENAME   = 'C:\tpch\data\fs116\',
    SIZE       = 3750MB,
    FILEGROWTH = 0),
( NAME       = tpch_data80,
    FILENAME   = 'C:\tpch\data\fs128\',
    SIZE       = 3750MB,
    FILEGROWTH = 0),
( NAME       = tpch_data81,
    FILENAME   = 'C:\tpch\data\fs140\',
    SIZE       = 3750MB,
    FILEGROWTH = 0),
( NAME       = tpch_data82,
```

```
  FILENAME   = 'C:\tpch\data\fs152\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data83,
  FILENAME   = 'C:\tpch\data\fs164\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data84,
  FILENAME   = 'C:\tpch\data\fs6\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data85,
  FILENAME   = 'C:\tpch\data\fs18\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data86,
  FILENAME   = 'C:\tpch\data\fs30\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data87,
  FILENAME   = 'C:\tpch\data\fs42\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data88,
  FILENAME   = 'C:\tpch\data\fs54\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data89,
  FILENAME   = 'C:\tpch\data\fs66\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
```

```
( NAME       = tpch_data90,
  FILENAME   = 'C:\tpch\data\fs78\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data91,
  FILENAME   = 'C:\tpch\data\fs93\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data92,
  FILENAME   = 'C:\tpch\data\fs105\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data93,
  FILENAME   = 'C:\tpch\data\fs117\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data94,
  FILENAME   = 'C:\tpch\data\fs129\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data95,
  FILENAME   = 'C:\tpch\data\fs141\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data96,
  FILENAME   = 'C:\tpch\data\fs153\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data97,
  FILENAME   = 'C:\tpch\data\fs165\',
  SIZE       = 3750MB,
```

```
  FILEGROWTH = 0),
( NAME      = tpch_data98,
  FILENAME  = 'C:\tpch\data\fs7\',
  SIZE      = 3750MB,
  FILEGROWTH = 0),
( NAME      = tpch_data99,
  FILENAME  = 'C:\tpch\data\fs19\',
  SIZE      = 3750MB,
  FILEGROWTH = 0),
( NAME      = tpch_data100,
  FILENAME  = 'C:\tpch\data\fs31\',
  SIZE      = 3750MB,
  FILEGROWTH = 0),
( NAME      = tpch_data101,
  FILENAME  = 'C:\tpch\data\fs43\',
  SIZE      = 3750MB,
  FILEGROWTH = 0),
( NAME      = tpch_data102,
  FILENAME  = 'C:\tpch\data\fs55\',
  SIZE      = 3750MB,
  FILEGROWTH = 0),
( NAME      = tpch_data103,
  FILENAME  = 'C:\tpch\data\fs67\',
  SIZE      = 3750MB,
  FILEGROWTH = 0),
( NAME      = tpch_data104,
  FILENAME  = 'C:\tpch\data\fs79\',
  SIZE      = 3750MB,
  FILEGROWTH = 0),
( NAME      = tpch_data105,
  FILENAME  = 'C:\tpch\data\fs94\',
```

```
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data106,
  FILENAME   = 'C:\tpch\data\fs106\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data107,
  FILENAME   = 'C:\tpch\data\fs118\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data108,
  FILENAME   = 'C:\tpch\data\fs130\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data109,
  FILENAME   = 'C:\tpch\data\fs142\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data110,
  FILENAME   = 'C:\tpch\data\fs154\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data111,
  FILENAME   = 'C:\tpch\data\fs166\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data112,
  FILENAME   = 'C:\tpch\data\fs8\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data113,
```

```
  FILENAME   = 'C:\tpch\data\fs20\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data114,
  FILENAME   = 'C:\tpch\data\fs32\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data115,
  FILENAME   = 'C:\tpch\data\fs44\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data116,
  FILENAME   = 'C:\tpch\data\fs56\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data117,
  FILENAME   = 'C:\tpch\data\fs68\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data118,
  FILENAME   = 'C:\tpch\data\fs80\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data119,
  FILENAME   = 'C:\tpch\data\fs95\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data120,
  FILENAME   = 'C:\tpch\data\fs107\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
```

```
( NAME       = tpch_data121,
  FILENAME   = 'C:\tpch\data\fs119\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data122,
  FILENAME   = 'C:\tpch\data\fs131\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data123,
  FILENAME   = 'C:\tpch\data\fs143\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data124,
  FILENAME   = 'C:\tpch\data\fs155\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data125,
  FILENAME   = 'C:\tpch\data\fs167\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data126,
  FILENAME   = 'C:\tpch\data\fs9\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data127,
  FILENAME   = 'C:\tpch\data\fs21\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data128,
  FILENAME   = 'C:\tpch\data\fs33\',
  SIZE       = 3750MB,
```

```
  FILEGROWTH = 0),
( NAME       = tpch_data129,
  FILENAME   = 'C:\tpch\data\fs45\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data130,
  FILENAME   = 'C:\tpch\data\fs57\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data131,
  FILENAME   = 'C:\tpch\data\fs69\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data132,
  FILENAME   = 'C:\tpch\data\fs81\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data133,
  FILENAME   = 'C:\tpch\data\fs96\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data134,
  FILENAME   = 'C:\tpch\data\fs108\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data135,
  FILENAME   = 'C:\tpch\data\fs120\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data136,
  FILENAME   = 'C:\tpch\data\fs132\',
```

```
    SIZE       = 3750MB,
    FILEGROWTH = 0),
( NAME       = tpch_data137,
    FILENAME   = 'C:\tpch\data\fs144\',
    SIZE       = 3750MB,
    FILEGROWTH = 0),
( NAME       = tpch_data138,
    FILENAME   = 'C:\tpch\data\fs156\',
    SIZE       = 3750MB,
    FILEGROWTH = 0),
( NAME       = tpch_data139,
    FILENAME   = 'C:\tpch\data\fs168\',
    SIZE       = 3750MB,
    FILEGROWTH = 0),
( NAME       = tpch_data140,
    FILENAME   = 'C:\tpch\data\fs10\',
    SIZE       = 3750MB,
    FILEGROWTH = 0),
( NAME       = tpch_data141,
    FILENAME   = 'C:\tpch\data\fs22\',
    SIZE       = 3750MB,
    FILEGROWTH = 0),
( NAME       = tpch_data142,
    FILENAME   = 'C:\tpch\data\fs34\',
    SIZE       = 3750MB,
    FILEGROWTH = 0),
( NAME       = tpch_data143,
    FILENAME   = 'C:\tpch\data\fs46\',
    SIZE       = 3750MB,
    FILEGROWTH = 0),
( NAME       = tpch_data144,
```

```
  FILENAME   = 'C:\tpch\data\fs58\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data145,
  FILENAME   = 'C:\tpch\data\fs70\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data146,
  FILENAME   = 'C:\tpch\data\fs82\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data147,
  FILENAME   = 'C:\tpch\data\fs97\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data148,
  FILENAME   = 'C:\tpch\data\fs109\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data149,
  FILENAME   = 'C:\tpch\data\fs121\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data150,
  FILENAME   = 'C:\tpch\data\fs133\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data151,
  FILENAME   = 'C:\tpch\data\fs145\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
```

```
( NAME       = tpch_data152,
  FILENAME   = 'C:\tpch\data\fs157\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data153,
  FILENAME   = 'C:\tpch\data\fs169\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data154,
  FILENAME   = 'C:\tpch\data\fs11\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data155,
  FILENAME   = 'C:\tpch\data\fs23\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data156,
  FILENAME   = 'C:\tpch\data\fs35\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data157,
  FILENAME   = 'C:\tpch\data\fs47\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data158,
  FILENAME   = 'C:\tpch\data\fs59\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_data159,
  FILENAME   = 'C:\tpch\data\fs71\',
  SIZE       = 3750MB,
```

```
  FILEGROWTH = 0),
( NAME      = tpch_data160,
  FILENAME  = 'C:\tpch\data\fs83\',
  SIZE      = 3750MB,
  FILEGROWTH = 0),
( NAME      = tpch_data161,
  FILENAME  = 'C:\tpch\data\fs98\',
  SIZE      = 3750MB,
  FILEGROWTH = 0),
( NAME      = tpch_data162,
  FILENAME  = 'C:\tpch\data\fs110\',
  SIZE      = 3750MB,
  FILEGROWTH = 0),
( NAME      = tpch_data163,
  FILENAME  = 'C:\tpch\data\fs122\',
  SIZE      = 3750MB,
  FILEGROWTH = 0),
( NAME      = tpch_data164,
  FILENAME  = 'C:\tpch\data\fs134\',
  SIZE      = 3750MB,
  FILEGROWTH = 0),
( NAME      = tpch_data165,
  FILENAME  = 'C:\tpch\data\fs146\',
  SIZE      = 3750MB,
  FILEGROWTH = 0),
( NAME      = tpch_data166,
  FILENAME  = 'C:\tpch\data\fs158\',
  SIZE      = 3750MB,
  FILEGROWTH = 0),
( NAME      = tpch_data167,
  FILENAME  = 'C:\tpch\data\fs170\',
```

```
  SIZE       = 3750MB,
  FILEGROWTH = 0),
FILEGROUP   LOAD_FG
( NAME       = tpch_load0,
  FILENAME   = 'C:\tpch\load\fs0\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load1,
  FILENAME   = 'C:\tpch\load\fs12\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load2,
  FILENAME   = 'C:\tpch\load\fs24\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load3,
  FILENAME   = 'C:\tpch\load\fs36\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load4,
  FILENAME   = 'C:\tpch\load\fs48\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load5,
  FILENAME   = 'C:\tpch\load\fs60\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load6,
  FILENAME   = 'C:\tpch\load\fs72\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
```

```
( NAME       = tpch_load7,
  FILENAME   = 'C:\tpch\load\fs87\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load8,
  FILENAME   = 'C:\tpch\load\fs99\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load9,
  FILENAME   = 'C:\tpch\load\fs111\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load10,
  FILENAME   = 'C:\tpch\load\fs123\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load11,
  FILENAME   = 'C:\tpch\load\fs135\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load12,
  FILENAME   = 'C:\tpch\load\fs147\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load13,
  FILENAME   = 'C:\tpch\load\fs159\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load14,
  FILENAME   = 'C:\tpch\load\fs1\',
  SIZE       = 3750MB,
```

```
  FILEGROWTH = 0),
( NAME       = tpch_load15,
  FILENAME   = 'C:\tpch\load\fs13\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load16,
  FILENAME   = 'C:\tpch\load\fs25\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load17,
  FILENAME   = 'C:\tpch\load\fs37\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load18,
  FILENAME   = 'C:\tpch\load\fs49\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load19,
  FILENAME   = 'C:\tpch\load\fs61\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load20,
  FILENAME   = 'C:\tpch\load\fs73\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load21,
  FILENAME   = 'C:\tpch\load\fs88\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load22,
  FILENAME   = 'C:\tpch\load\fs100\',
```

```
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load23,
  FILENAME   = 'C:\tpch\load\fs112\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load24,
  FILENAME   = 'C:\tpch\load\fs124\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load25,
  FILENAME   = 'C:\tpch\load\fs136\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load26,
  FILENAME   = 'C:\tpch\load\fs148\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load27,
  FILENAME   = 'C:\tpch\load\fs160\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load28,
  FILENAME   = 'C:\tpch\load\fs2\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load29,
  FILENAME   = 'C:\tpch\load\fs14\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load30,
```

```
  FILENAME   = 'C:\tpch\load\fs26\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load31,
  FILENAME   = 'C:\tpch\load\fs38\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load32,
  FILENAME   = 'C:\tpch\load\fs50\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load33,
  FILENAME   = 'C:\tpch\load\fs62\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load34,
  FILENAME   = 'C:\tpch\load\fs74\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load35,
  FILENAME   = 'C:\tpch\load\fs89\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load36,
  FILENAME   = 'C:\tpch\load\fs101\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load37,
  FILENAME   = 'C:\tpch\load\fs113\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
```

```
( NAME       = tpch_load38,
  FILENAME   = 'C:\tpch\load\fs125\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load39,
  FILENAME   = 'C:\tpch\load\fs137\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load40,
  FILENAME   = 'C:\tpch\load\fs149\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load41,
  FILENAME   = 'C:\tpch\load\fs161\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load42,
  FILENAME   = 'C:\tpch\load\fs3\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load43,
  FILENAME   = 'C:\tpch\load\fs15\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load44,
  FILENAME   = 'C:\tpch\load\fs27\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load45,
  FILENAME   = 'C:\tpch\load\fs39\',
  SIZE       = 3750MB,
```

```
  FILEGROWTH = 0),
( NAME      = tpch_load46,
  FILENAME  = 'C:\tpch\load\fs51\',
  SIZE      = 3750MB,
  FILEGROWTH = 0),
( NAME      = tpch_load47,
  FILENAME  = 'C:\tpch\load\fs63\',
  SIZE      = 3750MB,
  FILEGROWTH = 0),
( NAME      = tpch_load48,
  FILENAME  = 'C:\tpch\load\fs75\',
  SIZE      = 3750MB,
  FILEGROWTH = 0),
( NAME      = tpch_load49,
  FILENAME  = 'C:\tpch\load\fs90\',
  SIZE      = 3750MB,
  FILEGROWTH = 0),
( NAME      = tpch_load50,
  FILENAME  = 'C:\tpch\load\fs102\',
  SIZE      = 3750MB,
  FILEGROWTH = 0),
( NAME      = tpch_load51,
  FILENAME  = 'C:\tpch\load\fs114\',
  SIZE      = 3750MB,
  FILEGROWTH = 0),
( NAME      = tpch_load52,
  FILENAME  = 'C:\tpch\load\fs126\',
  SIZE      = 3750MB,
  FILEGROWTH = 0),
( NAME      = tpch_load53,
  FILENAME  = 'C:\tpch\load\fs138\',
```

```
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load54,
  FILENAME   = 'C:\tpch\load\fs150\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load55,
  FILENAME   = 'C:\tpch\load\fs162\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load56,
  FILENAME   = 'C:\tpch\load\fs4\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load57,
  FILENAME   = 'C:\tpch\load\fs16\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load58,
  FILENAME   = 'C:\tpch\load\fs28\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load59,
  FILENAME   = 'C:\tpch\load\fs40\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load60,
  FILENAME   = 'C:\tpch\load\fs52\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load61,
```

```
  FILENAME   = 'C:\tpch\load\fs64\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load62,
  FILENAME   = 'C:\tpch\load\fs76\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load63,
  FILENAME   = 'C:\tpch\load\fs91\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load64,
  FILENAME   = 'C:\tpch\load\fs103\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load65,
  FILENAME   = 'C:\tpch\load\fs115\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load66,
  FILENAME   = 'C:\tpch\load\fs127\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load67,
  FILENAME   = 'C:\tpch\load\fs139\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load68,
  FILENAME   = 'C:\tpch\load\fs151\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
```

```
( NAME       = tpch_load69,
  FILENAME   = 'C:\tpch\load\fs163\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load70,
  FILENAME   = 'C:\tpch\load\fs5\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load71,
  FILENAME   = 'C:\tpch\load\fs17\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load72,
  FILENAME   = 'C:\tpch\load\fs29\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load73,
  FILENAME   = 'C:\tpch\load\fs41\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load74,
  FILENAME   = 'C:\tpch\load\fs53\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load75,
  FILENAME   = 'C:\tpch\load\fs65\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load76,
  FILENAME   = 'C:\tpch\load\fs77\',
  SIZE       = 3750MB,
```

```
  FILEGROWTH = 0),
( NAME      = tpch_load77,
  FILENAME  = 'C:\tpch\load\fs92\',
  SIZE      = 3750MB,
  FILEGROWTH = 0),
( NAME      = tpch_load78,
  FILENAME  = 'C:\tpch\load\fs104\',
  SIZE      = 3750MB,
  FILEGROWTH = 0),
( NAME      = tpch_load79,
  FILENAME  = 'C:\tpch\load\fs116\',
  SIZE      = 3750MB,
  FILEGROWTH = 0),
( NAME      = tpch_load80,
  FILENAME  = 'C:\tpch\load\fs128\',
  SIZE      = 3750MB,
  FILEGROWTH = 0),
( NAME      = tpch_load81,
  FILENAME  = 'C:\tpch\load\fs140\',
  SIZE      = 3750MB,
  FILEGROWTH = 0),
( NAME      = tpch_load82,
  FILENAME  = 'C:\tpch\load\fs152\',
  SIZE      = 3750MB,
  FILEGROWTH = 0),
( NAME      = tpch_load83,
  FILENAME  = 'C:\tpch\load\fs164\',
  SIZE      = 3750MB,
  FILEGROWTH = 0),
( NAME      = tpch_load84,
  FILENAME  = 'C:\tpch\load\fs6\',
```

```
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load85,
  FILENAME   = 'C:\tpch\load\fs18\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load86,
  FILENAME   = 'C:\tpch\load\fs30\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load87,
  FILENAME   = 'C:\tpch\load\fs42\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load88,
  FILENAME   = 'C:\tpch\load\fs54\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load89,
  FILENAME   = 'C:\tpch\load\fs66\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load90,
  FILENAME   = 'C:\tpch\load\fs78\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load91,
  FILENAME   = 'C:\tpch\load\fs93\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load92,
```

```
  FILENAME   = 'C:\tpch\load\fs105\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load93,
  FILENAME   = 'C:\tpch\load\fs117\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load94,
  FILENAME   = 'C:\tpch\load\fs129\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load95,
  FILENAME   = 'C:\tpch\load\fs141\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load96,
  FILENAME   = 'C:\tpch\load\fs153\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load97,
  FILENAME   = 'C:\tpch\load\fs165\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load98,
  FILENAME   = 'C:\tpch\load\fs7\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load99,
  FILENAME   = 'C:\tpch\load\fs19\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
```

```
( NAME       = tpch_load100,
  FILENAME   = 'C:\tpch\load\fs31\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load101,
  FILENAME   = 'C:\tpch\load\fs43\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load102,
  FILENAME   = 'C:\tpch\load\fs55\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load103,
  FILENAME   = 'C:\tpch\load\fs67\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load104,
  FILENAME   = 'C:\tpch\load\fs79\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load105,
  FILENAME   = 'C:\tpch\load\fs94\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load106,
  FILENAME   = 'C:\tpch\load\fs106\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load107,
  FILENAME   = 'C:\tpch\load\fs118\',
  SIZE       = 3750MB,
```

```
  FILEGROWTH = 0),
( NAME      = tpch_load108,
  FILENAME  = 'C:\tpch\load\fs130\',
  SIZE      = 3750MB,
  FILEGROWTH = 0),
( NAME      = tpch_load109,
  FILENAME  = 'C:\tpch\load\fs142\',
  SIZE      = 3750MB,
  FILEGROWTH = 0),
( NAME      = tpch_load110,
  FILENAME  = 'C:\tpch\load\fs154\',
  SIZE      = 3750MB,
  FILEGROWTH = 0),
( NAME      = tpch_load111,
  FILENAME  = 'C:\tpch\load\fs166\',
  SIZE      = 3750MB,
  FILEGROWTH = 0),
( NAME      = tpch_load112,
  FILENAME  = 'C:\tpch\load\fs8\',
  SIZE      = 3750MB,
  FILEGROWTH = 0),
( NAME      = tpch_load113,
  FILENAME  = 'C:\tpch\load\fs20\',
  SIZE      = 3750MB,
  FILEGROWTH = 0),
( NAME      = tpch_load114,
  FILENAME  = 'C:\tpch\load\fs32\',
  SIZE      = 3750MB,
  FILEGROWTH = 0),
( NAME      = tpch_load115,
  FILENAME  = 'C:\tpch\load\fs44\',
```

```
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load116,
  FILENAME   = 'C:\tpch\load\fs56\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load117,
  FILENAME   = 'C:\tpch\load\fs68\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load118,
  FILENAME   = 'C:\tpch\load\fs80\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load119,
  FILENAME   = 'C:\tpch\load\fs95\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load120,
  FILENAME   = 'C:\tpch\load\fs107\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load121,
  FILENAME   = 'C:\tpch\load\fs119\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load122,
  FILENAME   = 'C:\tpch\load\fs131\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load123,
```

```
  FILENAME   = 'C:\tpch\load\fs143\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load124,
  FILENAME   = 'C:\tpch\load\fs155\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load125,
  FILENAME   = 'C:\tpch\load\fs167\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load126,
  FILENAME   = 'C:\tpch\load\fs9\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load127,
  FILENAME   = 'C:\tpch\load\fs21\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load128,
  FILENAME   = 'C:\tpch\load\fs33\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load129,
  FILENAME   = 'C:\tpch\load\fs45\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load130,
  FILENAME   = 'C:\tpch\load\fs57\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
```

```
( NAME       = tpch_load131,
  FILENAME   = 'C:\tpch\load\fs69\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load132,
  FILENAME   = 'C:\tpch\load\fs81\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load133,
  FILENAME   = 'C:\tpch\load\fs96\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load134,
  FILENAME   = 'C:\tpch\load\fs108\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load135,
  FILENAME   = 'C:\tpch\load\fs120\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load136,
  FILENAME   = 'C:\tpch\load\fs132\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load137,
  FILENAME   = 'C:\tpch\load\fs144\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load138,
  FILENAME   = 'C:\tpch\load\fs156\',
  SIZE       = 3750MB,
```

```
  FILEGROWTH = 0),
( NAME       = tpch_load139,
  FILENAME   = 'C:\tpch\load\fs168\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load140,
  FILENAME   = 'C:\tpch\load\fs10\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load141,
  FILENAME   = 'C:\tpch\load\fs22\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load142,
  FILENAME   = 'C:\tpch\load\fs34\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load143,
  FILENAME   = 'C:\tpch\load\fs46\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load144,
  FILENAME   = 'C:\tpch\load\fs58\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load145,
  FILENAME   = 'C:\tpch\load\fs70\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load146,
  FILENAME   = 'C:\tpch\load\fs82\',
```

```
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load147,
  FILENAME   = 'C:\tpch\load\fs97\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load148,
  FILENAME   = 'C:\tpch\load\fs109\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load149,
  FILENAME   = 'C:\tpch\load\fs121\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load150,
  FILENAME   = 'C:\tpch\load\fs133\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load151,
  FILENAME   = 'C:\tpch\load\fs145\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load152,
  FILENAME   = 'C:\tpch\load\fs157\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load153,
  FILENAME   = 'C:\tpch\load\fs169\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load154,
```

```
  FILENAME   = 'C:\tpch\load\fs11\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load155,
  FILENAME   = 'C:\tpch\load\fs23\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load156,
  FILENAME   = 'C:\tpch\load\fs35\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load157,
  FILENAME   = 'C:\tpch\load\fs47\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load158,
  FILENAME   = 'C:\tpch\load\fs59\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load159,
  FILENAME   = 'C:\tpch\load\fs71\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load160,
  FILENAME   = 'C:\tpch\load\fs83\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load161,
  FILENAME   = 'C:\tpch\load\fs98\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
```

```
( NAME       = tpch_load162,
  FILENAME   = 'C:\tpch\load\fs110\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load163,
  FILENAME   = 'C:\tpch\load\fs122\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load164,
  FILENAME   = 'C:\tpch\load\fs134\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load165,
  FILENAME   = 'C:\tpch\load\fs146\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load166,
  FILENAME   = 'C:\tpch\load\fs158\',
  SIZE       = 3750MB,
  FILEGROWTH = 0),
( NAME       = tpch_load167,
  FILENAME   = 'C:\tpch\load\fs170\',
  SIZE       = 3750MB,
  FILEGROWTH = 0)
LOG ON
( NAME         = tpchlog1,
  FILENAME     = 'C:\TPCH\log\intraid1disk2\',
  SIZE         = 60000MB,
  FILEGROWTH   = 0)
```

Create Base Tables

```
-- File:    CREATETABLES.SQL
--          Microsoft TPC-H Benchmark Kit Ver. 2.7.0-1004
--          Copyright Microsoft, 2008
--


create table PART
        (P_PARTKEY      int                 not null,
         P_NAME         varchar(55)         not null,
         P_MFGR         char(25)            not null,
         P_BRAND        char(10)            not null,
         P_TYPE         varchar(25)     not null,
         P_SIZE         int                 not null,
         P_CONTAINER    char(10)            not null,
         P_RETAILPRICE  float                   not null,
         P_COMMENT      varchar(23)     not null)
on LOAD_FG
with (DATA_COMPRESSION=PAGE)

create table SUPPLIER
        (S_SUPPKEY      int                 not null,
         S_NAME         char(25)            not null,
         S_ADDRESS      varchar(40)         not null,
         S_NATIONKEY    int                 not null,
         S_PHONE        char(15)            not null,
         S_ACCTBAL      float               not null,
         S_COMMENT      varchar(101)    not null)
on LOAD_FG
with (DATA_COMPRESSION=PAGE)

create table PARTSUPP
        (PS_PARTKEY     int                 not null,
```

```
        PS_SUPPKEY      int             not null,
        PS_AVAILQTY     int             not null,
        PS_SUPPLYCOST   float           not null,
        PS_COMMENT      varchar(199)    not null)
on LOAD_FG
with (DATA_COMPRESSION=PAGE)

create table CUSTOMER
       (C_CUSTKEY       int             not null,
        C_NAME          varchar(25)     not null,
        C_ADDRESS       varchar(40)     not null,
        C_NATIONKEY     int             not null,
        C_PHONE         char(15)        not null,
        C_ACCTBAL       float           not null,
        C_MKTSEGMENT    char(10)        not null,
        C_COMMENT       varchar(117)    not null)
on LOAD_FG
with (DATA_COMPRESSION=PAGE)

create table ORDERS
       (O_ORDERKEY      int             not null,
        O_CUSTKEY       int             not null,
        O_ORDERSTATUS   char(1)         not null,
        O_TOTALPRICE    float           not null,
        O_ORDERDATE     date            not null,
        O_ORDERPRIORITY char(15)        not null,
        O_CLERK         char(15)        not null,
        O_SHIPPRIORITY  int             not null,
        O_COMMENT       varchar(79)     not null)
on LOAD_FG
with (DATA_COMPRESSION=PAGE)
```

```
create table LINEITEM
        (L_ORDERKEY     int             not null,
         L_PARTKEY      int             not null,
         L_SUPPKEY      int             not null,
         L_LINENUMBER   int                     not null,
         L_QUANTITY     float                   not null,
         L_EXTENDEDPRICE    float               not null,
         L_DISCOUNT     float           not null,
         L_TAX          float           not null,
         L_RETURNFLAG   char(1)                 not null,
         L_LINESTATUS   char(1)                 not null,
         L_SHIPDATE     date        not null,
         L_COMMITDATE   date            not null,
         L_RECEIPTDATE  date            not null,
         L_SHIPINSTRUCT     char(25)    not null,
         L_SHIPMODE     char(10)        not null,
         L_COMMENT      varchar(44)     not null)
on LOAD_FG
with (DATA_COMPRESSION=PAGE)

create table NATION
        (N_NATIONKEY    int             not null,
         N_NAME         char(25)        not null,
         N_REGIONKEY    int             not null,
         N_COMMENT      varchar(152)        not null)
on LOAD_FG
with (DATA_COMPRESSION=PAGE)

create table REGION
        (R_REGIONKEY    int             not null,
```

```
        R_NAME          char(25)            not null,
        R_COMMENT       varchar(152)        not null)
on LOAD_FG
with (DATA_COMPRESSION=PAGE)
```

Indexes

```
-- File:    CREATECLUSTEREDINDEXES.SQL
--          Microsoft TPC-H Benchmark Kit Ver. 2.7.0-1004
--          Copyright Microsoft, 2008
--


CREATE INDEX N_REGIONKEY_IDX ON NATION(N_REGIONKEY) WITH (FILLFACTOR=100,
SORT_IN_TEMPDB=ON, DATA_COMPRESSION = page) ON DATA_FG

CREATE INDEX S_NATIONKEY_IDX ON SUPPLIER(S_NATIONKEY) WITH (fillfactor=100,
SORT_IN_TEMPDB=ON, DATA_COMPRESSION = page) ON DATA_FG

CREATE CLUSTERED INDEX O_ORDERDATE_CLUIDX ON ORDERS(O_ORDERDATE) WITH (FILLFACTOR=95,
SORT_IN_TEMPDB=ON, MAXDOP=%INDEX_CREATE_PARALLELISM%) ON DATA_FG

CREATE INDEX PS_SUPPKEY_IDX ON PARTSUPP(PS_SUPPKEY) WITH( FILLFACTOR=100,
SORT_IN_TEMPDB=ON, DATA_COMPRESSION = page) ON DATA_FG

CREATE CLUSTERED INDEX L_SHIPDATE_CLUIDX ON LINEITEM(L_SHIPDATE) WITH ( FILLFACTOR=95,
SORT_IN_TEMPDB=ON, DATA_COMPRESSION = page, MAXDOP=%INDEX_CREATE_PARALLELISM%) ON
DATA_FG

CREATE INDEX L_ORDERKEY_IDX ON LINEITEM(L_ORDERKEY) WITH ( FILLFACTOR=95,
SORT_IN_TEMPDB=ON, DATA_COMPRESSION = page) ON DATA_FG

CREATE INDEX L_PARTKEY_IDX ON LINEITEM(L_PARTKEY) WITH (FILLFACTOR=95,
SORT_IN_TEMPDB=ON, DATA_COMPRESSION = page) ON DATA_FG
```

Foreign Keys

```
--
-- File:    CREATERFK.SQL
--          Microsoft TPC-H Benchmark Kit Ver. 2.7.0-1004
--          Copyright Microsoft, 2008
--
```

```
IF NOT EXISTS ( SELECT name FROM sysobjects WHERE name = 'FK_S_NATIONKEY' )
   ALTER TABLE SUPPLIER ADD CONSTRAINT FK_S_NATIONKEY
      FOREIGN KEY (S_NATIONKEY) REFERENCES NATION(N_NATIONKEY)
GO

IF NOT EXISTS ( SELECT name FROM sysobjects WHERE name = 'FK_PS_PARTKEY' )
   ALTER TABLE PARTSUPP ADD CONSTRAINT FK_PS_PARTKEY
      FOREIGN KEY (PS_PARTKEY) REFERENCES PART(P_PARTKEY)
GO

IF NOT EXISTS ( SELECT name FROM sysobjects WHERE name = 'FK_PS_SUPPKEY' )
   ALTER TABLE PARTSUPP ADD CONSTRAINT FK_PS_SUPPKEY
      FOREIGN KEY (PS_SUPPKEY) REFERENCES SUPPLIER(S_SUPPKEY)
GO

IF NOT EXISTS ( SELECT name FROM sysobjects WHERE name = 'FK_C_NATIONKEY' )
   ALTER TABLE CUSTOMER ADD CONSTRAINT FK_C_NATIONKEY
      FOREIGN KEY (C_NATIONKEY) REFERENCES NATION(N_NATIONKEY)
GO

IF NOT EXISTS ( SELECT name FROM sysobjects WHERE name = 'FK_O_CUSTKEY' )
   ALTER TABLE ORDERS ADD CONSTRAINT FK_O_CUSTKEY
      FOREIGN KEY (O_CUSTKEY) REFERENCES CUSTOMER(C_CUSTKEY)
GO

IF NOT EXISTS ( SELECT name FROM sysobjects WHERE name = 'FK_N_REGIONKEY' )
   ALTER TABLE NATION ADD CONSTRAINT FK_N_REGIONKEY
      FOREIGN KEY (N_REGIONKEY) REFERENCES REGION(R_REGIONKEY)
GO

IF NOT EXISTS ( SELECT name FROM sysobjects WHERE name = 'FK_L_ORDERKEY' )
```

```
   ALTER TABLE LINEITEM ADD CONSTRAINT FK_L_ORDERKEY
      FOREIGN KEY (L_ORDERKEY) REFERENCES ORDERS(O_ORDERKEY)
GO

IF NOT EXISTS ( SELECT name FROM sysobjects WHERE name = 'FK_L_PARTKEY' )
   ALTER TABLE LINEITEM ADD CONSTRAINT FK_L_PARTKEY
      FOREIGN KEY (L_PARTKEY) REFERENCES PART(P_PARTKEY)
GO

IF NOT EXISTS ( SELECT name FROM sysobjects WHERE name = 'FK_L_SUPPKEY' )
   ALTER TABLE LINEITEM ADD CONSTRAINT FK_L_SUPPKEY
      FOREIGN KEY (L_SUPPKEY) REFERENCES SUPPLIER(S_SUPPKEY)
GO

IF NOT EXISTS ( SELECT name FROM sysobjects WHERE name = 'FK_L_PARTKEY_SUPPKEY' )
   ALTER TABLE LINEITEM ADD CONSTRAINT FK_L_PARTKEY_SUPPKEY
      FOREIGN KEY (L_PARTKEY,L_SUPPKEY) REFERENCES PARTSUPP(PS_PARTKEY, PS_SUPPKEY)
GO
```

Primary Keys

```
ALTER TABLE NATION ADD CONSTRAINT PK_N_NATIONKEY PRIMARY KEY (N_NATIONKEY) ON DATA_FG

ALTER TABLE REGION ADD CONSTRAINT PK_R_REGIONKEY PRIMARY KEY (R_REGIONKEY) ON DATA_FG

ALTER TABLE PART ADD CONSTRAINT PK_P_PARTKEY PRIMARY KEY (P_PARTKEY) ON DATA_FG

ALTER TABLE SUPPLIER ADD CONSTRAINT PK_S_SUPPKEY PRIMARY KEY (S_SUPPKEY) ON DATA_FG

ALTER TABLE CUSTOMER ADD CONSTRAINT PK_C_CUSTKEY PRIMARY KEY (C_CUSTKEY) ON DATA_FG

ALTER TABLE PARTSUPP ADD CONSTRAINT PK_PS_PARTKEY_PS_SUPPKEY PRIMARY KEY (PS_PARTKEY,
PS_SUPPKEY) ON DATA_FG

ALTER TABLE ORDERS ADD CONSTRAINT PK_O_ORDERKEY PRIMARY KEY (O_ORDERKEY) WITH
(FILLFACTOR=95) ON DATA_FG
```

Backup

```
backup database tpch300g to
```

```
   disk='g:\tpch300g_1of4.bak',
   disk='h:\tpch300g_2of4.bak',
   disk='i:\tpch300g_3of4.bak',
   disk='j:\tpch300g_4of4.bak'
   with init, compression, maxtransfersize=1048576, buffercount=1000, stats=1
GO
```

Appendix C: Query Text and Output

/* TPC_H Query 1 - Pricing Summary Report */

```
SELECT      L_RETURNFLAG,
        L_LINESTATUS,
        SUM(L_QUANTITY)                                     AS SUM_QTY,
        SUM(L_EXTENDEDPRICE)                                AS SUM_BASE_PRICE,
        SUM(L_EXTENDEDPRICE*(1-L_DISCOUNT))                 AS SUM_DISC_PRICE,
        SUM(L_EXTENDEDPRICE*(1-L_DISCOUNT)*(1+L_TAX))       AS SUM_CHARGE,
        AVG(L_QUANTITY)                                     AS AVG_QTY,
        AVG(L_EXTENDEDPRICE)                                AS AVG_PRICE,
        AVG(L_DISCOUNT)                                     AS AVG_DISC,
        COUNT_BIG(*)                                    AS COUNT_ORDER
FROM   LINEITEM
WHERE       L_SHIPDATE    <= dateadd(dd, -90, cast('1998-12-01'as date))
GROUP       BY      L_RETURNFLAG,
                    L_LINESTATUS
ORDER       BY      L_RETURNFLAG,
                    L_LINESTATUS
```

```
L_RETURNFLAG  L_LINESTATUS        SUM_QTY      SUM_BASE_PRICE      SUM_DISC_PRICE
SUM_CHARGE          AVG_QTY         AVG_PRICE          AVG_DISC        COUNT_ORDER

------------  ------------  ----------------  ------------------  ------------------  ------------------  --------------------
--------------------  --------------------  --------------------

A             F             37734107.00      56586554400.73      53758257134.87      55909065222.83
25.52           38273.13              .05           1478493

N             F               991417.00       1487504710.38       1413082168.05       1469649223.19             25.52
38284.47              .05           38854

N             O             74476040.00     111701729697.74     106118230307.61     110367043872.50
25.50           38249.12              .05           2920374

R             F             37719753.00      56568041380.90      53741292684.60      55889619119.83
25.51           38250.86              .05           1478870
```

(4 row(s) affected)

/* TPC_H Query 2 - Minimum Cost Supplier */

```
SELECT          TOP 100
        S_ACCTBAL,
        S_NAME,
        N_NAME,
        P_PARTKEY,
        P_MFGR,
        S_ADDRESS,
        S_PHONE,
        S_COMMENT
FROM    PART,
        SUPPLIER,
        PARTSUPP,
        NATION,
        REGION
WHERE           P_PARTKEY       = PS_PARTKEY AND
        S_SUPPKEY       = PS_SUPPKEY AND
        P_SIZE          = 15 AND
        P_TYPE                  LIKE '%%BRASS' AND
        S_NATIONKEY = N_NATIONKEY AND
        N_REGIONKEY             = R_REGIONKEY AND
        R_NAME                  = 'EUROPE' AND
        PS_SUPPLYCOST           = (     SELECT          MIN(PS_SUPPLYCOST)
                                FROM    PARTSUPP,
                                        SUPPLIER,
                                        NATION,
```

```
                                    REGION

                                WHERE       P_PARTKEY     = PS_PARTKEY AND

                                    S_SUPPKEY     = PS_SUPPKEY AND

                                    S_NATIONKEY = N_NATIONKEY AND

                                    N_REGIONKEY       = R_REGIONKEY AND

                                    R_NAME            = 'EUROPE'

                        )

ORDER       BY      S_ACCTBAL DESC,

                    N_NAME,

                    S_NAME,

                    P_PARTKEY

    S_ACCTBAL  S_NAME          N_NAME          P_PARTKEY    P_MFGR
S_ADDRESS                  S_PHONE         S_COMMENT

---------------- ------------------------- ------------------------- ----------- -------------------------
---------------------------------------- ---------------
-----------------------------------------------------------------------------------------------------

       9938.53  Supplier#000005359       UNITED KINGDOM            185358  Manufacturer#4
QKuHYh,vZGiwu2FWEJoLDx04            33-429-790-6131     blithely silent pinto beans are furiously. slyly final
deposits acros

       9937.84  Supplier#000005969       ROMANIA                   108438  Manufacturer#1
ANDENSOSmk,miq23Xfb5RWt6dvUcvt6Qa       29-520-692-3537     carefully slow deposits use furiously. slyly
ironic platelets above the ironic

       9936.22  Supplier#000005250       UNITED KINGDOM            249  Manufacturer#4
B3rqp0xbSEim4Mpy2RH J               33-320-228-2957     blithely special packages are. stealthily express
deposits across the closely final instructi

…

...

       7852.45  Supplier#000005864       RUSSIA                    8363  Manufacturer#4
WCNfBPZeSXh3h,c                     32-454-883-3821     blithely regular deposits

       7850.66  Supplier#000001518       UNITED KINGDOM            86501  Manufacturer#1
ONda3YJiHKJOC                       33-730-383-3892     furiously final accounts wake carefully idle requests. even
dolphins wake acc

       7843.52  Supplier#000006683       FRANCE                    11680  Manufacturer#4
2Z0JGkiv01Y00oCFwUGfviIbhzCdy       16-464-517-8943     carefully bold accounts doub

(100 row(s) affected)
```

/* TPC_H Query 3 - Shipping Priority */

```
SELECT          TOP 10
        L_ORDERKEY,
        SUM(L_EXTENDEDPRICE*(1-L_DISCOUNT))     AS REVENUE,
        O_ORDERDATE,
        O_SHIPPRIORITY
FROM    CUSTOMER,
        ORDERS,
        LINEITEM
WHERE           C_MKTSEGMENT        = 'BUILDING' AND
        C_CUSTKEY     = O_CUSTKEY AND
        L_ORDERKEY    = O_ORDERKEY AND
        O_ORDERDATE           < '1995-03-15' AND
        L_SHIPDATE    > '1995-03-15'
GROUP           BY      L_ORDERKEY,
                O_ORDERDATE,
                O_SHIPPRIORITY
ORDER           BY      REVENUE DESC,
                O_ORDERDATE
Q3 *** 11620 rows found.
  *** Rows Returned 10.

 L_ORDERKEY             REVENUE  O_ORDERDATE  O_SHIPPRIORITY
-----------  --------------------  -----------  --------------
   2456423          406181.01   1995-03-05             0
   3459808          405838.70   1995-03-04             0
    492164          390324.06   1995-02-19             0
   1188320          384537.94   1995-03-09             0
```

```
   2435712        378673.06   1995-02-26          0
   4878020        378376.80   1995-03-12          0
   5521732        375153.92   1995-03-13          0
   2628192        373133.31   1995-02-22          0
    993600        371407.46   1995-03-05          0
   2300070        367371.15   1995-03-13          0
(10 row(s) affected)
```

/* TPC_H Query 4 - Order Priority Checking */

```
SELECT          O_ORDERPRIORITY,
        COUNT(*)                AS ORDER_COUNT
FROM   ORDERS
WHERE           O_ORDERDATE             >= '1993-07-01' AND
        O_ORDERDATE             < dateadd (mm, 3,  cast ('1993-07-01' as date)) AND
        EXISTS                  (       SELECT          *
                                FROM   LINEITEM
                                WHERE           L_ORDERKEY   = O_ORDERKEY AND
                                        L_COMMITDATE          < L_RECEIPTDATE
                        )
GROUP           BY      O_ORDERPRIORITY
ORDER           BY      O_ORDERPRIORITY
Q4 *** 5 rows found.

O_ORDERPRIORITY  ORDER_COUNT
---------------  -----------
1-URGENT             10594
2-HIGH               10476
3-MEDIUM             10410
```

```
4-NOT SPECIFIED       10556
5-LOW                 10487
(5 row(s) affected)
```

/* TPC_H Query 5 - Local Supplier Volume */

```
SELECT          N_NAME,
        SUM(L_EXTENDEDPRICE*(1-L_DISCOUNT))     AS REVENUE
FROM    CUSTOMER,
        ORDERS,
        LINEITEM,
        SUPPLIER,
        NATION,
        REGION
WHERE           C_CUSTKEY     = O_CUSTKEY AND
        L_ORDERKEY   = O_ORDERKEY AND
        L_SUPPKEY      = S_SUPPKEY AND
        C_NATIONKEY = S_NATIONKEY AND
        S_NATIONKEY  = N_NATIONKEY AND
        N_REGIONKEY          = R_REGIONKEY AND
        R_NAME               = 'ASIA' AND
        O_ORDERDATE          >= '1994-01-01' AND
        O_ORDERDATE          < DATEADD(YY, 1, cast ('1994-01-01'as date))
GROUP           BY      N_NAME
ORDER           BY      REVENUE DESC
Q5 *** 5 rows found.

N_NAME                          REVENUE
------------------------- --------------------
INDONESIA                    55502041.17
```

```
VIETNAM                  55295086.00
CHINA                    53724494.26
INDIA                    52035511.00
JAPAN                    45410175.70
(5 row(s) affected)
```

/* TPC_H Query 6 - Forecasting Revenue Change */

```
SELECT          SUM(L_EXTENDEDPRICE*L_DISCOUNT)         AS REVENUE
FROM   LINEITEM
WHERE           L_SHIPDATE     >= '1994-01-01' AND
          L_SHIPDATE     < dateadd (yy, 1, cast('1994-01-01' as date)) AND
          L_DISCOUNT     BETWEEN .06 - 0.01 AND .06 + 0.01 AND
          L_QUANTITY     < 24
Q6 *** One row found.

          REVENUE
--------------------
      123141078.23
(1 row(s) affected)
```

/* TPC_H Query 7 - Volume Shipping */

```
SELECT          SUPP_NATION,
          CUST_NATION,
          L_YEAR,
          SUM(VOLUME)          AS REVENUE
FROM   (          SELECT          N1.N_NAME                    AS SUPP_NATION,
                            N2.N_NAME                    AS CUST_NATION,
                            datepart(yy,L_SHIPDATE)      AS L_YEAR,
                            L_EXTENDEDPRICE*(1-L_DISCOUNT)  AS VOLUME
```

```
                FROM   SUPPLIER,
                       LINEITEM,
                       ORDERS,
                       CUSTOMER,
                       NATION N1,
                       NATION N2
                WHERE          S_SUPPKEY     = L_SUPPKEY AND
                       O_ORDERKEY  = L_ORDERKEY AND
                       C_CUSTKEY     = O_CUSTKEY AND
                       S_NATIONKEY  = N1.N_NATIONKEY AND
                       C_NATIONKEY = N2.N_NATIONKEY AND
                       (       (N1.N_NAME    = 'FRANCE'       AND N2.N_NAME        = 'GERMANY')
                              OR
                              (N1.N_NAME    = 'GERMANY'    AND N2.N_NAME        = 'FRANCE')
                       ) AND
                       L_SHIPDATE     BETWEEN '1995-01-01' AND '1996-12-31'
          )          AS SHIPPING
GROUP          BY      SUPP_NATION,
                CUST_NATION,
                L_YEAR
ORDER          BY      SUPP_NATION,
                CUST_NATION,
                L_YEAR
Q7  *** 4 rows found.

supp_nation     cust_nation     year     revenue
-----------     -----------     ----     -----------------
FRANCE                GERMANY              1995     54639732.73
FRANCE                GERMANY              1996     54633083.31
```

```
GERMANY          FRANCE          1995    52531746.67
GERMANY          FRANCE          1996    52520549.02
(4 row(s) affected)
```

/* TPC_H Query 8 - National Market Share */

```
SELECT      O_YEAR,
        SUM(CASE    WHEN  NATION        = 'BRAZIL'
                    THEN  VOLUME
                    ELSE  0
                    END) / SUM(VOLUME)  AS MKT_SHARE
FROM  (     SELECT      datepart(yy,O_ORDERDATE)            AS O_YEAR,
                    L_EXTENDEDPRICE * (1-L_DISCOUNT)        AS VOLUME,
                    N2.N_NAME                               AS NATION
            FROM  PART,
                    SUPPLIER,
                    LINEITEM,
                    ORDERS,
                    CUSTOMER,
                    NATION N1,
                    NATION N2,
                    REGION
            WHERE       P_PARTKEY     = L_PARTKEY AND
                    S_SUPPKEY     = L_SUPPKEY AND
                    L_ORDERKEY    = O_ORDERKEY AND
                    O_CUSTKEY     = C_CUSTKEY AND
                    C_NATIONKEY = N1.N_NATIONKEY AND
                    N1.N_REGIONKEY      = R_REGIONKEY AND
                    R_NAME              = 'AMERICA' AND
                    S_NATIONKEY = N2.N_NATIONKEY AND
```

```
                    O_ORDERDATE         BETWEEN '1995-01-01' AND '1996-12-31' AND
                    P_TYPE              = 'ECONOMY ANODIZED STEEL'
        )       AS  ALL_NATIONS
GROUP       BY  O_YEAR
ORDER       BY  O_YEAR
```

Q8 *** 2 rows found.

```
    YEAR        MKT_SHARE
----------  --------------------
    1995            .03
    1996            .04
```

(2 row(s) affected)

/* TPC_H Query 9 - Product Type Profit Measure */

```
SELECT      NATION,
        O_YEAR,
        SUM(AMOUNT)         AS SUM_PROFIT
FROM    (       SELECT      N_NAME                                          AS
NATION,
                    datepart(yy, O_ORDERDATE)                               AS O_YEAR,
                    L_EXTENDEDPRICE*(1-L_DISCOUNT)-PS_SUPPLYCOST*L_QUANTITY
        AS AMOUNT
                FROM    PART,
                    SUPPLIER,
                    LINEITEM,
                    PARTSUPP,
                    ORDERS,
                    NATION
                WHERE       S_SUPPKEY   = L_SUPPKEY AND
                    PS_SUPPKEY  = L_SUPPKEY AND
```

```
                PS_PARTKEY    = L_PARTKEY AND
                P_PARTKEY     = L_PARTKEY AND
                O_ORDERKEY    = L_ORDERKEY AND
                S_NATIONKEY   = N_NATIONKEY AND
                P_NAME                LIKE '%%green%%'
        )       AS PROFIT
GROUP   BY      NATION,
                O_YEAR
ORDER   BY      NATION,
                O_YEAR          DESC
```

Q9 *** 175 rows found.

NATION	YEAR	SUM_PROFIT
ALGERIA	1998	31342867.24
ALGERIA	1997	57138193.03
ALGERIA	1996	56140140.13
ALGERIA	1995	53051469.66
ALGERIA	1994	53867582.12
ALGERIA	1993	54942718.12
ALGERIA	1992	54628034.70
ARGENTINA	1998	30211185.70
ARGENTINA	1997	50805741.77
ARGENTINA	1996	51923746.59
…		
...		
UNITED STATES	1993	48029946.79
UNITED STATES	1992	48671944.51
VIETNAM	1998	30442736.06

```
VIETNAM                 1997    50309179.80
VIETNAM                 1996    50488161.42
VIETNAM                 1995    49658284.61
VIETNAM                 1994    50596057.26
VIETNAM                 1993    50953919.14
VIETNAM                 1992    49613838.33
(175 row(s) affected)
```

/* TPC_H Query 10 - Returned Item Reporting */

```
SELECT          TOP 20
        C_CUSTKEY,
        C_NAME,
        SUM(L_EXTENDEDPRICE*(1-L_DISCOUNT))     AS REVENUE,
        C_ACCTBAL,
        N_NAME,
        C_ADDRESS,
        C_PHONE,
        C_COMMENT
FROM    CUSTOMER,
        ORDERS,
        LINEITEM,
        NATION
WHERE           C_CUSTKEY     = O_CUSTKEY             AND
        L_ORDERKEY   = O_ORDERKEY                     AND
        O_ORDERDATE           >= '1993-10-01'                 AND
        O_ORDERDATE           < dateadd(mm, 3, cast('1993-10-01' as date ))           AND
        L_RETURNFLAG          = 'R'                   AND
        C_NATIONKEY = N_NATIONKEY
GROUP           BY      C_CUSTKEY,
```

```
                C_NAME,
                C_ACCTBAL,
                C_PHONE,
                N_NAME,
                C_ADDRESS,
                C_COMMENT
ORDER           BY      REVENUE     DESC
```

Query10 *** 20 rows found.

```
 C_CUSTKEY  C_NAME              REVENUE         C_ACCTBAL       N_NAME
C_ADDRESS                      C_PHONE         C_COMMENT

---------- ------------------------ -------------------- ----------------- -------------------------
---------------------------------------    ---------------
-----------------------------------------------------------------------------------------------------------------

    57040  Customer#000057040              734235.24          632.87   JAPAN                Eioyzjf4pp
22-895-641-3466     requests sleep blithely about the furiously i

   143347  Customer#000143347              721002.70          2557.47   EGYPT                1aReFYv,Kw4
14-742-935-3718     fluffily bold excuses haggle finally after the u

…

...

    52528  Customer#000052528              556397.35          551.79   ARGENTINA
NFztyTOR10UOJ                  11-208-192-3205     unusual requests detect. slyly dogged theodolites use slyly.
deposit

    23431  Customer#000023431              554269.54          3381.86   ROMANIA
HgiV0phqhaIa9aydNoIlb           29-915-458-2654     instructions nag quickly. furiously bold accounts cajol

(20 row(s) affected)
```

/* TPC_H Query 11 - Important Stock Indentification */

```
SELECT          PS_PARTKEY,
        SUM(PS_SUPPLYCOST*PS_AVAILQTY)  AS VALUE
FROM    PARTSUPP,
        SUPPLIER,
```

```
        NATION
WHERE       PS_SUPPKEY    = S_SUPPKEY    AND
        S_NATIONKEY = N_NATIONKEY        AND
        N_NAME                = 'GERMANY'
GROUP       BY      PS_PARTKEY
HAVING      SUM(PS_SUPPLYCOST*PS_AVAILQTY) >
            (       SELECT      SUM(PS_SUPPLYCOST*PS_AVAILQTY) * 0.0001000000
                    FROM    PARTSUPP,
                            SUPPLIER,
                            NATION
                    WHERE       PS_SUPPKEY    = S_SUPPKEY    AND
                            S_NATIONKEY = N_NATIONKEY        AND
                            N_NAME                = 'GERMANY'
            )
ORDER       BY      VALUE DESC
```

Q11 *** 1048 rows found.

PS_PARTKEY	VALUE
129760	17538456.86
166726	16503353.92
191287	16474801.97
161758	16101755.54
…	
...	
154731	7888301.33
101674	7879324.60
51968	7879102.21
72073	7877736.11

```
    5182      7874521.73

(1048 row(s) affected)
```

/* TPC_H Query 12 - Shipping Modes and Order Priority */

```
SELECT          L_SHIPMODE,
        SUM(    CASE    WHEN O_ORDERPRIORITY  = '1-URGENT'        OR
                            O_ORDERPRIORITY  = '2-HIGH'
                        THEN 1
                        ELSE 0
                END)    AS HIGH_LINE_COUNT,
        SUM(    CASE    WHEN O_ORDERPRIORITY <> '1-URGENT'        AND
                            O_ORDERPRIORITY <> '2-HIGH'
                        THEN 1
                        ELSE 0
                END)    AS LOW_LINE_COUNT
FROM    ORDERS,
        LINEITEM
WHERE           O_ORDERKEY  = L_ORDERKEY                    AND
        L_SHIPMODE      IN ('MAIL','SHIP')                  AND
        L_COMMITDATE            < L_RECEIPTDATE             AND
        L_SHIPDATE      < L_COMMITDATE                      AND
        L_RECEIPTDATE           >= '1994-01-01'             AND
        L_RECEIPTDATE           < dateadd(yy, 1,cast ('1994-01-01' as date))
GROUP           BY      L_SHIPMODE
ORDER           BY      L_SHIPMODE
Q12 *** 2 rows found.

L_SHIPMODE  HIGH_LINE_COUNT  LOW_LINE_COUNT
----------  ---------------  --------------
```

```
MAIL                6202          9324
SHIP                6200          9262
(2 row(s) affected)
```

/* TPC_H Query 13 - Customer Distribution */

```
SELECT          C_COUNT,
        COUNT(*)        AS CUSTDIST
FROM   (        SELECT          C_CUSTKEY,
                        COUNT(O_ORDERKEY)
                FROM    CUSTOMER left outer join ORDERS on
                        C_CUSTKEY     = O_CUSTKEY             AND
                        O_COMMENT     not like '%%special%%requests%%'
                GROUP           BY      C_CUSTKEY
        )       AS C_ORDERS (C_CUSTKEY, C_COUNT)
GROUP           BY      C_COUNT
ORDER           BY      CUSTDIST        DESC,
                C_COUNT                 DESC
Q13 *** 42 rows found.

C_COUNT             CUSTDIST
--------------------  --------------------
              0              50004
              9               6641
             10               6566
             11               6058
              8               5949
…
...
             39                  2
```

```
            41                  1

(42 row(s) affected)
```

/* TPC_H Query 14 - Promotion Effect */

```
SELECT          100.00 * SUM    (       CASE    WHEN P_TYPE LIKE 'PROMO%%'
                                        THEN L_EXTENDEDPRICE*(1-L_DISCOUNT)
                                        ELSE 0
                                END) / SUM(L_EXTENDEDPRICE*(1-L_DISCOUNT))      AS
PROMO_REVENUE
FROM   LINEITEM,
        PART
WHERE           L_PARTKEY     = P_PARTKEY   AND
        L_SHIPDATE    >= '1995-09-01'               AND
        L_SHIPDATE    < dateadd(mm, 1,cast ('1995-09-01' as date))
Q14 *** One row found.

     PROMO_REVENUE
---------------------
           16.38
(1 row(s) affected)
```

/* TPC_H Query 15 - Create View for Top Supplier Query */

```
CREATE          VIEW REVENUE0 (SUPPLIER_NO, TOTAL_REVENUE)
AS
SELECT          L_SUPPKEY,
        SUM(L_EXTENDEDPRICE*(1-L_DISCOUNT))
FROM   LINEITEM
WHERE           L_SHIPDATE    >= '1996-01-01' AND
        L_SHIPDATE    < dateadd(mm, 3, cast ('1996-01-01' as date))
```

```
GROUP           BY      L_SUPPKEY
GO

/* TPC_H  Query 15 - Top Supplier */

SELECT          S_SUPPKEY,
        S_NAME,
        S_ADDRESS,
        S_PHONE,
        TOTAL_REVENUE
FROM    SUPPLIER,
        REVENUE0
WHERE           S_SUPPKEY       = SUPPLIER_NO AND
        TOTAL_REVENUE       = (         SELECT          MAX(TOTAL_REVENUE)
                                FROM    REVENUE0
                            )
ORDER           BY      S_SUPPKEY

DROP VIEW REVENUE0
Q15 *** One row found.

 S_SUPPKEY  S_NAME                S_ADDRESS                              S_PHONE             TOTAL_REVENUE
---------- ------------------------ ---------------------------------------- --------------- --------------------
      8449  Supplier#000008449       Wp34zim9qYFbVctdW                      20-469-856-8873         1772627.21
(1 row(s) affected)
/* TPC_H  Query 16 - Parts/Supplier Relationship */

SELECT          P_BRAND,
        P_TYPE,
```

```
        P_SIZE,
        COUNT(DISTINCT PS_SUPPKEY)          AS SUPPLIER_CNT
FROM    PARTSUPP,
        PART
WHERE           P_PARTKEY       = PS_PARTKEY                            AND
        P_BRAND                 <> 'Brand#45'                                   AND
        P_TYPE                  NOT LIKE 'MEDIUM POLISHED%%'                                    AND
        P_SIZE          IN (49, 14, 23, 45, 19, 3, 36, 9)       AND
        PS_SUPPKEY      NOT IN          (       SELECT          S_SUPPKEY
                                        FROM    SUPPLIER
                                        WHERE           S_COMMENT       LIKE '%%Customer%
%Complaints%%'
                                )
GROUP           BY      P_BRAND,
                P_TYPE,
                P_SIZE
ORDER           BY      SUPPLIER_CNT            DESC,
                P_BRAND,
                P_TYPE,
                P_SIZE
Q16 *** 18314 rows found.

P_BRAND    P_TYPE                  P_SIZE      SUPPLIER_CNT
---------- ------------------------- ----------- ------------
Brand#41   MEDIUM BRUSHED TIN               3          28
Brand#54   STANDARD BRUSHED COPPER          14          27
Brand#11   STANDARD BRUSHED TIN             23          24
...
...
```

```
 Brand#54   ECONOMY POLISHED BRASS          9          3
 Brand#55   PROMO PLATED BRASS             19         3
 Brand#55   STANDARD PLATED TIN            49         3
(18314 row(s) affected)
```

/* TPC_H Query 17 - Small-Quantity-Order Revenue */

```
SELECT          SUM(L_EXTENDEDPRICE)/7.0   AS AVG_YEARLY
FROM   LINEITEM,
       PART
WHERE          P_PARTKEY     = L_PARTKEY   AND
       P_BRAND               = 'Brand#23'              AND
       P_CONTAINER  = 'MED BOX'             AND
       L_QUANTITY   <        (       SELECT          0.2 * AVG(L_QUANTITY)
                                     FROM   LINEITEM
                                     WHERE          L_PARTKEY     = P_PARTKEY
                             )
Q17 *** One row found.

    AVG_YEARLY
----------------
     348406.05
(1 row(s) affected)
```

/* TPC_H Query 18 - Large Volume Customer */

```
SELECT          TOP 100
       C_NAME,
       C_CUSTKEY,
       O_ORDERKEY,
       O_ORDERDATE,
```

```
        O_TOTALPRICE,
        SUM(L_QUANTITY)
FROM    CUSTOMER,
        ORDERS,
        LINEITEM
WHERE   O_ORDERKEY  IN  (   SELECT  L_ORDERKEY
                            FROM    LINEITEM
                            GROUP   BY  L_ORDERKEY HAVING
SUM(L_QUANTITY) > 300
                        )   AND
        C_CUSTKEY   = O_CUSTKEY  AND
        O_ORDERKEY  = L_ORDERKEY
GROUP   BY  C_NAME,
            C_CUSTKEY,
            O_ORDERKEY,
            O_ORDERDATE,
            O_TOTALPRICE
ORDER   BY  O_TOTALPRICE    DESC,
            O_ORDERDATE
```

Q18 *** 57 rows found.

C_NAME	C_CUSTKEY	O_ORDERKEY	O_ORDERDATE	O_TOTALPRICE	Sum(L_QUANTITY)
Customer#000128120	128120	4722021	1994-04-07	544089.09	323.00
Customer#000144617	144617	3043270	1997-02-12	530604.44	317.00
…					
...					
Customer#000082441	82441	857959	1994-02-07	382579.74	305.00
Customer#000088703	88703	2995076	1994-01-30	363812.12	302.00

(57 row(s) affected)

/* TPC_H Query 19 - Discounted Revenue */

```
SELECT      SUM(L_EXTENDEDPRICE* (1 - L_DISCOUNT))  AS REVENUE
FROM  LINEITEM,
      PART
WHERE       (     P_PARTKEY     = L_PARTKEY                                    AND
            P_BRAND             = 'Brand#12'
      AND
            P_CONTAINER  IN ( 'SM CASE', 'SM BOX', 'SM PACK', 'SM PKG')      AND
            L_QUANTITY   >= 1                                                AND
            L_QUANTITY   <= 1 + 10                                           AND
            P_SIZE       BETWEEN 1 AND 5                                     AND
            L_SHIPMODE   IN ('AIR', 'AIR REG')                               AND
            L_SHIPINSTRUCT      = 'DELIVER IN PERSON'
      )
      OR
      (     P_PARTKEY     = L_PARTKEY                                        AND
            P_BRAND             = 'Brand#23'
      AND
            P_CONTAINER  IN ( 'MED BAG', 'MED BOX', 'MED PKG', 'MED PACK')   AND
            L_QUANTITY   >= 10                                               AND
            L_QUANTITY   <= 10 + 10                                          AND
            P_SIZE       BETWEEN 1 AND 10                                    AND
            L_SHIPMODE   IN ('AIR', 'AIR REG')                               AND
            L_SHIPINSTRUCT      = 'DELIVER IN PERSON'
      )
      OR
      (     P_PARTKEY     = L_PARTKEY                                        AND
            P_BRAND             = 'Brand#34'
```

```
        AND
                P_CONTAINER  IN ( 'LG CASE', 'LG BOX', 'LG PACK', 'LG PKG')          AND
                L_QUANTITY   >= 20                                                   AND
                L_QUANTITY   <= 20 + 10                                              AND
                P_SIZE       BETWEEN 1 AND 15                                        AND
                L_SHIPMODE   IN ('AIR', 'AIR REG')                                   AND
                L_SHIPINSTRUCT       = 'DELIVER IN PERSON'
        )
Q19 *** One row found.
        REVENUE
-----------------
      3083843.06
(1 row(s) affected)
/* TPC_H  Query 20 - Potential Part Promotion */

SELECT          S_NAME,
        S_ADDRESS
FROM    SUPPLIER,
        NATION
WHERE           S_SUPPKEY       IN      (       SELECT          PS_SUPPKEY
                                        FROM    PARTSUPP
                                        WHERE           PS_PARTKEY in           (       SELECT
        P_PARTKEY
                                                                        FROM    PART
                                                                        WHERE           P_NAME like
'forest%%'
                                                                )       AND
                                        PS_AVAILQTY  >          (       SELECT          0.5 *
sum(L_QUANTITY)
                                                                        FROM    LINEITEM
```

```
                                                                WHERE           L_PARTKEY
        = PS_PARTKEY AND
                                                                        L_SUPPKEY     =
PS_SUPPKEY    AND
                                                                        L_SHIPDATE    >=
'1994-01-01'                AND
                                                                        L_SHIPDATE    <
dateadd(yy,1,cast('1994-01-01' as date))
                                                                )
                                )          AND
        S_NATIONKEY = N_NATIONKEY          AND
        N_NAME                  = 'CANADA'
ORDER           BY      S_NAME
Q20 *** 204 rows found.

S_NAME                  S_ADDRESS
-------------------------  ----------------------------------------
Supplier#000000020      iybAE,RmTymrZVYaFZva2SH,j
Supplier#000000091      YV45D7TkfdQanOOZ7q9QxkyGUapU1oOWU6q3
…
...
Supplier#000009869      ucLqxzrpBTRMewGSM29t0rNTM30g1Tu3Xgg3mKag
Supplier#000009899      7XdpAHrzr1t,UQFZE
Supplier#000009974      7wJ,J5DKcxSU4Kp1cQLpbcAvB5AsvKT
(204 row(s) affected)
/* TPC_H  Query 21 - Suppliers Who Kept Orders Waiting */

SELECT          TOP 100
        S_NAME,
        COUNT(*)        AS NUMWAIT
FROM    SUPPLIER,
```

```
        LINEITEM L1,
        ORDERS,
        NATION
WHERE   S_SUPPKEY       = L1.L_SUPPKEY          AND
        O_ORDERKEY      = L1.L_ORDERKEY         AND
        O_ORDERSTATUS       = 'F'               AND
        L1.L_RECEIPTDATE    > L1.L_COMMITDATE   AND
        EXISTS      (       SELECT      *
                    FROM    LINEITEM L2
                    WHERE       L2.L_ORDERKEY       = L1.L_ORDERKEY     AND
                                L2.L_SUPPKEY <> L1.L_SUPPKEY
                )       AND
        NOT EXISTS  (       SELECT      *
                            FROM    LINEITEM L3
                            WHERE       L3.L_ORDERKEY           = L1.L_ORDERKEY
                AND
                                L3.L_SUPPKEY        <> L1.L_SUPPKEY         AND
                                L3.L_RECEIPTDATE    > L3.L_COMMITDATE
                    )       AND
        S_NATIONKEY = N_NATIONKEY       AND
        N_NAME              = 'SAUDI ARABIA'
GROUP       BY      S_NAME
ORDER       BY      NUMWAIT     DESC,
                    S_NAME
Q21 *** 100 rows found.

S_NAME                  NUMWAIT
-------------------------  -----------
Supplier#000002829              20
```

```
Supplier#000005808              18
…
...
Supplier#000002357              12
Supplier#000002483              12
(100 row(s) affected)
```

/* TPC_H Query 22 - Global Sales Opportunity */

```
SELECT      CNTRYCODE,
        COUNT(*)    AS NUMCUST,
        SUM(C_ACCTBAL)    AS TOTACCTBAL
FROM    (       SELECT      SUBSTRING(C_PHONE,1,2)    AS CNTRYCODE,
                        C_ACCTBAL
                FROM    CUSTOMER
                WHERE       SUBSTRING(C_PHONE,1,2)    IN    ('13', '31', '23', '29', '30', '18', '17')
        AND
                        C_ACCTBAL       >       (       SELECT      AVG(C_ACCTBAL)
                                                        FROM    CUSTOMER
                                                        WHERE       C_ACCTBAL    > 0.00
        AND
                                                                SUBSTRING(C_PHONE,1,2)
        IN      ('13', '31', '23', '29', '30', '18', '17')
                                                    )       AND
                        NOT EXISTS      (       SELECT      *
                                                FROM    ORDERS
                                                WHERE       O_CUSTKEY    = C_CUSTKEY
                                        )
        )       AS CUSTSALE
GROUP       BY      CNTRYCODE
ORDER       BY      CNTRYCODE
```

Q22 *** 7 rows found.

CNTRYCODE	NUMCUST	TOTACCTBAL
13	888	6737713.99
17	861	6460573.72
18	964	7241687.40
23	892	6706457.95
29	948	7158866.63
30	909	6808436.13
31	922	6806670.18

(7 row(s) affected)

Appendix D: Seeds and Query Substitution Parameters

Stream 0: 61206155

14 1995-01-01

2 24 NICKEL EUROPE

9 ghost

20 plum 1994-01-01 RUSSIA

6 1997-01-01 0.03 24

17 Brand#53 WRAP BOX

18 313

8 IRAQ MIDDLE EAST MEDIUM ANODIZED TIN

21 FRANCE

13 unusual requests

3 MACHINERY 1995-03-25

22 32 12 11 34 29 16 26

16 Brand#45 MEDIUM PLATED 37 36 23 2 40 44 50 35

4 1996-11-01

11 INDONESIA 0.0000003333

15 1993-01-01

1 69

10 1994-11-01

19 Brand#54 Brand#25 Brand#44 10 10 29

5 AFRICA 1997-01-01

7 FRANCE IRAQ

12 SHIP FOB 1995-01-01

Stream 1: 61206156

21 UNITED KINGDOM

3 FURNITURE 1995-03-10

18 315

5 AMERICA 1993-01-01

11 RUSSIA 0.0000003333

7 RUSSIA CANADA

6 1993-01-01 0.09 24

20 burnished 1997-01-01 IRAQ

17 Brand#54 WRAP PACK

12 FOB TRUCK 1995-01-01

16 Brand#25 ECONOMY POLISHED 19 23 48 24 37 11 8 13

15 1995-01-01

13 express accounts

10 1993-08-01

2 12 TIN AMERICA

8 CANADA AMERICA SMALL POLISHED TIN

14 1995-01-01

19 Brand#51 Brand#53 Brand#44 6 11 26

9 dodger

22 29 28 10 19 23 24 27

1 77

4 1994-08-01

Stream 2: 61206157

6 1993-01-01 0.06 25

17 Brand#51 WRAP CAN

14 1996-01-01

16 Brand#55 SMALL ANODIZED 2 7 32 10 34 25 30 12

19 Brand#53 Brand#41 Brand#43 1 12 22

10 1994-05-01

9 cornsilk

2 50 COPPER MIDDLE EAST

15 1993-01-01

8 SAUDI ARABIA MIDDLE EAST SMALL BURNISHED TIN

5 ASIA 1993-01-01

22 28 16 30 11 21 10 19

12 TRUCK FOB 1995-01-01

7 KENYA SAUDI ARABIA

13 express accounts

18 312

1 85

4 1997-03-01

20 metallic 1996-01-01 ARGENTINA

3 MACHINERY 1995-03-27

11 IRAN 0.0000003333

21 MOROCCO

Stream 3: 61206158

8 JAPAN ASIA STANDARD BRUSHED NICKEL

5 EUROPE 1993-01-01

4 1994-12-01

6 1993-01-01 0.04 25

17 Brand#53 SM BOX

7 FRANCE JAPAN

1 93

18 314

22 14 24 15 11 17 28 22

14 1996-01-01

9 burnished

10 1993-03-01

15 1996-01-01

11 UNITED KINGDOM 0.0000003333

20 wheat 1994-01-01 MOZAMBIQUE

2 37 STEEL AMERICA

21 GERMANY

19 Brand#15 Brand#24 Brand#32 6 13 29

13 express accounts

16 Brand#45 LARGE BURNISHED 36 45 16 33 10 17 5
6

12 RAIL FOB 1996-01-01

3 BUILDING 1995-03-12

Stream 4: 61206159

5 MIDDLE EAST 1993-01-01

21 ALGERIA

14 1996-01-01

19 Brand#12 Brand#12 Brand#31 1 14 25

15 1993-01-01

17 Brand#55 SM PACK

12 AIR SHIP 1996-01-01

6 1993-01-01 0.09 24

4 1997-07-01

9 black

8 EGYPT MIDDLE EAST STANDARD PLATED NICKEL

16 Brand#25 PROMO POLISHED 48 20 14 13 4 9 26
40

11 IRAQ 0.0000003333

2 25 BRASS MIDDLE EAST

10 1993-12-01

18 315

1 101

13 express accounts

7 UNITED KINGDOM EGYPT

22 16 22 13 24 15 26 29

3 HOUSEHOLD 1995-03-29

20 honeydew 1993-01-01 FRANCE

Stream 5: 61206160

21 PERU

15 1996-01-01

4 1995-03-01

6 1993-01-01 0.07 25

7 MOROCCO VIETNAM

16 Brand#15 SMALL BRUSHED 43 19 40 42 18 41 31 26

19 Brand#15 Brand#45 Brand#31 7 15 21

18 313

14 1996-01-01

22 18 21 16 25 19 32 10

11 UNITED STATES 0.0000003333

13 express accounts

3 BUILDING 1995-03-14

1 109

2 13 TIN ASIA

5 AFRICA 1993-01-01

8 VIETNAM ASIA STANDARD ANODIZED NICKEL

20 salmon 1996-01-01 SAUDI ARABIA

12 REG AIR SHIP 1996-01-01

17 Brand#52 SM CAN

10 1994-09-01

9 almond

Stream 6: 61206161

10 1993-06-01

3 HOUSEHOLD 1995-03-31

15 1994-01-01

13 express deposits

6 1994-01-01 0.04 25

8 JORDAN MIDDLE EAST PROMO POLISHED NICKEL

9 tomato

7 GERMANY JORDAN

4 1997-10-01

11 JAPAN 0.0000003333

22 20 19 27 13 26 30 28

18 314

12 SHIP FOB 1993-01-01

1 117

5 AMERICA 1994-01-01

16 Brand#45 ECONOMY BURNISHED 10 1 36 21 15 44
8 29

2 1 COPPER MIDDLE EAST

14 1997-01-01

19 Brand#22 Brand#23 Brand#25 2 16 29

20 cyan 1994-01-01 IRAN

17 Brand#54 LG BOX

21 INDONESIA

Appendix E: Refresh Function Source Code

RF1

```
-- File:    CREATERF1PROC.SQL
--          Microsoft TPC-H Benchmark Kit Ver. 2.7.0-1004
--          Copyright Microsoft, 2008
--


IF exists (SELECT name FROM sysobjects WHERE name = 'RF1')
          DROP PROCEDURE RF1
GO


--
-- Create a stored RefreshInsert procedure which will catch the deadlock
-- victim abort and restart the insert transaction.
--
CREATE PROCEDURE RF1
     @current_execution INTEGER, @insert_sets INTEGER, @parallel_executions INTEGER, @total_executions INTEGER
AS
BEGIN

DECLARE @startdate DATE
DECLARE @enddate DATE
DECLARE @edate DATE
DECLARE @rangeStart INTEGER
DECLARE @rangeSize INTEGER
DECLARE @range INTEGER

DECLARE @success INTEGER
DECLARE @index INTEGER
```

```
DECLARE @div INTEGER
DECLARE @mod INTEGER
DECLARE @skip INTEGER
DECLARE @i INTEGER
DECLARE @rangeSum INTEGER
DECLARE @totRangeSize INTEGER
DECLARE @stmt NCHAR(1000)
DECLARE @orderSql NCHAR(1000)
DECLARE @liSql NCHAR(1000)

DECLARE @ErrorMessage    NVARCHAR(4000)
DECLARE @ErrorNumber     INT
DECLARE @ErrorSeverity   INT
DECLARE @ErrorState      INT
DECLARE @ErrorLine       INT
DECLARE @ErrorProcedure  NVARCHAR(200)

SET @skip = @total_executions/@parallel_executions
SET @div = (@current_execution - 1)/@parallel_executions
SET @mod = (@current_execution - 1) - @div * @parallel_executions
SET @index = @mod*@skip + @div + 1



--
-- Get the range for this execution
--
SET @stmt = N'SELECT @sdate = dateadd(day,-1,min(O_ORDERDATE)), @edate = max(O_ORDERDATE)
                    FROM NEWORDERS'
EXEC sp_executesql @stmt,N'@sdate DATE output, @edate DATE output',@startdate output, @enddate output

--SELECT 'CurrExec:'+cast(@current_execution as varchar(200)) +','+cast(scheduler_id as varchar(200)) as [sched] from
sys.dm_exec_requests where session_id=@@spid
```

```
IF (@total_executions > @parallel_executions)
	BEGIN
	SET @div = (@index-1)/@skip
	SET @mod = (@index-1) - @div * @skip

	--SET @rangeSize = datediff(day, @startdate, @enddate)/@parallel_executions + 1
	SET @rangeSize = ((@div+1) * datediff(day, @startdate, @enddate))/@parallel_executions - (@div * datediff(day, @startdate, @enddate))/@parallel_executions

	--SET @rangeStart = @div * @rangeSize
	SET @rangeStart = (@div * datediff(day, @startdate, @enddate))/@parallel_executions
	SET @rangeStart = @rangeStart + (@rangeSize * @mod)/@skip

	SET @totRangeSize = ((@mod + 1) * @rangeSize)/@skip - (@mod * @rangeSize)/@skip
	SET @rangeSize = @totRangeSize

	IF (@rangeSize < 0)
		SET @rangeSize = 0
	IF (@insert_sets <= 0)
		SET @insert_sets = 1
	END
ELSE
	BEGIN
	SET @rangeSize = (@current_execution * datediff(day, @startdate, @enddate))/@total_executions - ((@current_execution-1) * datediff(day, @startdate, @enddate))/@total_executions
	SET @rangeStart = ((@current_execution-1) * datediff(day, @startdate, @enddate))/@total_executions
	END

SET @startdate = dateadd(day, @rangeStart, @startdate)
IF (@index < @total_executions)
	SET @enddate = dateadd(day, @rangeSize, @startdate)
```

```
SET @range = datediff(day, @startdate, @enddate) / @insert_sets

--
--  This handles the case when the max-min/insert_sets is less that 1
--
IF @range = 0
        SET @range = 1

--
-- Generate the two insert statements
--
SET @edate = dateadd(day, @range, @startdate)
SET @orderSql = N'INSERT INTO ORDERS (O_ORDERKEY, O_CUSTKEY, O_ORDERSTATUS, O_TOTALPRICE,
                                      O_ORDERDATE, O_ORDERPRIORITY, O_CLERK, O_SHIPPRIORITY,
O_COMMENT)
                  (SELECT O_ORDERKEY, O_CUSTKEY, O_ORDERSTATUS, O_TOTALPRICE,
                                      O_ORDERDATE, O_ORDERPRIORITY, O_CLERK, O_SHIPPRIORITY,
O_COMMENT
                   FROM NEWORDERS
                   WHERE O_ORDERDATE > @startdate AND O_ORDERDATE <= @edate)
                  option (loop join,MaxDop 1)'
SET @liSql = N'INSERT INTO LINEITEM (L_ORDERKEY,L_PARTKEY,L_SUPPKEY,L_LINENUMBER,L_QUANTITY,
                                     L_EXTENDEDPRICE, L_DISCOUNT, L_TAX, L_RETURNFLAG, L_LINESTATUS,
                                     L_SHIPDATE, L_COMMITDATE, L_RECEIPTDATE, L_SHIPINSTRUCT, L_SHIPMODE,
L_COMMENT)
                  (SELECT L_ORDERKEY,L_PARTKEY,L_SUPPKEY,L_LINENUMBER,L_QUANTITY,
                                     L_EXTENDEDPRICE, L_DISCOUNT, L_TAX, L_RETURNFLAG, L_LINESTATUS,
                                     L_SHIPDATE, L_COMMITDATE, L_RECEIPTDATE, L_SHIPINSTRUCT, L_SHIPMODE,
L_COMMENT
                   FROM NEWLINEITEM, NEWORDERS
                   WHERE L_ORDERKEY = O_ORDERKEY AND O_ORDERDATE > @startdate AND
                                      O_ORDERDATE <= @edate)
```

```
                option (loop join,MaxDop 1)'


--
--  Loop through the order keys inserting sets into the
--  ORDERS and LINTEITEM tables
--
WHILE @startdate < @enddate
        BEGIN
        --
        --  Insert into ORDERS and LINEITEM tables
        --
        INSERT_TRANS:
        SET @success = 1
        BEGIN TRANSACTION


        BEGIN TRY
                EXEC sp_executesql @orderSql, N'@startdate DATE, @edate DATE', @startdate, @edate
                EXEC sp_executesql @liSql, N'@startdate DATE, @edate DATE', @startdate, @edate
        END TRY
        BEGIN CATCH
                SET @success = 0
                IF (error_number() = 1205)          -- deadlock victim
                        BEGIN
                        PRINT 'Insert deadlock - restarting RF1'
                        IF (@@trancount>0)
                                ROLLBACK TRANSACTION
                        END
                ELSE
                        BEGIN                       -- not a deadlock
                        PRINT ERROR_MESSAGE()
                        SELECT          @ErrorNumber = ERROR_NUMBER(),
```

```
                @ErrorSeverity = ERROR_SEVERITY(),
                @ErrorState = ERROR_STATE(),
                @ErrorLine = ERROR_LINE(),
                @ErrorProcedure = ISNULL(ERROR_PROCEDURE(), '-');
            SELECT @ErrorMessage = N'Error %%d, Level %%d, State %%d, Procedure %%s, Line %%d, ' +
                                                    'Message: '+ ERROR_MESSAGE();
            IF (@@trancount>0)
                    ROLLBACK TRANSACTION
            RAISERROR
                (
                @ErrorMessage,
                @ErrorSeverity,
                1,
                @ErrorNumber,    -- parameter: original error number.
                @ErrorSeverity,  -- parameter: original error severity.
                @ErrorState,     -- parameter: original error state.
                @ErrorProcedure, -- parameter: original error procedure name.
                @ErrorLine       -- parameter: original error line number.
                );
            END
END CATCH

IF (@success = 0)                           -- deadlock - redo the inserts
        GOTO INSERT_TRANS

COMMIT TRANSACTION

SET @startdate = @edate
SET @edate = dateadd(day, @range, @edate)

IF (@edate > @enddate)
```

```
                SET @edate = @enddate


        END
END

GO
```

RF2

```
-- File:    CREATERF2PROC.SQL
--          Microsoft TPC-H Benchmark Kit Ver. 2.7.0-1004
--          Copyright Microsoft, 2008
--

IF exists (SELECT name FROM sysobjects WHERE name = 'RF2')
        DROP PROCEDURE RF2
GO


--
-- Create a stored Refresh Delete procedure which will catch the deadlock
-- victim abort and restart the delete transaction.
--
CREATE PROCEDURE RF2
    @current_execution INTEGER, @delete_sets INTEGER, @parallel_executions INTEGER, @total_executions INTEGER
AS
BEGIN

DECLARE @startdate DATE
DECLARE @enddate DATE
DECLARE @edate DATE
DECLARE @rangeStart INTEGER
DECLARE @rangeSize INTEGER
```

```
DECLARE @range INTEGER

declare @success INTEGER
declare @index INTEGER
declare @div INTEGER
declare @mod INTEGER
declare @skip INTEGER
declare @i INTEGER
declare @rangeSum INTEGER
declare @totRangeSize INTEGER
declare @sql NCHAR(1000)
declare @orderSql NCHAR(1000)
declare @liSql NCHAR(1000)

DECLARE @ErrorMessage    NVARCHAR(4000)
DECLARE @ErrorNumber     INT
DECLARE @ErrorSeverity   INT
DECLARE @ErrorState      INT
DECLARE @ErrorLine       INT
DECLARE @ErrorProcedure  NVARCHAR(200)

SET @skip = @total_executions/@parallel_executions
SET @div = floor((@current_execution-1)/@parallel_executions)
SET @mod = (@current_execution - 1) - @div * @parallel_executions
SET @index = @mod*@skip + @div + 1

SET @sql = N'SELECT @sdate = dateadd(day,-1,min(O_ORDERDATE)), @edate = max(O_ORDERDATE)
                    FROM MOD_OLDORDERS'
EXEC sp_executesql @sql,N'@sdate DATE output, @edate DATE output',@startdate output, @enddate output

--SELECT 'CurrExec:'+cast(@current_execution as varchar(200)) +','+cast(scheduler_id as varchar(200)) as [sched] from
sys.dm_exec_requests where session_id=@@spid
```

```
IF (@total_executions > @parallel_executions)
	BEGIN
	SET @div = (@index-1)/@skip
	SET @mod = (@index-1) - @div * @skip

	--SET @rangeSize = datediff(day, @startdate, @enddate)/@parallel_executions + 1
	SET @rangeSize = ((@div+1) * datediff(day, @startdate, @enddate))/@parallel_executions - (@div * datediff(day, @startdate, @enddate))/@parallel_executions

	--SET @rangeStart = @div * @rangeSize
	SET @rangeStart = (@div * datediff(day, @startdate, @enddate))/@parallel_executions
	SET @rangeStart = @rangeStart + (@rangeSize * @mod)/@skip

	SET @totRangeSize = ((@mod + 1) * @rangeSize)/@skip - (@mod * @rangeSize)/@skip
	SET @rangeSize = @totRangeSize

	IF (@rangeSize < 0)
		SET @rangeSize = 0
	IF (@delete_sets <= 0)
		SET @delete_sets = 1
	END
ELSE
	BEGIN
	SET @rangeSize = (@current_execution * datediff(day, @startdate, @enddate))/@total_executions - ((@current_execution-1) * datediff(day, @startdate, @enddate))/@total_executions
	SET @rangeStart = ((@current_execution-1) * datediff(day, @startdate, @enddate))/@total_executions
	END

SET @startdate = dateadd(day, @rangeStart, @startdate)
IF (@index < @total_executions)
	SET @enddate = dateadd(day, @rangeSize, @startdate)
```

```
SET @range = datediff(day, @startdate, @enddate) / @delete_sets

--
--  This handles the case when the max-min/delete_sets is less that 1
--
IF @range = 0
        SET @range = 1

--
--  Loop through the order keys deleting sets from orders
--  and lineitem tables
--
SET @edate = dateadd(day, @range, @startdate)
SET @liSql = N'DELETE FROM LINEITEM WHERE L_ORDERKEY in
                (SELECT O_ORDERKEY FROM MOD_OLDORDERS
                        WHERE O_ORDERDATE > @startdate AND O_ORDERDATE <= @edate)
                        option (loop join,MaxDop 1)'
SET @orderSql = N'DELETE FROM ORDERS WHERE O_ORDERKEY in
                (SELECT O_ORDERKEY FROM MOD_OLDORDERS
                        WHERE O_ORDERDATE > @startdate AND O_ORDERDATE <= @edate)
                        option (loop join,MaxDop 1)'

WHILE @startdate < @enddate
        BEGIN

        DELETE_TRANS:
        SET @success = 1
        BEGIN TRANSACTION

        BEGIN TRY
```

```
        EXEC sp_executesql @liSql, N'@startdate DATE, @edate DATE', @startdate, @edate
        EXEC sp_executesql @orderSql, N'@startdate DATE, @edate DATE', @startdate, @edate
END TRY
BEGIN CATCH
        SET @success = 0
        IF (error_number() = 1205)          -- deadlock victim
                BEGIN
                PRINT 'Delete deadlock - restarting RF2'
                IF (@@trancount>0)
                        ROLLBACK TRANSACTION
                END
        ELSE
                BEGIN                       -- not a deadlock
                PRINT ERROR_MESSAGE()
                SELECT          @ErrorNumber = ERROR_NUMBER(),
                    @ErrorSeverity = ERROR_SEVERITY(),
                    @ErrorState = ERROR_STATE(),
                    @ErrorLine = ERROR_LINE(),
                    @ErrorProcedure = ISNULL(ERROR_PROCEDURE(), '-');
                SELECT @ErrorMessage = N'Error %%d, Level %%d, State %%d, Procedure %%s, Line %%d, ' +
                                                        'Message: '+ ERROR_MESSAGE();
                IF (@@trancount>0)
                        ROLLBACK TRANSACTION
                RAISERROR
                    (
                    @ErrorMessage,
                    @ErrorSeverity,
                    1,
                    @ErrorNumber,    -- parameter: original error number.
                    @ErrorSeverity,  -- parameter: original error severity.
                    @ErrorState,     -- parameter: original error state.
```

```
                @ErrorProcedure, -- parameter: original error procedure name.
                @ErrorLine       -- parameter: original error line number.
                );
            END
    END CATCH

    IF (@success = 0)                   -- deadlock - redo the inserts
        GOTO DELETE_TRANS

    COMMIT TRANSACTION

    SET @startdate = @edate
    SET @edate = dateadd(day, @range, @edate)

    IF (@edate > @enddate)
        SET @edate = @enddate

    END
END

GO
```

RF1_Whole.CMD

```
setlocal
set TPCH_NUM_LOAD_STREAMS=%1
set TPCH_NUM_LOAD_FILES=%2
set TPCH_NUM_EXEC_STREAMS=%3
set TPCH_NUM_EXEC_TOTAL=%4
set TPCH_EXEC_BATCH_SIZE=%5
set TPCH_FF_LOCN=%6
set TPCH_RF_STREAM_NUM=%7
```

```
set TPCH_RUN_NUM=%8
set TPCH_COMMENT_STR=%9
set
TPCH_OUTPUT_DIR=%TPCH_OUTPUT_DIR_PREFIX%\%TPCH_RUN_NUM%
set
TPCH_MASTERLOG_FILE=%TPCH_OUTPUT_DIR%\%TPCH_MASTERLOG_NAME%
if not exist %TPCH_OUTPUT_DIR% md %TPCH_OUTPUT_DIR%
pushd %TPCH_OUTPUT_DIR%
echo !DATE! !TIME! Start: Executing RF1
%TPCH_COMMENT_STR% >> %TPCH_MASTERLOG_FILE%
%TPCH_SQL_SHELL% -d %TPCH_DATABASE% -i
create_RF1_tables.sql >> create_RF1_tables.out
set
TPCH_SEMAPHORE_NAME=Load.%TPCH_RF_STREAM_NUM%.%TPCH_RUN_NUM%
start
%TPCH_AUTOMATION_CMD_PATH%\WaitForSemaphore.cmd
%TPCH_SEMAPHORE_NAME%
%TPCH_NUM_LOAD_STREAMS%
%TPCH_SEMAPHORE_NAME%_all
set /A LOCAL_CURR_STREAM = 1
:outerLoopLoadRun
start
%TPCH_AUTOMATION_CMD_PATH%\execSQLFileListSemaphore.cmd %TPCH_SEMAPHORE_NAME%
RF1_Load_List_%TPCH_RF_STREAM_NUM%.%LOCAL_CURR_STREAM%.txt %TPCH_RUN_NUM% no no no
set /A LOCAL_CURR_STREAM = %LOCAL_CURR_STREAM% +
1
if %LOCAL_CURR_STREAM% LEQ
%TPCH_NUM_LOAD_STREAMS% goto outerLoopLoadRun
%TPCH_AUTOMATION_EXEC%\semaphore -wait
%TPCH_SEMAPHORE_NAME%_all -count 1
%TPCH_SQL_SHELL% -d %TPCH_DATABASE% -i
```

```
create_RF1_indices.sql >> create_indices_RF1.out
set
TPCH_SEMAPHORE_NAME=Exec.%TPCH_RF_STREAM_NUM%.%TPCH_RUN_NUM%
start
%TPCH_AUTOMATION_CMD_PATH%\WaitForSemaphore.cmd
%TPCH_SEMAPHORE_NAME%
%TPCH_NUM_EXEC_STREAMS%
%TPCH_SEMAPHORE_NAME%_all
set /A LOCAL_CURR_STREAM = 1
:outerLoopExecRun
start
%TPCH_AUTOMATION_CMD_PATH%\execSQLFileListSemaphore.cmd %TPCH_SEMAPHORE_NAME%
RF1_Execute_List_%TPCH_RF_STREAM_NUM%.%LOCAL_CURR_STREAM%.txt %TPCH_RUN_NUM% no no no
set /A LOCAL_CURR_STREAM = %LOCAL_CURR_STREAM% +
1
if %LOCAL_CURR_STREAM% LEQ
%TPCH_NUM_EXEC_STREAMS% goto outerLoopExecRun
%TPCH_AUTOMATION_EXEC%\semaphore -wait
%TPCH_SEMAPHORE_NAME%_all -count 1
echo !DATE! !TIME! End : Executing RF1
%TPCH_COMMENT_STR% >> %TPCH_MASTERLOG_FILE%
%TPCH_SQL_SHELL% -d %TPCH_DATABASE% -i
%TPCH_AUTOMATION_SQL%\Dump_Row_Count.sql >>
Post_RF1_Row_Count.out
endlocal
```

RF2_Whole.CMD

```
setlocal
set TPCH_NUM_LOAD_STREAMS=%1
set TPCH_NUM_LOAD_FILES=%2
```

```
set TPCH_NUM_EXEC_STREAMS=%3

set TPCH_NUM_EXEC_TOTAL=%4

set TPCH_EXEC_BATCH_SIZE=%5

set TPCH_FF_LOCN=%6

set TPCH_RF_STREAM_NUM=%7

set TPCH_RUN_NUM=%8

set TPCH_COMMENT_STR=%9

set

TPCH_OUTPUT_DIR=%TPCH_OUTPUT_DIR_PREFIX%\%TPCH_RUN_NUM%

set

TPCH_MASTERLOG_FILE=%TPCH_OUTPUT_DIR%\%TPCH_MASTERLOG_NAME%

if not exist %TPCH_OUTPUT_DIR% md %TPCH_OUTPUT_DIR%

pushd %TPCH_OUTPUT_DIR%

echo !DATE! !TIME! Start: Executing RF2 %TPCH_COMMENT_STR%>> %TPCH_MASTERLOG_FILE%

%TPCH_SQL_SHELL% -d %TPCH_DATABASE% -i create_RF2_tables.sql >> create_RF2_tables.out

set

TPCH_SEMAPHORE_NAME=Load.%TPCH_RF_STREAM_NUM%.%TPCH_RUN_NUM%

start %TPCH_AUTOMATION_CMD_PATH%\WaitForSemaphore.cmd

%TPCH_SEMAPHORE_NAME% %TPCH_NUM_LOAD_STREAMS%

%TPCH_SEMAPHORE_NAME%_all

set /A LOCAL_CURR_STREAM = 1

:outerLoopLoadRun

start

%TPCH_AUTOMATION_CMD_PATH%\execSQLFileListSemaphore.cmd %TPCH_SEMAPHORE_NAME% RF2_Load_List_
%TPCH_RF_STREAM_NUM%.%LOCAL_CURR_STR

EAM%.txt %TPCH_RUN_NUM% no no no

set /A LOCAL_CURR_STREAM = %LOCAL_CURR_STREAM% + 1

if %LOCAL_CURR_STREAM% LEQ

%TPCH_NUM_LOAD_STREAMS% goto outerLoopLoadRun

%TPCH_AUTOMATION_EXEC%\semaphore -wait

%TPCH_SEMAPHORE_NAME%_all -count 1

create_RF2_indices.sql >> create_indices_RF2.out
```

```
set
TPCH_SEMAPHORE_NAME=Exec.%TPCH_RF_STREAM_NUM%.%TPCH_RUN_NUM%
start %TPCH_AUTOMATION_CMD_PATH%\WaitForSemaphore.cmd
%TPCH_SEMAPHORE_NAME% %TPCH_NUM_EXEC_STREAMS%
%TPCH_SEMAPHORE_NAME%_all
set /A LOCAL_CURR_STREAM = 1
:outerLoopExecRun
start
%TPCH_AUTOMATION_CMD_PATH%\execSQLFileListSemaphore.cmd %TPCH_SEMAPHORE_NAME%
RF2_Execute_List_%TPCH_RF_STREAM_NUM%.%LOCAL_CURR_STREAM%.txt %TPCH_RUN_NUM% no no no
set /A LOCAL_CURR_STREAM = %LOCAL_CURR_STREAM% + 1
if %LOCAL_CURR_STREAM% LEQ
%TPCH_NUM_EXEC_STREAMS% goto outerLoopExecRun
%TPCH_AUTOMATION_EXEC%\semaphore -wait
%TPCH_SEMAPHORE_NAME%_all -count 1
%TPCH_COMMENT_STR%_Exec >> %TPCH_MASTERLOG_FILE%
echo !DATE! !TIME! End : Executing RF2 %TPCH_COMMENT_STR%>> %TPCH_MASTERLOG_FILE%
%TPCH_SQL_SHELL% -d %TPCH_DATABASE% -i
%TPCH_AUTOMATION_SQL%\Dump_Row_Count.sql >>
%TPCH_SQL_SHELL% -d %TPCH_DATABASE% -i %TPCH_AUTOMATION_SQL%\Increment_Update_Set.sql >>
Increment_Update_Set.out
endlocal
```

Global Variables

```
TPCH_AUTOMATION_PATH "C:\tpch\rfs"
TPCH_AUTOMATION_CMD_PATH "%TPCH_AUTOMATION_PATH%\cmd"
TPCH_AUTOMATION_SQL "%TPCH_AUTOMATION_PATH%\sql"
TPCH_AUTOMATION_CONFIG "%TPCH_AUTOMATION_PATH%\config"
TPCH_AUTOMATION_EXEC "%TPCH_AUTOMATION_PATH%\execs"
TPCH_AUTOMATION_VBS "%TPCH_AUTOMATION_PATH%\vbs"
TPCH_MASTERLOG_NAME "MasterLog.txt"
TPCH_OUTPUT_DIR_PREFIX "C:\tpch"
```

TPCH_EXEC_WINDOW_COLOR "9F"

TPCH_DATABASE "tpch300g"

TPCH_SCALE_FACTOR "300g"

TPCH_SCALE_FACTOR_SIMPLE "300"

TPCH_SQL_SHELL "sqlcmd -STPCH -Usa -P**** -b -w 65535 -l 60 -y 0

Create_RF1_Indices.sql

```
create clustered index NEWORDERS_CLUIDX on NEWORDERS (O_ORDERDATE) on GENERAL_FG

create clustered index NEWLINEITEM_CLUIDX on NEWLINEITEM (L_ORDERKEY) on GENERAL_FG
```

Create_RF1_Tables.sql

```
if exists (select name from sysobjects where name = 'NEWORDERS') drop table NEWORDERS

create table NEWORDERS (O_ORDERKEY bigint not null,

                O_CUSTKEY int not null,

              O_ORDERSTATUS char(1) not null,

              O_TOTALPRICE float not null,

              O_ORDERDATE datetime not null,

              O_ORDERPRIORITY char(15) not null,

              O_CLERK char(15) not null,

              O_SHIPPRIORITY int not null,

              O_COMMENT varchar(79) not null) on GENERAL_FG

if exists (select name from sysobjects where name = 'NEWLINEITEM') drop table NEWLINEITEM

create table NEWLINEITEM (L_ORDERKEY bigint not null,

                L_PARTKEY int not null,

                L_SUPPKEY int not null,

                L_LINENUMBER int not null,

                L_QUANTITY float not null,

                L_EXTENDEDPRICE float not null,

                L_DISCOUNT float not null,

                L_TAX float not null,

                L_RETURNFLAG char(1) not null,

                L_LINESTATUS char(1) not null,

                L_SHIPDATE datetime not null,
```

```
L_COMMITDATE datetime not null,
L_RECEIPTDATE datetime not null,
L_SHIPINSTRUCT char(25) not null,
 L_SHIPMODE char(10 ) not null,
 L_COMMENT varchar(44) not null) on GENERAL_FG
```

Create_RF2_Indices.sql

```
create clustered index MOD_OLDORDERS_CLUIDX on MOD_OLDORDERS (O_ORDERDATE) on GENERAL_FG
create index MOD_OLDORDERS_IDX on MOD_OLDORDERS (O_ORDERKEY) on GENERAL_FG
```

Create_RF2_Tables.sql

```
declare @segment integer
declare @sql nchar(1000)
if exists (select name from sysobjects where name = 'MOD_OLDORDERS') drop table MOD_OLDORDERS
create table MOD_OLDORDERS (O_ORDERDATE datetime, O_ORDERKEY bigint)
set @segment = 1
while @segment <= $(totalSegments)
    begin
    set @sql = 'if exists (select name from sysobjects where name = "OLDORDERS_'
                + RTRIM(CONVERT(varchar(30),@segment))+ '")
          drop table OLDORDERS_' + RTRIM(CONVERT(varchar(30),@segment))
    exec sp_executesql @sql
    set @sql = 'create table OLDORDERS_' + RTRIM(CONVERT(varchar(30),@segment))
          + '(O_ORDERKEY int)'
    exec sp_executesql @sql
    set @segment = @segment + 1
    end
```

Execute_RF1_tmpl.sql

```
EXEC RF1 $(currExec), $(batchSize), $(numParallelExecs), $(totalExecs)
```

Execute_RF2_tmpl.sql

```
EXEC RF2 $(currExec), $(batchSize), $(numParallelExecs), $(totalExecs)
```

Increment_Update_Set.sql

```
UPDATE TPCH_AUX_TABLE SET updateset=updateset+1
```

go

select * from TPCH_AUX_TABLE

go

Load_RF1_tmpl.sql

print 'RF1 Load'

declare @sql nchar(1000)

declare @set integer

select @set = updateset from TPCH_AUX_TABLE

set @sql = 'bulk insert NEWLINEITEM from "$(ffLoc)\Lineitem.tbl.u' + RTRIM(CONVERT(varchar(30),@set))+ '.$(partNo)" with

(FieldTerminator = "|", RowTerminator ="\n",tablock)'

exec sp_executesql @sql

set @sql = 'bulk insert NEWORDERS from "$(ffLoc)\Orders.tbl.u' + RTRIM(CONVERT(varchar(30), @set)) + '.$(partNo)" with

(FieldTerminator = "|", RowTerminator ="\n",tablock)'

exec sp_executesql @sql

Load_RF2_tmpl.sql

print 'RF2 Load'

declare @set integer

declare @sql nchar(1000)

select @set = updateset from TPCH_AUX_TABLE

set @sql = 'bulk insert OLDORDERS_$(partNo) from "$(ffLoc)\Delete.u' + RTRIM(CONVERT(varchar(30),@set)) + '.$(partNo)" with

(RowTerminator ="|",tablock)'

exec sp_executesql @sql

insert into MOD_OLDORDERS (O_ORDERDATE, O_ORDERKEY) (select B.O_ORDERDATE, B.O_ORDERKEY from

OLDORDERS_$(partNo) A, ORDERS B where A.O_ORDERKEY = B.O_ORDERKEY)

Get_Row_Count.sql

select name, rowcnt from sysindexes where id = object_id('LINEITEM')

select name, rowcnt from sysindexes where id = object_id('ORDERS')

Script calls

RF1_Whole 32 32 64 64 40 G:\mnt\ntfs 0 Run1 Run1_Power

RF1_Whole 32 32 64 64 40 G:\mnt\ntfs 8 Run2 Run2_Power

RF2_Whole 32 32 64 64 40 G:\mnt\ntfs 0 Run1 Run1_Power

RF2_Whole 32 32 64 64 40 G:\mnt\ntfs 8 Run2 Run2_Power

RFStreams_Run1 32 32 64 64 40 g:\mnt\ntfs 6 Run1

RFStreams_Run2 32 32 64 64 40 g:\mnt\ntfs 14 Run2

execSQLFileList.cmd

```
echo on
set TPCH_INPUT_LIST=%1
set TPCH_INPUT_LIST_DIR=%~dp1
set TPCH_INPUT_LIST_NAME=%~n1
set TPCH_RUN_NUM=%2
set TPCH_OUTPUT_DIR=%TPCH_OUTPUT_DIR_PREFIX%\%TPCH_RUN_NUM%
set TPCH_MASTERLOG_FILE=%TPCH_OUTPUT_DIR%\%TPCH_MASTERLOG_NAME%
set TPCH_COLLECT_SHOWPLAN=%3
set TPCH_COLLECT_PERFMON=%4
set TPCH_WRITE_TO_MASTER=%5
if not exist %TPCH_OUTPUT_DIR% md %TPCH_OUTPUT_DIR%
COLOR %TPCH_EXEC_WINDOW_COLOR%
for /F "tokens=1" %%i in (%TPCH_INPUT_LIST%) do (
    set TPCH_CURRENT_FILE_NAME=%%~nxi
    set TPCH_CURRENT_FILE=%TPCH_INPUT_LIST_DIR%\%%~nxi
    set TPCH_CURRENT_OUTPUT_FILE=%TPCH_OUTPUT_DIR%\%%~ni.out
    set TPCH_EXEC_FILE=!TPCH_CURRENT_FILE!
    if not exist !TPCH_CURRENT_FILE! goto :missingfile
    title %%~ni
    if /i '%TPCH_WRITE_TO_MASTER%'=='yes' (
        echo !DATE! !TIME! Start: Executing !TPCH_CURRENT_FILE! >> %TPCH_MASTERLOG_FILE%
    )
    set ERRORLEVEL=0
    %TPCH_SQL_SHELL% -d %TPCH_DATABASE% -i !TPCH_EXEC_FILE! -o !TPCH_CURRENT_OUTPUT_FILE!
    echo %ERRORLEVEL%
    if not errorlevel 0 goto :errorexit
    if /i '%TPCH_WRITE_TO_MASTER%'=='yes' (
```

```
        echo !DATE! !TIME! End : Executing !TPCH_CURRENT_FILE! >> %TPCH_MASTERLOG_FILE%
)
)
goto finish
:errorexit
echo Program returned with error when executing %TPCH_CURRENT_FILE%
goto finish
:missingfile
echo File %TPCH_CURRENT_FILE% missing
goto finish
:finish
endlocal
```

execSQLFileListSemaphore

```
setlocal
set TPCH_SEMAPHORE_NAME=%1
shift
call %TPCH_AUTOMATION_CMD_PATH%\execSQLFileList %1 %2 %3 %4 %5 %6 %7 %8 %9
%TPCH_AUTOMATION_EXEC%\semaphore -release %TPCH_SEMAPHORE_NAME%
exit
endlocal
```

RFStreams_Run1.cmd

```
setlocal
set TPCH_NUM_LOAD_STREAMS=%1
set TPCH_NUM_LOAD_FILES=%2
set TPCH_NUM_EXEC_STREAMS=%3
set TPCH_NUM_EXEC_TOTAL=%4
set TPCH_EXEC_BATCH_SIZE=%5
set TPCH_FF_LOCN=%6
set TPCH_NUM_RF_STREAMS=%7
set TPCH_RUN_NUM=%8
set TPCH_OUTPUT_DIR=%TPCH_OUTPUT_DIR_PREFIX%\%TPCH_RUN_NUM%
```

```
set TPCH_MASTERLOG_FILE=%TPCH_OUTPUT_DIR%\%TPCH_MASTERLOG_NAME%

if not exist %TPCH_OUTPUT_DIR% md %TPCH_OUTPUT_DIR%

pushd %TPCH_OUTPUT_DIR%

set /A LOCAL_CURR_STREAM = 1

:outerRFLoop

call %TPCH_AUTOMATION_CMD_PATH%\RF1_Whole.cmd %TPCH_NUM_LOAD_STREAMS%
%TPCH_NUM_LOAD_FILES%

%TPCH_NUM_EXEC_STREAMS% %TPCH_NUM_EXEC_TOTAL% %TPCH_EXEC_BATCH_SIZE% %TPCH_FF_LOCN%

%LOCAL_CURR_STREAM% %TPCH_RUN_NUM% Throughput_RF1_Stream%LOCAL_CURR_STREAM%

call %TPCH_AUTOMATION_CMD_PATH%\RF2_Whole.cmd %TPCH_NUM_LOAD_STREAMS%
%TPCH_NUM_LOAD_FILES%

%TPCH_NUM_EXEC_STREAMS% %TPCH_NUM_EXEC_TOTAL% %TPCH_EXEC_BATCH_SIZE% %TPCH_FF_LOCN%

%LOCAL_CURR_STREAM% %TPCH_RUN_NUM% Throughput_RF2_Stream%LOCAL_CURR_STREAM%

set /A LOCAL_CURR_STREAM = %LOCAL_CURR_STREAM% + 1

if %LOCAL_CURR_STREAM% LEQ %TPCH_NUM_RF_STREAMS% goto outerRFLoop

endlocal
```

RFStreams_Run2

```
setlocal

set TPCH_NUM_LOAD_STREAMS=%1

set TPCH_NUM_LOAD_FILES=%2

set TPCH_NUM_EXEC_STREAMS=%3

set TPCH_NUM_EXEC_TOTAL=%4

set TPCH_EXEC_BATCH_SIZE=%5

set TPCH_FF_LOCN=%6

set TPCH_NUM_RF_STREAMS=%7

set TPCH_RUN_NUM=%8

set TPCH_OUTPUT_DIR=%TPCH_OUTPUT_DIR_PREFIX%\%TPCH_RUN_NUM%

set TPCH_MASTERLOG_FILE=%TPCH_OUTPUT_DIR%\%TPCH_MASTERLOG_NAME%

if not exist %TPCH_OUTPUT_DIR% md %TPCH_OUTPUT_DIR%

pushd %TPCH_OUTPUT_DIR%

set /A LOCAL_CURR_STREAM = 9

:outerRFLoop
```

```
call %TPCH_AUTOMATION_CMD_PATH%\RF1_Whole.cmd %TPCH_NUM_LOAD_STREAMS%
%TPCH_NUM_LOAD_FILES%

%TPCH_NUM_EXEC_STREAMS% %TPCH_NUM_EXEC_TOTAL% %TPCH_EXEC_BATCH_SIZE% %TPCH_FF_LOCN%

%LOCAL_CURR_STREAM% %TPCH_RUN_NUM% Throughput_RF1_Stream%LOCAL_CURR_STREAM%

call %TPCH_AUTOMATION_CMD_PATH%\RF2_Whole.cmd %TPCH_NUM_LOAD_STREAMS%
%TPCH_NUM_LOAD_FILES%

%TPCH_NUM_EXEC_STREAMS% %TPCH_NUM_EXEC_TOTAL% %TPCH_EXEC_BATCH_SIZE% %TPCH_FF_LOCN%

%LOCAL_CURR_STREAM% %TPCH_RUN_NUM% Throughput_RF2_Stream%LOCAL_CURR_STREAM%

set /A LOCAL_CURR_STREAM = %LOCAL_CURR_STREAM% + 1

if %LOCAL_CURR_STREAM% LEQ %TPCH_NUM_RF_STREAMS% goto outerRFLoop

endlocal
```

WaitForSemaphore.cmd

```
setlocal

set TPCH_Group=%1

set waitcount=%2

set TPCH_Sentinel=%3

%TPCH_AUTOMATION_EXEC%\semaphore -wait %TPCH_Group% -count %waitcount%

%TPCH_AUTOMATION_EXEC%\semaphore -release %TPCH_Sentinel%

exit

endlocal
```

Call_Create_RFStreams.cmd

```
Create-RFStreams 64 64 64 128 40 C:\tpch\data 15 Run1 7
```

Create-RF1_Whole

```
setlocal

set TPCH_NUM_LOAD_STREAMS=%1

set TPCH_NUM_LOAD_FILES=%2

set TPCH_NUM_EXEC_STREAMS=%3

set TPCH_NUM_EXEC_TOTAL=%4

set TPCH_EXEC_BATCH_SIZE=%5

set TPCH_FF_LOCN=%6

set TPCH_RF_STREAM_NUM=%7

set /a TPCH_UPDATESET=%TPCH_RF_STREAM_NUM% + 1
```

```
set TPCH_RUN_NUM=%8

set TPCH_COMMENT_STR=%9

set TPCH_FF_LOCN=%TPCH_FF_LOCN%\%TPCH_UPDATESET%\rf128

set TPCH_OUTPUT_DIR=%TPCH_OUTPUT_DIR_PREFIX%\%TPCH_RUN_NUM%

set TPCH_MASTERLOG_FILE=%TPCH_OUTPUT_DIR%\%TPCH_MASTERLOG_NAME%

if not exist %TPCH_OUTPUT_DIR% md %TPCH_OUTPUT_DIR%

pushd %TPCH_OUTPUT_DIR%

if not exist Create_RF1_Tables.sql copy %TPCH_AUTOMATION_SQL%\RF_templ\Create_RF1_Tables.sql

if not exist Create_RF1_Indices.sql copy %TPCH_AUTOMATION_SQL%\RF_templ\Create_RF1_Indices.sql

set /A LOCAL_CURR_STREAM = 1

:outerLoopLoadCreate

set /A LOCAL_CURR_LOAD = %LOCAL_CURR_STREAM%

if exist (RF1_Load_List_%TPCH_RF_STREAM_NUM%.%LOCAL_CURR_STREAM%.txt) del

RF1_Load_List_%TPCH_RF_STREAM_NUM%.%LOCAL_CURR_STREAM%.txt

:innerLoopLoadCreate

echo :setvar ffLoc %TPCH_FF_LOCN%                > load_RF1_input.%TPCH_RF_STREAM_NUM%.%LOCAL_CURR_LOAD
%.sql

echo :setvar partNo %LOCAL_CURR_LOAD%                >> load_RF1_input.%TPCH_RF_STREAM_NUM%.
%LOCAL_CURR_LOAD%.sql

type %TPCH_AUTOMATION_SQL%\RF_templ\Load_RF1_tmpl.sql >>

load_RF1_input.%TPCH_RF_STREAM_NUM%.%LOCAL_CURR_LOAD%.sql

echo load_RF1_input.%TPCH_RF_STREAM_NUM%.%LOCAL_CURR_LOAD%.sql >>

RF1_Load_List_%TPCH_RF_STREAM_NUM%.%LOCAL_CURR_STREAM%.txt

set /A LOCAL_CURR_LOAD = %LOCAL_CURR_LOAD% + %TPCH_NUM_LOAD_STREAMS%

if %LOCAL_CURR_LOAD% LEQ %TPCH_NUM_LOAD_FILES% goto innerLoopLoadCreate

set /A LOCAL_CURR_STREAM = %LOCAL_CURR_STREAM% + 1

if %LOCAL_CURR_STREAM% LEQ %TPCH_NUM_LOAD_STREAMS% goto outerLoopLoadCreate

set /A LOCAL_CURR_STREAM = 1

:outerLoopExecCreate

set /A LOCAL_CURR_EXEC = %LOCAL_CURR_STREAM%

if exist (RF1_Execute_List_%TPCH_RF_STREAM_NUM%.%LOCAL_CURR_STREAM%.txt) del

RF1_Execute_List_%TPCH_RF_STREAM_NUM%.%LOCAL_CURR_STREAM%.txt
```

```
:innerLoopExecCreate
echo :setvar currExec %LOCAL_CURR_EXEC%                    >
exec_RF1_input.%TPCH_RF_STREAM_NUM%.%LOCAL_CURR_EXEC%.sql
echo :setvar batchSize %TPCH_EXEC_BATCH_SIZE%              >>
exec_RF1_input.%TPCH_RF_STREAM_NUM%.%LOCAL_CURR_EXEC%.sql
    echo :setvar numParallelExecs %TPCH_NUM_EXEC_STREAMS% >>
exec_RF1_input.%TPCH_RF_STREAM_NUM%.%LOCAL_CURR_EXEC%.sql
    echo :setvar totalExecs %TPCH_NUM_EXEC_TOTAL%          >>
exec_RF1_input.%TPCH_RF_STREAM_NUM%.%LOCAL_CURR_EXEC%.sql
    type %TPCH_AUTOMATION_SQL%\RF_templ\Execute_RF1_tmpl.sql>>
exec_RF1_input.%TPCH_RF_STREAM_NUM%.%LOCAL_CURR_EXEC%.sql
echo exec_RF1_input.%TPCH_RF_STREAM_NUM%.%LOCAL_CURR_EXEC%.sql >>
RF1_Execute_List_%TPCH_RF_STREAM_NUM%.%LOCAL_CURR_STREAM%.txt
set /A LOCAL_CURR_EXEC = %LOCAL_CURR_EXEC% + %TPCH_NUM_EXEC_STREAMS%
if %LOCAL_CURR_EXEC% LEQ %TPCH_NUM_EXEC_TOTAL% goto innerLoopExecCreate
set /A LOCAL_CURR_STREAM = %LOCAL_CURR_STREAM% + 1
if %LOCAL_CURR_STREAM% LEQ %TPCH_NUM_EXEC_STREAMS% goto outerLoopExecCreate
endlocal
```

Create-RF2_Whole.cmd

```
setlocal
set TPCH_NUM_LOAD_STREAMS=%1
set TPCH_NUM_LOAD_FILES=%2
set TPCH_NUM_EXEC_STREAMS=%3
set TPCH_NUM_EXEC_TOTAL=%4
set TPCH_EXEC_BATCH_SIZE=%5
set TPCH_FF_LOCN=%6
set TPCH_RF_STREAM_NUM=%7
set /a TPCH_UPDATESET=%7+1
set TPCH_RUN_NUM=%8
set TPCH_COMMENT_STR=%9
set TPCH_FF_LOCN=%TPCH_FF_LOCN%\%TPCH_UPDATESET%\rf128
```

```
set TPCH_OUTPUT_DIR=%TPCH_OUTPUT_DIR_PREFIX%\%TPCH_RUN_NUM%

set TPCH_MASTERLOG_FILE=%TPCH_OUTPUT_DIR%\%TPCH_MASTERLOG_NAME%

if not exist %TPCH_OUTPUT_DIR% md %TPCH_OUTPUT_DIR%

pushd %TPCH_OUTPUT_DIR%

echo :setvar totalSegments %TPCH_NUM_LOAD_FILES%              > Create_RF2_Tables.sql

type %TPCH_AUTOMATION_SQL%\RF_templ\Create_RF2_Tables.sql >> Create_RF2_Tables.sql

if not exist Increment_Update_Set.sql copy %TPCH_AUTOMATION_SQL%\RF_templ\Increment_Update_Set.sql

if not exist Create_RF2_Indices.sql copy %TPCH_AUTOMATION_SQL%\RF_templ\Create_RF2_Indices.sql

set /A LOCAL_CURR_STREAM = 1

:outerLoopLoadCreate

set /A LOCAL_CURR_LOAD = %LOCAL_CURR_STREAM%

if exist (RF2_Load_List_%TPCH_RF_STREAM_NUM%.%LOCAL_CURR_STREAM%.txt) del

RF2_Load_List_%TPCH_RF_STREAM_NUM%.%LOCAL_CURR_STREAM%.txt

echo :setvar ffLoc %TPCH_FF_LOCN%              > load_RF2_input.%TPCH_RF_STREAM_NUM%.%LOCAL_CURR_LOAD
%.sql

echo :setvar partNo %LOCAL_CURR_LOAD%              >> load_RF2_input.%TPCH_RF_STREAM_NUM%.
%LOCAL_CURR_LOAD%.sql

type %TPCH_AUTOMATION_SQL%\RF_templ\Load_RF2_tmpl.sql >>

load_RF2_input.%TPCH_RF_STREAM_NUM%.%LOCAL_CURR_LOAD%.sql

echo load_RF2_input.%TPCH_RF_STREAM_NUM%.%LOCAL_CURR_LOAD%.sql >>

RF2_Load_List_%TPCH_RF_STREAM_NUM%.%LOCAL_CURR_STREAM%.txt

set /A LOCAL_CURR_LOAD = %LOCAL_CURR_LOAD% + %TPCH_NUM_LOAD_STREAMS%

if %LOCAL_CURR_LOAD% LEQ %TPCH_NUM_LOAD_FILES% goto innerLoopLoadCreate

set /A LOCAL_CURR_STREAM = %LOCAL_CURR_STREAM% + 1

if %LOCAL_CURR_STREAM% LEQ %TPCH_NUM_LOAD_STREAMS% goto outerLoopLoadCreate

set /A LOCAL_CURR_STREAM = 1

:outerLoopExecCreate

set /A LOCAL_CURR_EXEC = %LOCAL_CURR_STREAM%

if exist (RF2_Execute_List_%TPCH_RF_STREAM_NUM%.%LOCAL_CURR_STREAM%.txt) del

RF2_Execute_List_%TPCH_RF_STREAM_NUM%.%LOCAL_CURR_STREAM%.txt

:innerLoopExecCreate

echo :setvar currExec %LOCAL_CURR_EXEC%              >
```

```
exec_RF2_input.%TPCH_RF_STREAM_NUM%.%LOCAL_CURR_EXEC%.sql
echo :setvar batchSize %TPCH_EXEC_BATCH_SIZE%          >>
exec_RF2_input.%TPCH_RF_STREAM_NUM%.%LOCAL_CURR_EXEC%.sql
echo :setvar numParallelExecs %TPCH_NUM_EXEC_STREAMS% >>
exec_RF2_input.%TPCH_RF_STREAM_NUM%.%LOCAL_CURR_EXEC%.sql
echo :setvar totalExecs %TPCH_NUM_EXEC_TOTAL%          >>
exec_RF2_input.%TPCH_RF_STREAM_NUM%.%LOCAL_CURR_EXEC%.sql
type %TPCH_AUTOMATION_SQL%\RF_templ\Execute_RF2_tmpl.sql>>
exec_RF2_input.%TPCH_RF_STREAM_NUM%.%LOCAL_CURR_EXEC%.sql
echo exec_RF2_input.%TPCH_RF_STREAM_NUM%.%LOCAL_CURR_EXEC%.sql >>
RF2_Execute_List_%TPCH_RF_STREAM_NUM%.%LOCAL_CURR_STREAM%.txt
set /A LOCAL_CURR_EXEC = %LOCAL_CURR_EXEC% + %TPCH_NUM_EXEC_STREAMS%
if %LOCAL_CURR_EXEC% LEQ %TPCH_NUM_EXEC_TOTAL% goto innerLoopExecCreate
set /A LOCAL_CURR_STREAM = %LOCAL_CURR_STREAM% + 1
if %LOCAL_CURR_STREAM% LEQ %TPCH_NUM_EXEC_STREAMS% goto outerLoopExecCreate
endlocal
```

Create-RF_Streams.cmd

```
setlocal
set TPCH_NUM_LOAD_STREAMS=%1
set TPCH_NUM_LOAD_FILES=%2
set TPCH_NUM_EXEC_STREAMS=%3
set TPCH_NUM_EXEC_TOTAL=%4
set TPCH_EXEC_BATCH_SIZE=%5
set TPCH_FF_LOCN=%6
set TPCH_NUM_RF_STREAMS=%7
set TPCH_RUN_NUM=%8
set TPCH_SWITCH_TO_RUN2=%9
set TPCH_OUTPUT_DIR=%TPCH_OUTPUT_DIR_PREFIX%\%TPCH_RUN_NUM%
set TPCH_MASTERLOG_FILE=%TPCH_OUTPUT_DIR%\%TPCH_MASTERLOG_NAME%
if not exist %TPCH_OUTPUT_DIR% md %TPCH_OUTPUT_DIR%
pushd %TPCH_OUTPUT_DIR%
```

```
set /A LOCAL_CURR_STREAM = 0

:outerRFLoop

if %LOCAL_CURR_STREAM% GTR %TPCH_SWITCH_TO_RUN2% set TPCH_RUN_NUM=Run2

call %TPCH_AUTOMATION_PATH%\CreateFiles\Create-RF1_Whole.cmd %TPCH_NUM_LOAD_STREAMS%

%TPCH_NUM_LOAD_FILES% %TPCH_NUM_EXEC_STREAMS% %TPCH_NUM_EXEC_TOTAL%
%TPCH_EXEC_BATCH_SIZE%

%TPCH_FF_LOCN% %LOCAL_CURR_STREAM% %TPCH_RUN_NUM% Throughput_RF1_Stream
%LOCAL_CURR_STREAM%

call %TPCH_AUTOMATION_PATH%\CreateFiles\Create-RF2_Whole.cmd %TPCH_NUM_LOAD_STREAMS%

%TPCH_NUM_LOAD_FILES% %TPCH_NUM_EXEC_STREAMS% %TPCH_NUM_EXEC_TOTAL%
%TPCH_EXEC_BATCH_SIZE%

%TPCH_FF_LOCN% %LOCAL_CURR_STREAM% %TPCH_RUN_NUM% Throughput_RF2_Stream
%LOCAL_CURR_STREAM%

set /A LOCAL_CURR_STREAM = %LOCAL_CURR_STREAM% + 1

if %LOCAL_CURR_STREAM% LEQ %TPCH_NUM_RF_STREAMS% goto outerRFLoop

endlocal
```

Appendix F: Implementation Specific Layer and Source Code

```
VERSION 1.0 CLASS
BEGIN
 MultiUse = -1  'True
 Persistable = 0  'NotPersistable
 DataBindingBehavior = 0  'vbNone
 DataSourceBehavior  = 0  'vbNone
 MTSTransactionMode  = 0  'NotAnMTSObject
END
Attribute VB_Name = "cArrConstraints"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
'  FILE:       cArrConstraints.cls
'              Microsoft TPC-H Kit Ver. 2.7.0-1005
'              Copyright Microsoft, 2008
'              All Rights Reserved
'
'
'  PURPOSE:    Implements an array of cConstraint objects.
'              Type-safe wrapper around cNodeCollections.
'              Also contains additional functions that determine all the
'              constraints for a step, all constraints in a workspace,
'              validation functions, etc.
'  Contact:    Reshma Tharamal (reshmat@microsoft.com)
'
Option Explicit

Private mcarrConstraints As cNodeCollections

' Used to indicate the source module name when errors
' are raised by this class
Private mstrSource As String
Private Const mstrModuleName As String = "cArrConstraints."
Public Sub SaveWspConstraints(ByVal lngWorkspace As Long)
   ' Calls a procedure to commit all changes to the constraints
   ' in the passed in workspace.

   Call mcarrConstraints.Save(lngWorkspace)

End Sub
Public Property Set ConstraintDB(vdata As Database)

   Set mcarrConstraints.NodeDB = vdata

End Property
Public Property Get ConstraintDB() As Database

   Set ConstraintDB = mcarrConstraints.NodeDB

End Property
```

```
Public Sub Modify(cConsToUpdate As cConstraint)

  ' Modify the constraint record
  Call mcarrConstraints.Modify(cConsToUpdate)

End Sub
Public Sub CreateNewConstraintVersion(ByVal lngStepId As Long, _
      ByVal strNewVersion As String, _
      ByVal strOldVersion As String, _
      ByVal intStepType As Integer)

  ' Does all the processing needed to create new versions of
  ' all the constraints for a given step
  ' It inserts new constraint records in the database with
  ' the new version numbers on them
  ' It also updates the version number on all constraints
  ' for the step in the array to the new version passed in
  ' Since it handles both global and manager/worker steps,
  ' it checks for the step_id or global_step_id fields,
  ' depending on the type of step

  Dim lngIndex As Long
  Dim cUpdateConstraint As cConstraint

  On Error GoTo CreateNewConstraintVersionErr
  mstrSource = mstrModuleName & "CreateNewConstraintVersion"

  ' Update the version/global version on Constraint with the
  ' passed in step/global step id
  For lngIndex = 0 To mcarrConstraints.Count - 1
     Set cUpdateConstraint = mcarrConstraints(lngIndex)
     If intStepType = gintGlobalStep Then
        If cUpdateConstraint.GlobalStepId = lngStepId And _
              cUpdateConstraint.IndOperation <> DeleteOp Then
           cUpdateConstraint.GlobalVersionNo = strNewVersion

           ' Set the operation to indicate an insert
           cUpdateConstraint.IndOperation = InsertOp
        End If
     Else
        If cUpdateConstraint.StepId = lngStepId And _
              cUpdateConstraint.IndOperation <> DeleteOp Then
           cUpdateConstraint.VersionNo = strNewVersion

           ' Set the operation to indicate an insert
           cUpdateConstraint.IndOperation = InsertOp
        End If
     End If
  Next lngIndex

  Exit Sub

CreateNewConstraintVersionErr:
```

```
  LogErrors Errors
  gstrSource = mstrModuleName & "CreateNewConstraintVersion"
  On Error GoTo 0
  Err.Raise vbObjectError + errCreateNewConstraintVersionFailed, _
        mstrSource, _
        LoadResString(errCreateNewConstraintVersionFailed)

End Sub
Private Sub Class_Initialize()

  Set mcarrConstraints = New cNodeCollections
  BugMessage "cArrConstraints: Initialize event - setting Constraint count to 0"

End Sub

Private Sub Class_Terminate()

  Set mcarrConstraints = Nothing
  BugMessage "cArrConstraints: Terminate event triggered"

End Sub

Public Sub Add(ByVal cConstraintToAdd As cConstraint)

  Set cConstraintToAdd.NodeDB = mcarrConstraints.NodeDB

  ' Retrieve a unique constraint identifier
  cConstraintToAdd.ConstraintId = cConstraintToAdd.NextIdentifier

  ' Call a procedure to load the constraint record in the array
  Call mcarrConstraints.Add(cConstraintToAdd)

End Sub
Public Sub Delete(ByVal cOldConstraint As cConstraint)

  Dim lngDeleteElement As Long
  Dim cConsToDelete As cConstraint

  lngDeleteElement = QueryConstraintIndex(cOldConstraint.ConstraintId)
  Set cConsToDelete = mcarrConstraints(lngDeleteElement)

  Call mcarrConstraints.Delete(cConsToDelete.Position)

  Set cConsToDelete = Nothing

End Sub
Private Function QueryConstraintIndex(lngConstraintId As Long) _
    As Long

  Dim lngIndex As Integer

  ' Find the element in the array to be deleted
  For lngIndex = 0 To mcarrConstraints.Count - 1
```

```
      ' Note: The constraint id is not a primary key field in
      ' the database - there can be multiple records with the
      ' same constraint_id but for different versions of a step
      ' However, since we'll always load the constraint information
      ' for the latest version of a step, we'll have just one
      ' constraint record with a given constraint_id
      If mcarrConstraints(lngIndex).ConstraintId = lngConstraintId Then
         QueryConstraintIndex = lngIndex
         Exit Function
      End If

   Next lngIndex

   ' Raise error that Constraint has not been found
   ShowError errConstraintNotFound
   On Error GoTo 0
   Err.Raise vbObjectError + errConstraintNotFound, mstrSource, _
      LoadResString(errConstraintNotFound)

End Function

Public Function QueryConstraint(ByVal lngConstraintId As Long) _
   As cConstraint

   ' Returns a cConstraint object with the property values
   ' corresponding to the Constraint Identifier, lngConstraintId

   Dim lngQueryElement As Long

   lngQueryElement = QueryConstraintIndex(lngConstraintId)

   ' Set the return value to the queried Constraint
   Set QueryConstraint = mcarrConstraints(lngQueryElement)

End Function

Public Sub LoadConstraints(ByVal lngWorkspaceId As Long, rstStepsInWsp As Recordset)

   ' Loads the constraints array with all the constraints
   ' for the workspace
   Dim recConstraints As Recordset
   Dim qyCons As DAO.QueryDef
   Dim strSql As String
   Dim dtStart As Date

   On Error GoTo LoadConstraintsErr
   mstrSource = mstrModuleName & "LoadConstraints"

   If rstStepsInWsp.RecordCount = 0 Then
      Exit Sub
   End If

   ' First check if the database object has been set
   If mcarrConstraints.NodeDB Is Nothing Then
```

```
      On Error GoTo 0
      Err.Raise vbObjectError + errSetDBBeforeLoad, _
            mstrSource, _
            LoadResString(errSetDBBeforeLoad)
   End If

   dtStart = Now

   ' Select based on the global step id since there might
   ' be constraints for a global step that run are executed
   ' for the workspace
   ' This method has the advantage that if the steps are queried right, everything else follows
   strSql = "Select a.constraint_id, a.step_id, a.version_no, " & _
      " a.constraint_type, a.global_step_id, a.global_version_no, " & _
      " a.sequence_no, b.workspace_id " & _
      " from step_constraints a, att_steps b " & _
      " where a.global_step_id = b.step_id " & _
      " and a.global_version_no = b.version_no " & _
      " and a.global_step_id = [g_s_id] " & _
      " and a.global_version_no = [g_ver_no] " & _
      " and b.archived_flag = [archived] "

   ' Find the highest X-component of the version number
   strSql = strSql & " AND ( a.step_id = 0 or ( cint( mid( a.version_no, 1, instr( a.version_no, " & gstrDQ &
gstrVerSeparator & gstrDQ & " ) - 1 ) ) = " & _
      " ( select max( cint( mid( version_no, 1, instr( version_no, " & gstrDQ & gstrVerSeparator & gstrDQ & " ) -
1 ) ) ) " & _
      " from att_steps AS d " & _
      " WHERE a.step_id = d.step_id " & _
      " and d.archived_flag = [archived] ) "

   ' Find the highest Y-component of the version number for the highest X-component
   strSql = strSql & " AND cint( mid( a.version_no, instr( a.version_no, " & gstrDQ & gstrVerSeparator & gstrDQ &
" ) + 1 ) ) = " & _
      " ( select max( cint( mid( version_no, instr( version_no, " & gstrDQ & gstrVerSeparator & gstrDQ & " ) + 1 ) ) )
" & _
      " from att_steps AS y " & _
      " Where a.step_id = y.step_id " & _
      " AND cint( mid( version_no, 1, instr( version_no, " & gstrDQ & gstrVerSeparator & gstrDQ & " ) - 1 ) ) = " &
_
      " ( select max( cint( mid( version_no, 1, instr( version_no, " & gstrDQ & gstrVerSeparator & gstrDQ & " ) -
1 ) ) ) " & _
      " from att_steps AS c " & _
      " WHERE y.step_id = c.step_id " & _
      " and c.archived_flag = [archived] ) ) ) ) "

   ' Order the constraints by sequence within a given step
   strSql = strSql & " order by a.sequence_no "

   Set qyCons = mcarrConstraints.NodeDB.CreateQueryDef(gstrEmptyString, strSql)
   qyCons.Parameters("archived").Value = False

   rstStepsInWsp.MoveFirst
```

```
  While Not rstStepsInWsp.EOF

    If Not (rstStepsInWsp!global_flag) Then
      qyCons.Close
      BugMessage "Query constraints Read + load took: " & CStr(DateDiff("s", dtStart, Now))
      Exit Sub
    End If

    qyCons.Parameters("g_s_id").Value = rstStepsInWsp!step_id
    qyCons.Parameters("g_ver_no").Value = rstStepsInWsp!version_no

    Set recConstraints = qyCons.OpenRecordset(dbOpenSnapshot)

    Call LoadRecordsetInConstraintArray(recConstraints)
    recConstraints.Close

    rstStepsInWsp.MoveNext
  Wend

  qyCons.Close
  BugMessage "Query constraints Read + load took: " & CStr(DateDiff("s", dtStart, Now))

  Exit Sub

LoadConstraintsErr:
  LogErrors Errors
  gstrSource = mstrModuleName & "LoadConstraints"
  On Error GoTo 0
  Err.Raise vbObjectError + errLoadDataFailed, _
        mstrSource, _
        LoadResString(errLoadDataFailed)

End Sub
Public Sub UnloadStepConstraints(ByVal lngStepId As Long)

  ' Unloads all the constraints for the workspace from
  ' the constraints array

  Dim lngIndex As Long

  ' Find all constraints in the array with a matching step id
  ' It is important to step in reverse order through the array,
  ' since we delete constraint records!
  For lngIndex = mcarrConstraints.Count - 1 To 0 Step -1
    If mcarrConstraints(lngIndex).GlobalStepId = lngStepId Then

      ' Unload the constraint from the array
      Call mcarrConstraints.Unload(lngIndex)

    End If
  Next lngIndex

End Sub
Public Sub UnloadConstraint(cOldConstraint As cConstraint)
```

```
  ' Unloads the constraint from the constraints array

  Dim lngDeleteElement As Long

  lngDeleteElement = QueryConstraintIndex(cOldConstraint.ConstraintId)

  Call mcarrConstraints.Unload(lngDeleteElement)

End Sub
Private Sub LoadRecordsetInConstraintArray(ByVal recConstraints As Recordset)
  ' Loads all the constraint records in the passed in
  ' recordset into the array

  Dim cNewConstraint As cConstraint

  On Error GoTo LoadRecordsetInConsArrayErr
  mstrSource = mstrModuleName & "LoadRecordsetInConstraintArray"

  If recConstraints.RecordCount = 0 Then
     Exit Sub
  End If

  recConstraints.MoveFirst
  While Not recConstraints.EOF
     Set cNewConstraint = New cConstraint

     ' Initialize Constraint values
     cNewConstraint.ConstraintId = CLng(ErrorOnNullField(recConstraints, "Constraint_id"))
     cNewConstraint.StepId = CLng(ErrorOnNullField(recConstraints, "step_id"))
     cNewConstraint.VersionNo = CStr(ErrorOnNullField(recConstraints, "version_no"))

     cNewConstraint.GlobalStepId = CLng(ErrorOnNullField(recConstraints, "global_step_id"))
     cNewConstraint.GlobalVersionNo = CStr(ErrorOnNullField(recConstraints, "global_version_no"))
     cNewConstraint.SequenceNo = CInt(ErrorOnNullField(recConstraints, "sequence_no"))

     cNewConstraint.WorkspaceId = CLng(ErrorOnNullField(recConstraints, FLD_ID_WORKSPACE))
     cNewConstraint.ConstraintType = CInt(ErrorOnNullField(recConstraints, "constraint_type"))

     ' Add this record to the array of Constraints
     mcarrConstraints.Load cNewConstraint

     Set cNewConstraint = Nothing
     recConstraints.MoveNext
  Wend

  Exit Sub

LoadRecordsetInConsArrayErr:
  LogErrors Errors
  gstrSource = mstrModuleName & "LoadRecordsetInConstraintArray"
  On Error GoTo 0
  Err.Raise vbObjectError + errLoadRsInArrayFailed, _
        mstrSource, _
        LoadResString(errLoadRsInArrayFailed)
```

```
End Sub

Public Function ConstraintsForStep( _
      ByVal lngStepId As Long, _
      ByVal strVersionNo As String, _
      Optional ByVal intConstraintType As ConstraintType = 0, _
      Optional ByVal blnSort As Boolean = True, _
      Optional ByVal blnGlobal As Boolean = False, _
      Optional ByVal blnGlobalConstraintsOnly As Boolean = False) _
      As Variant

  ' Returns a variant containing an array of cConstraint objects,
  ' containing all the constraints that have been defined for the
  ' given step. If the Global flag is set to true, the
  ' search will be made for all the constraints that have
  ' a matching global_step_id

  Dim lngIndex As Long
  Dim cStepConstraint() As cConstraint
  Dim lngConstraintCount As Long
  Dim cTempConstraint As cConstraint

  On Error GoTo ConstraintsForStepErr
  mstrSource = mstrModuleName & "ConstraintsForStep"

  lngConstraintCount = 0

  ' Find each element in the constraints array
  For lngIndex = 0 To mcarrConstraints.Count - 1
     ' If a constraint type has been specified then check
     ' if the constraint type for the record matches the
     ' passed in type
     Set cTempConstraint = mcarrConstraints(lngIndex)
     If Not blnGlobal Then
        If cTempConstraint.StepId = lngStepId And _
              cTempConstraint.VersionNo = strVersionNo And _
              cTempConstraint.IndOperation <> DeleteOp And _
              (intConstraintType = 0 Or _
              cTempConstraint.ConstraintType = intConstraintType) Then
           ' We have a matching constraint for the given step
           AddArrayElement cStepConstraint, _
                 cTempConstraint, lngConstraintCount
        End If
     Else
        If cTempConstraint.GlobalStepId = lngStepId And _
              cTempConstraint.GlobalVersionNo = strVersionNo And _
              cTempConstraint.IndOperation <> DeleteOp Then
           If blnGlobalConstraintsOnly = False Or _
                 (blnGlobalConstraintsOnly And _
                 cTempConstraint.StepId = 0 And _
                 cTempConstraint.VersionNo = gstrMinVersion) Then

              ' We have a matching constraint for the global step
```

```
                AddArrayElement cStepConstraint, _
                    cTempConstraint, lngConstraintCount
            End If
          End If
        End If

    Next lngIndex

    ' Set the return value of the function to the array of
    ' constraints that has been built above
    If lngConstraintCount = 0 Then
        ConstraintsForStep = Empty
    Else
        ConstraintsForStep = cStepConstraint()
    End If

    ' Sort the constraints
    If blnSort Then
        Call QuickSort(ConstraintsForStep)
    End If

    Exit Function

ConstraintsForStepErr:
    LogErrors Errors
    On Error GoTo 0
    Err.Raise vbObjectError + errConstraintsForStepFailed, _
            mstrSource, _
            LoadResString(errConstraintsForStepFailed)

End Function
Private Sub AddArrayElement(ByRef arrNodes() As cConstraint, _
        ByVal objToAdd As cConstraint, _
        ByRef lngCount As Long)
    ' Adds the passed in object to the array

    ' Increase the array dimension and add the object to it
    ReDim Preserve arrNodes(lngCount)
    Set arrNodes(lngCount) = objToAdd
    lngCount = lngCount + 1

End Sub

Public Function ConstraintsForWsp( _
        ByVal lngWorkspaceId As Long, _
        Optional ByVal intConstraintType As Integer = 0, _
        Optional ByVal blnSort As Boolean = True, _
        Optional ByVal blnGlobalConstraintsOnly As Boolean = False) _
        As Variant

    ' Returns a variant containing an array of cConstraint objects,
    ' containing all the constraints that have been defined for the
    ' given workspace.
```

```
  Dim lngIndex As Long
  Dim cWspConstraint() As cConstraint
  Dim lngConstraintCount As Long
  Dim cTempConstraint As cConstraint

  On Error GoTo ConstraintsForWspErr
  mstrSource = mstrModuleName & "ConstraintsForWsp"

  lngConstraintCount = 0

  ' Find each element in the constraints array
  For lngIndex = 0 To mcarrConstraints.Count - 1
     ' If a constraint type has been specified then check
     ' if the constraint type for the record matches the
     ' passed in type
     Set cTempConstraint = mcarrConstraints(lngIndex)
     If cTempConstraint.WorkspaceId = lngWorkspaceId And _
           cTempConstraint.IndOperation <> DeleteOp And _
           (intConstraintType = 0 Or _
           cTempConstraint.ConstraintType = intConstraintType) Then

        If blnGlobalConstraintsOnly = False Or _
              (blnGlobalConstraintsOnly And _
              cTempConstraint.StepId = 0 And _
              cTempConstraint.VersionNo = gstrMinVersion) Then

           ' We have a matching constraint for the workspace
           AddArrayElement cWspConstraint, _
                 cTempConstraint, lngConstraintCount
        End If
     End If
  Next lngIndex

  ' Set the return value of the function to the array of
  ' constraints that has been built above
  If lngConstraintCount = 0 Then
     ConstraintsForWsp = Empty
  Else
     ConstraintsForWsp = cWspConstraint()
  End If

  ' Sort the constraints
  If blnSort Then
     Call QuickSort(ConstraintsForWsp)
  End If

  Exit Function

ConstraintsForWspErr:
  LogErrors Errors
  On Error GoTo 0
  Err.Raise vbObjectError + errConstraintsForWspFailed, _
        mstrSource, _
        LoadResString(errConstraintsForWspFailed)
```

```
End Function
Public Function PreConstraintsForStep( _
      ByVal lngStepId As Long, _
      ByVal strVersionNo As String, _
      Optional ByVal blnSort As Boolean) As Variant

  ' Returns a variant containing an array of cConstraint objects,
  ' containing all the pre-execution constraints that have
  ' been defined for the given step_id and version

  ' Call a function that will return a variant containing
  ' all the constraints of the passed in type
  PreConstraintsForStep = ConstraintsForStep(lngStepId, _
        strVersionNo, gintPreStep, blnSort)

End Function
Public Function PostConstraintsForStep( _
      ByVal lngStepId As Long, _
      ByVal strVersionNo As String, _
      Optional ByVal blnSort As Boolean) As Variant

  ' Returns a variant containing an array of cConstraint objects,
  ' containing all the Post-execution constraints that have
  ' been defined for the given step_id and version

  ' Call a function that will return a variant containing
  ' all the constraints of the passed in type
  PostConstraintsForStep = ConstraintsForStep(lngStepId, _
        strVersionNo, gintPostStep, blnSort)

End Function
Public Function PostConstraintsForWsp( _
      ByVal lngWorkspaceId As Long, _
      Optional ByVal blnSort As Boolean) As Variant

  ' Returns a variant containing an array of cConstraint objects,
  ' containing all the Post-execution globals that have
  ' been defined for the workspace

  ' Call a function that will return a variant containing
  ' all the constraints of the passed in type
  PostConstraintsForWsp = ConstraintsForWsp(lngWorkspaceId, _
        gintPostStep, blnSort, True)

End Function
Public Function PreConstraintsForWsp( _
      ByVal lngWorkspaceId As Long, _
      Optional ByVal blnSort As Boolean) As Variant

  ' Returns a variant containing an array of cConstraint objects,
  ' containing all the Pre-execution globals that have
  ' been defined for the workspace
```

```
  ' Call a function that will return a variant containing
  ' all the constraints of the passed in type
  PreConstraintsForWsp = ConstraintsForWsp(lngWorkspaceId, _
        gintPreStep, blnSort, True)

End Function
Public Property Get ConstraintCount() As Long

  ConstraintCount = mcarrConstraints.Count

End Property

VERSION 1.0 CLASS
BEGIN
 MultiUse = -1  'True
 Persistable = 0  'NotPersistable
 DataBindingBehavior = 0  'vbNone
 DataSourceBehavior  = 0  'vbNone
 MTSTransactionMode  = 0  'NotAnMTSObject
END
Attribute VB_Name = "cArrParameters"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
'  FILE:       cArrParameters.cls
'              Microsoft TPC-H Kit Ver. 2.7.0-1005
'              Copyright Microsoft, 2008
'              All Rights Reserved
'
'
'  PURPOSE:    Implements an array of cParameter objects.
'              Type-safe wrapper around cNodeCollections.
'              Also contains additional functions to determine parameter
'              values, validation functions, etc.
'  Contact:    Reshma Tharamal (reshmat@microsoft.com)
'
Option Explicit

Private mcarrParameters As cNodeCollections

' Used to indicate the source module name when errors
' are raised by this class
Private mstrSource As String
Private Const mstrModuleName As String = "cArrParameters."

Public Sub InitBuiltInsForRun(lWspId As Long, lRunId As Long)

  Dim cParamRec As cParameter

  ' Initialize the values of the run_id and output_dir built-in parameters and save them
  ' to the database
  Set cParamRec = GetParameterValue(lWspId, PARAM_RUN_ID)
  cParamRec.ParameterValue = CStr(lRunId)
```

```
  Call Modify(cParamRec)

  Set cParamRec = GetParameterValue(lWspId, PARAM_OUTPUT_DIR)
  cParamRec.ParameterValue = GetDefaultDir(lWspId, Me)
  cParamRec.ParameterValue = cParamRec.ParameterValue & gstrFileSeparator & CStr(lRunId)
  Call Modify(cParamRec)

  Call SaveParametersInWsp(lWspId)

End Sub


Public Property Set ParamDatabase(vdata As Database)

  Set mcarrParameters.NodeDB = vdata

End Property
Public Sub Modify(cModifiedParam As cParameter)

  ' First check if the parameter record is valid
  Call CheckDupParamName(cModifiedParam)

  Call mcarrParameters.Modify(cModifiedParam)

End Sub
Public Sub Load(ByRef cParamToAdd As cParameter)

  Call mcarrParameters.Load(cParamToAdd)

End Sub
Public Sub Add(ByRef cParamToAdd As cParameter)

  Set cParamToAdd.NodeDB = mcarrParameters.NodeDB

  ' First check if the parameter record is valid
  Call Validate(cParamToAdd)

  ' Retrieve a unique parameter identifier
  cParamToAdd.ParameterId = cParamToAdd.NextIdentifier

  Call mcarrParameters.Add(cParamToAdd)

End Sub

Public Sub Unload(lngParamToDelete As Long)

  Dim lngDeleteElement As Long

  lngDeleteElement = QueryIndex(lngParamToDelete)

  Call mcarrParameters.Unload(lngDeleteElement)

End Sub
```

```
Public Sub SaveParametersInWsp(ByVal lngWorkspace As Long)
  ' Calls a procedure to commit all changes to the parameters
  ' for the passed in workspace.

  ' Call a procedure to save all parameter records for the
  ' workspace
  Call mcarrParameters.Save(lngWorkspace)

End Sub
Public Function GetParameterValue(ByVal lngWorkspace As Long, _
    ByVal strParamName As String) As cParameter
  ' Returns the value for the passed in workspace parameter

  Dim cParamRec As cParameter
  Dim lngIndex As Long

  On Error GoTo GetParameterValueErr

  ' Find all parameters in the array with a matching workspace id
  For lngIndex = 0 To mcarrParameters.Count - 1
    Set cParamRec = mcarrParameters(lngIndex)
    If cParamRec.WorkspaceId = lngWorkspace And _
        cParamRec.ParameterName = strParamName Then

      Set GetParameterValue = cParamRec
      Exit For
    End If
  Next lngIndex

  If lngIndex > mcarrParameters.Count - 1 Then
    ' The parameter has not been defined for the workspace
    ' Raise an error
    On Error GoTo 0
    Err.Raise vbObjectError + errParamNameInvalid, _
        mstrModuleName & "GetParameterValue", _
        LoadResString(errParamNameInvalid)
  End If

  Exit Function

GetParameterValueErr:
  ' Log the error code raised by Visual Basic
  Call LogErrors(Errors)
  gstrSource = mstrModuleName & "GetParameterValue"
  On Error GoTo 0
  Err.Raise vbObjectError + errGetParamValueFailed, _
      gstrSource, _
      LoadResString(errGetParamValueFailed)

End Function
Public Sub Delete(lngParamToDelete As Long)
  ' Delete the passed in parameter

  Dim lngDeleteElement As Long
```

```
  lngDeleteElement = QueryIndex(lngParamToDelete)
  Call mcarrParameters.Delete(lngDeleteElement)

End Sub
Private Function QueryIndex(lngParameterId As Long) As Long

  Dim lngIndex As Long

  ' Find the matching parameter record in the array
  For lngIndex = 0 To mcarrParameters.Count - 1
    If mcarrParameters(lngIndex).ParameterId = lngParameterId And _
          mcarrParameters(lngIndex).IndOperation <> DeleteOp Then
      QueryIndex = lngIndex
      Exit Function
    End If
  Next lngIndex

  ' Raise error that parameter has not been found
  On Error GoTo 0
  Err.Raise vbObjectError + errParamNotFound, "cArrParameters.QueryIndex", _
    LoadResString(errParamNotFound)

End Function

Public Function QueryParameter(lngParameterId As Long) _
    As cParameter

  Dim lngQueryElement As Long

  lngQueryElement = QueryIndex(lngParameterId)

  ' Return the queried parameter object
  Set QueryParameter = mcarrParameters(lngQueryElement)

End Function
Public Property Get ParameterCount() As Long

  ParameterCount = mcarrParameters.Count

End Property
Public Property Get Item(lngIndex As Long) As cParameter
Attribute Item.VB_UserMemId = 0

  Set Item = mcarrParameters(lngIndex)

End Property

Public Sub Validate(ByVal cParamToValidate As cParameter)
  ' This procedure is necessary since the class cannot validate
  ' all the parameter properties on it's own. This is 'coz we
  ' might have created new parameters in the workspace, but not
  ' saved them to the database yet - hence the duplicate check
  ' has to be repeated in the array
```

```
  Dim lngIndex As Long
  Dim cTempParam As cParameter

  On Error GoTo ValidateErr

  ' Check if the parameter name already exists in the workspace
  For lngIndex = 0 To mcarrParameters.Count - 1
     Set cTempParam = mcarrParameters(lngIndex)
     If cTempParam.WorkspaceId = cParamToValidate.WorkspaceId And _
           cTempParam.ParameterName = cParamToValidate.ParameterName And _
           cTempParam.IndOperation <> DeleteOp Then
        On Error GoTo 0
        Err.Raise vbObjectError + errDuplicateParameterName, _
           mstrSource, LoadResString(errDuplicateParameterName)
     End If
  Next lngIndex

  Exit Sub

ValidateErr:
  LogErrors Errors
  mstrSource = mstrModuleName & "Validate"
  On Error GoTo 0
  Err.Raise vbObjectError + errValidateFailed, _
     mstrSource, LoadResString(errValidateFailed)

End Sub
Public Sub CheckDupParamName(ByVal cParamToValidate As cParameter)

  Dim lngIndex As Long
  Dim cTempParam As cParameter

  ' Check if the parameter name already exists in the workspace
  For lngIndex = 0 To mcarrParameters.Count - 1
     Set cTempParam = mcarrParameters(lngIndex)
     If cTempParam.WorkspaceId = cParamToValidate.WorkspaceId And _
           cTempParam.ParameterName = cParamToValidate.ParameterName And _
           cTempParam.ParameterId <> cParamToValidate.ParameterId And _
           cTempParam.IndOperation <> DeleteOp Then
        ShowError errDuplicateParameterName
        On Error GoTo 0
        Err.Raise vbObjectError + errDuplicateParameterName, _
           mstrSource, LoadResString(errDuplicateParameterName)
     End If
  Next lngIndex

End Sub

Private Sub Class_Initialize()

  'bugmessage "cArrParameters: Initialize event - setting parameter count to 0"
  Set mcarrParameters = New cNodeCollections
```

```
End Sub


Private Sub Class_Terminate()

   Set mcarrParameters = Nothing

End Sub
VERSION 1.0 CLASS
BEGIN
 MultiUse = -1  'True
 Persistable = 0  'NotPersistable
 DataBindingBehavior = 0  'vbNone
 DataSourceBehavior  = 0  'vbNone
 MTSTransactionMode  = 0  'NotAnMTSObject
END
Attribute VB_Name = "cArrSteps"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
'  FILE:       cArrSteps.cls
'              Microsoft TPC-H Kit Ver. 2.7.0-1005
'              Copyright Microsoft, 2008
'              All Rights Reserved
'
'
'  PURPOSE:    Implements an array of cStep objects.
'              Type-safe wrapper around cNodeCollections.
'              Also contains additional functions to update parent version
'              on substeps, validation functions, etc.
'  Contact:    Reshma Tharamal (reshmat@microsoft.com)
'
Option Explicit

Private mcarrSteps As cNodeCollections

' Used to indicate the source module name when errors
' are raised by this class
Private mstrSource As String
Private Const mstrModuleName As String = "cArrSteps."

Public Sub Unload(lngStepToDelete As Long)

   Dim lngDeleteElement As Long
   Dim cUnloadStep As cStep

   lngDeleteElement = QueryStepIndex(lngStepToDelete)
   Set cUnloadStep = QueryStep(lngStepToDelete)

   ' First unload all iterators for the step
   Call cUnloadStep.UnloadIterators

   ' Unload the step from the collection
```

```
   Call mcarrSteps.Unload(lngDeleteElement)

End Sub
Public Sub Modify(cModifiedStep As cStep)

   Dim iAppend As Integer
   Dim sLabel As String

   On Error GoTo ModifyErr

   iAppend = 0
   sLabel = cModifiedStep.StepLabel

   Validate cModifiedStep

   Call mcarrSteps.Modify(cModifiedStep)

   Exit Sub

ModifyErr:
   ' If the error raised by the add function is due to a duplication
   ' of the step label, then try to generate a unique label
   If Err.Number - vbObjectError = errStepLabelUnique Then
      iAppend = iAppend + 1
      cModifiedStep.StepLabel = sLabel & CStr(iAppend)
      ' Try to insert the step record again
      Resume
   End If

   ' Log the error code raised by Visual Basic
   Call LogErrors(Errors)
   On Error GoTo 0
   Err.Raise vbObjectError + errModifyStepFailed, _
         gstrSource, _
         LoadResString(errModifyStepFailed)

End Sub
Public Sub UpdateParentVersion(ByVal lngStepId As Long, _
      ByVal strNewVersion As String, _
      ByVal strOldVersion As String, _
      ByVal intStepType As Integer)

   ' Does all the processing needed to update the parent version
   ' number on all the sub-steps for a given step
   ' It updates the parent version no in the database for all
   ' sub-steps of the passed in step id
   ' It also updates the parent version number on all sub-steps
   ' in the array to the new version passed in

   Dim lngIndex As Long
   Dim cUpdateStep As cStep

   On Error GoTo UpdateParentVersionErr
```

```
  If intStepType <> gintManagerStep Then
     ' Only a manager can have sub-steps - if the passed
     ' in step is not a manager, exit
     Exit Sub
  End If

  ' For all steps in the array
  For lngIndex = 0 To mcarrSteps.Count - 1

     Set cUpdateStep = mcarrSteps(lngIndex)

     ' If the current step is a sub-step of the passed in step
     If cUpdateStep.ParentStepId = lngStepId And _
           cUpdateStep.ParentVersionNo = strOldVersion And _
           Not cUpdateStep.ArchivedFlag Then

        ' Update the parent version number for the sub-step
        ' in the array
        cUpdateStep.ParentVersionNo = strNewVersion

        ' Update the parent version number for the sub-step
        ' in the array
        Call Modify(cUpdateStep)

     End If
  Next lngIndex

  Exit Sub

UpdateParentVersionErr:
  LogErrors Errors
  mstrSource = mstrModuleName & "UpdateParentVersion"
  On Error GoTo 0
  Err.Raise vbObjectError + errUpdateParentVersionFailed, _
        mstrSource, _
        LoadResString(errUpdateParentVersionFailed)

End Sub
Private Sub Validate(cCheckStep As cStep)

  ' Step validations that depend on other steps in the collection

  Dim lngIndex As Long

  ' Ensure that the step label is unique in the workspace
  For lngIndex = 0 To mcarrSteps.Count - 1

     ' If the current step is a sub-step of the passed in step
     If mcarrSteps(lngIndex).WorkspaceId = cCheckStep.WorkspaceId And _
           mcarrSteps(lngIndex).StepLabel = cCheckStep.StepLabel And _
           mcarrSteps(lngIndex).StepId <> cCheckStep.StepId And _
           mcarrSteps(lngIndex).IndOperation <> DeleteOp Then
        On Error GoTo 0
        Err.Raise vbObjectError + errStepLabelUnique, _
```

```
            mstrModuleName & "Validate", _
            LoadResString(errStepLabelUnique)
    End If
  Next lngIndex

End Sub

Public Sub ValidateStep(cCheckStep As cStep)

  On Error GoTo ValidateStepErr

  'Public wrapper for Validate function (2 many Validates)
  Call Validate(cCheckStep)

  Exit Sub

ValidateStepErr:
  ShowError errStepLabelUnique
  On Error GoTo 0
  Err.Raise vbObjectError + errValidateFailed, _
        gstrSource, _
        LoadResString(errValidateFailed)
End Sub

Private Sub Class_Initialize()

  BugMessage "cArrSteps: Initialize event - setting step count to 0"
  Set mcarrSteps = New cNodeCollections

End Sub

Private Sub Class_Terminate()

  BugMessage "cArrSteps: Terminate event triggered"
  Set mcarrSteps = Nothing

End Sub

Public Sub Add(ByVal cStepToAdd As cStep)

  Dim iAppend As Integer
  Dim sLabel As String

  On Error GoTo AddErr

  iAppend = 0
  sLabel = cStepToAdd.StepLabel

  Set cStepToAdd.NodeDB = mcarrSteps.NodeDB

  ' Retrieve a unique step identifier
  cStepToAdd.StepId = cStepToAdd.NextStepId

  Validate cStepToAdd
```

```
  ' Call a procedure to add the step record
  Call mcarrSteps.Add(cStepToAdd)

  ' Call a procedure to add all iterators for the step
  cStepToAdd.AddAllIterators

  Exit Sub

AddErr:
  ' If the error raised by the add function is due to a duplication
  ' of the step label, then try to generate a unique label
  If Err.Number - vbObjectError = errStepLabelUnique Then
     iAppend = iAppend + 1
     cStepToAdd.StepLabel = sLabel & CStr(iAppend)
     ' Try to insert the step record again
     Resume
  End If

  ' Log the error code raised by Visual Basic
  Call LogErrors(Errors)
  On Error GoTo 0
  Err.Raise vbObjectError + errInsertStepFailed, _
        gstrSource, _
        LoadResString(errInsertStepFailed)

End Sub
Public Sub Load(cStepToLoad As cStep)

  Call mcarrSteps.Load(cStepToLoad)

End Sub
Public Sub SaveStepsInWsp(ByVal lngWorkspace As Long)
  ' Calls a procedure to commit all changes to the steps
  ' in the passed in workspace.

  Dim lngIndex As Integer

  ' Find all steps in the array with a matching workspace id
  ' It is important to step in reverse order through the array,
  ' since we delete step records sometimes!
  For lngIndex = mcarrSteps.Count - 1 To 0 Step -1
     If mcarrSteps(lngIndex).WorkspaceId = lngWorkspace Then

        ' Call a procedure to commit all changes to the
        ' Step record, if any
        Call CommitStep(mcarrSteps(lngIndex), lngIndex)

     End If
  Next lngIndex

End Sub
Private Sub CommitStep(ByVal cCommitStep As cStep, _
     ByVal intIndex As Integer)
```

```
  ' This procedure checks if any changes have been made to the
  ' passed in Step. If so, it calls the step methods to commit
  ' the changes.

  ' First commit all changes to the iterator records for
  ' the step
  cCommitStep.SaveIterators

  Call mcarrSteps.Commit(cCommitStep, intIndex)

End Sub
Public Sub Delete(lngStepToDelete As Long)

  Dim lngDeleteElement As Long

  lngDeleteElement = QueryStepIndex(lngStepToDelete)
  Call mcarrSteps.Delete(lngDeleteElement)

End Sub
Public Function QueryStepIndex(lngStepId As Long) As Long

  Dim lngIndex As Long

  ' Find the element in the array that corresponds to the
  ' passed in step id - note that while there will be multiple
  ' versions of a step in the database, only one version will
  ' be currently loaded in the array - meaning that the stepid
  ' is enough to uniquely identify a step
  For lngIndex = 0 To mcarrSteps.Count - 1
     If mcarrSteps(lngIndex).StepId = lngStepId Then
        QueryStepIndex = lngIndex
        Exit Function
     End If
  Next lngIndex

  ' Raise error that step has not been found
  On Error GoTo 0
  Err.Raise vbObjectError + errStepNotFound, mstrSource, _
     LoadResString(errStepNotFound)

End Function

Public Function QueryStep(ByVal lngStepId As Long) As cStep

  ' Populates the passed in cStep object with the property
  ' values corresponding to the Step Identifier, lngStepId

  Dim lngQueryElement As Integer

  lngQueryElement = QueryStepIndex(lngStepId)

  ' Initialize the passed in step object to the queried step
  Set QueryStep = mcarrSteps(lngQueryElement)
```

```
End Function
Public Property Get Item(ByVal Position As Long) As cStep
Attribute Item.VB_UserMemId = 0

  ' Returns the element at the passed in position in the array
  If Position >= 0 And Position < mcarrSteps.Count Then
     Set Item = mcarrSteps(Position)
  Else
     On Error GoTo 0
     Err.Raise vbObjectError + errItemDoesNotExist, mstrSource, _
        LoadResString(errItemDoesNotExist)
  End If

End Property
Public Property Set Item(ByVal Position As Long, _
     ByVal cStepRec As cStep)

  ' Returns the element at the passed in position in the array
  If Position >= 0 And Position < mcarrSteps.Count Then
     Set mcarrSteps(Position) = cStepRec
  Else
     On Error GoTo 0
     Err.Raise vbObjectError + errItemDoesNotExist, mstrSource, _
        LoadResString(errItemDoesNotExist)
  End If

End Property
Public Property Set StepDB(vdata As Database)

  Set mcarrSteps.NodeDB = vdata

End Property
Public Function SubSteps(ByVal lngStepId As Long, _
     ByVal strVersionNo As String) As Variant

  ' Returns a variant containing an array of all the substeps
  ' for the passed in step

  Dim intIndex As Integer
  Dim cSubSteps() As cStep
  Dim lngStepCount As Long
  Dim cQueryStep As cStep

  On Error GoTo SubStepsErr

  lngStepCount = 0

  Set cQueryStep = QueryStep(lngStepId)

  ' Only a manager can have sub-steps
  If cQueryStep.StepType = gintManagerStep Then

     ' For each element in the Steps array
     For intIndex = 0 To mcarrSteps.Count - 1
```

```
        ' Check if the parent step id and parent version number
        ' match the passed in step
        If mcarrSteps(intIndex).ParentStepId = lngStepId And _
              mcarrSteps(intIndex).ParentVersionNo = strVersionNo And _
              mcarrSteps(intIndex).IndOperation <> DeleteOp Then

           ' Increase the array dimension and add the step
           ' to it
           ReDim Preserve cSubSteps(lngStepCount)
           Set cSubSteps(lngStepCount) = mcarrSteps(intIndex)
           lngStepCount = lngStepCount + 1

        End If
     Next intIndex

  End If

  ' Set the return value of the function to the array of
  ' Steps that has been built above
  If lngStepCount = 0 Then
     SubSteps = Empty
  Else
     SubSteps = cSubSteps()
  End If

  Exit Function

SubStepsErr:
  LogErrors Errors
  mstrSource = mstrModuleName & "SubSteps"
  On Error GoTo 0
  Err.Raise vbObjectError + errSubStepsFailed, _
        mstrSource, _
        LoadResString(errSubStepsFailed)

End Function

Public Property Get StepCount() As Integer

  StepCount = mcarrSteps.Count

End Property

VERSION 1.0 CLASS
BEGIN
 MultiUse = -1  'True
END
Attribute VB_Name = "cAsyncShell"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
'--------------------------------------------------------------------------------
' Copyright  1997 Microsoft Corporation. All rights reserved.
```

```
'
' You have a royalty-free right to use, modify, reproduce and distribute the
' Sample Application Files (and/or any modified version) in any way you find
' useful, provided that you agree that Microsoft has no warranty, obligations or
' liability for any Sample Application Files.
'-------------------------------------------------------------------------------

Option Explicit

' Used to indicate the source module name when errors
' are raised by this class
Private mstrSource As String
Private Const mstrModuleName As String = "cAsyncShell."

Public Event Terminated()

Private WithEvents moTimer As cTimerSM
Attribute moTimer.VB_VarHelpID = -1
Private proc As PROCESS_INFORMATION
Private mfShelling As Boolean


'-------------------------------------------------------------------------------
'Initialization and cleanup:

Private Sub Class_Initialize()
  Set moTimer = New cTimerSM
End Sub

Private Sub Class_Terminate()
  If mfShelling Then CloseHandle proc.hProcess
End Sub

'-------------------------------------------------------------------------------
'Shelling:

Public Sub Shell(CommandLine As String, Optional PollingInterval As Long = 1000)
  Dim Start As STARTUPINFO

  If mfShelling Then
     On Error GoTo 0
     Err.Raise vbObjectError + errInstanceInUse, _
           mstrSource, _
           LoadResString(errInstanceInUse)
  End If
  mfShelling = True

  ' Initialize the STARTUPINFO structure:
  Start.cb = Len(Start)
  Start.dwFlags = STARTF_USESHOWWINDOW
  Start.wShowWindow = SW_SHOWMINNOACTIVE

  ' Start the shelled application:
  CreateProcessA 0&, CommandLine, 0&, 0&, 1&, _
```

```
      NORMAL_PRIORITY_CLASS, 0&, 0&, Start, proc

   With moTimer
      If PollingInterval > 0 Then
         .Interval = PollingInterval
      Else
         .Interval = 1000
      End If
      .Enabled = True
   End With
End Sub
'---------------------------------------------------------------------------
'Aborting:
Public Sub Abort()
   Dim nCode As Long
'    Dim X As Integer
'    Dim ReturnVal As Integer

   On Error GoTo AbortErr

   If Not mfShelling Then
      Call WriteError(errProgramError, mstrSource)
   Else
'       If IsWindow(proc.hProcess) = False Then Exit Sub
'
'       If (GetWindowLong(proc.hProcess, GWL_STYLE) And WS_DISABLED) Then Exit Sub
'
'       If IsWindow(proc.hProcess) Then
'          If Not (GetWindowLong(proc.hProcess, GWL_STYLE) And WS_DISABLED) Then
'             X = PostMessage(proc.hProcess, WM_CANCELMODE, 0, 0&)
'             X = PostMessage(proc.hProcess, WM_CLOSE, 0, 0&)
'          End If
'       End If

      If TerminateProcess(proc.hProcess, 0&) = 0 Then
         Debug.Print "Unable to terminate process: " & proc.hProcess
         Call WriteError(errTerminateProcessFailed, mstrSource, _
               ApiError(GetLastError()))
      Else
         ' Should always come here!
         GetExitCodeProcess proc.hProcess, nCode
         If nCode = STILL_ACTIVE Then
            ' Write an error and close the handles to the
            ' process anyway
            Call WriteError(errTerminateProcessFailed, mstrSource)
         End If
      End If

      ' Close all open handles to the shelled process, even
      ' if any of the above calls error out
      CloseHandle proc.hProcess
      moTimer.Enabled = False
      mfShelling = False
      RaiseEvent Terminated
```

```
  End If

  Exit Sub

AbortErr:
  Call LogErrors(Errors)
  mstrSource = mstrModuleName & "Abort"
  On Error GoTo 0
  Err.Raise vbObjectError + errProgramError, _
     mstrSource, _
     LoadResString(errProgramError)

End Sub
Private Sub moTimer_Timer()
  Dim nCode As Long

  GetExitCodeProcess proc.hProcess, nCode
  If nCode <> STILL_ACTIVE Then
     CloseHandle proc.hProcess
     moTimer.Enabled = False
     mfShelling = False
     RaiseEvent Terminated
  End If
End Sub
VERSION 1.0 CLASS
BEGIN
 MultiUse = -1  'True
 Persistable = 0  'NotPersistable
 DataBindingBehavior = 0  'vbNone
 DataSourceBehavior  = 0  'vbNone
 MTSTransactionMode  = 0  'NotAnMTSObject
END
Attribute VB_Name = "cConnDtl"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
'  FILE:       cConnDtl.cls
'              Microsoft TPC-H Kit Ver. 2.7.0-1005
'              Copyright Microsoft, 2008
'              All Rights Reserved
'
'
'  PURPOSE:    Encapsulates the properties and methods of a connection.
'              Contains functions to insert, update and delete
'              connection_dtls records from the database.
'  Contact:    Reshma Tharamal (reshmat@microsoft.com)
'
Option Explicit
Option Base 0

' Local variable(s) to hold property value(s)
Public WorkspaceId As Long
```

```
Public ConnNameId As Long
Public ConnName As String
Public ConnectionString As String
Public ConnType As ConnectionType
Public Position As Long
Public NodeDB As Database

Private mintOperation As Operation

' Used to indicate the source module name when errors
' are raised by this class
Private mstrSource As String
Private Const mstrModuleName As String = "cConnDtl."

' The cSequence class is used to generate unique Connection identifiers
Private mConnectionSeq As cSequence

' The StringSM class is used to carry out string operations
Private mFieldValue As cStringSM

Private Sub AssignParameters(qyExec As DAO.QueryDef)
  ' Assigns values to the parameters in the querydef object
  ' The parameter names are cryptic to differentiate them from the field names.
  ' When the parameter names are the same as the field names, parameters in the where
  ' clause do not get created.

  Dim prmParam As DAO.Parameter

  On Error GoTo AssignParametersErr

  For Each prmParam In qyExec.Parameters
    Select Case prmParam.Name
      Case "[w_id]"
        prmParam.Value = WorkspaceId

      Case "[c_id]"
        prmParam.Value = ConnNameId

      Case "[c_name]"
        prmParam.Value = ConnName

      Case "[c_str]"
        prmParam.Value = ConnectionString

      Case "[c_type]"
        prmParam.Value = ConnType

      Case Else
        ' Write the parameter name that is faulty
        WriteError errInvalidParameter, mstrSource, prmParam.Name
        On Error GoTo 0
        Err.Raise errInvalidParameter, mstrModuleName & "AssignParameters", _
            LoadResString(errInvalidParameter)
    End Select
```

```
    Next prmParam

    Exit Sub

AssignParametersErr:

    Call LogErrors(Errors)
    On Error GoTo 0
    Err.Raise vbObjectError + errAssignParametersFailed, _
        mstrModuleName & "AssignParameters", LoadResString(errAssignParametersFailed)

End Sub

Public Function Clone() As cConnDtl

    ' Creates a copy of a given Connection

    Dim cCloneConn As cConnDtl

    On Error GoTo CloneErr

    Set cCloneConn = New cConnDtl

    ' Copy all the Connection properties to the newly created Connection
    cCloneConn.WorkspaceId = WorkspaceId
    cCloneConn.ConnNameId = ConnNameId
    cCloneConn.ConnName = ConnName
    cCloneConn.ConnectionString = ConnectionString
    cCloneConn.ConnType = ConnType
    cCloneConn.IndOperation = mintOperation
    cCloneConn.Position = Position

    ' And set the return value to the newly created Connection
    Set Clone = cCloneConn
    Set cCloneConn = Nothing

    Exit Function

CloneErr:
    LogErrors Errors
    mstrSource = mstrModuleName & "Clone"
    On Error GoTo 0
    Err.Raise vbObjectError + errCloneFailed, mstrSource, LoadResString(errCloneFailed)

End Function
Private Sub CheckDupConnectionName()
    ' Check if the Connection name already exists in the workspace

    Dim rstConnection As Recordset
    Dim strSql As String
    Dim qy As DAO.QueryDef

    On Error GoTo CheckDupConnectionNameErr
    mstrSource = mstrModuleName & "CheckDupConnectionName"
```

```
  ' Create a recordset object to retrieve the count of all Connections
  ' for the workspace with the same name
  strSql = "Select count(*) as Connection_count " & _
     " from " & TBL_CONNECTION_DTLS & _
     " where " & FLD_ID_WORKSPACE & " = [w_id]" & _
     " and " & FLD_CONN_DTL_CONNECTION_NAME & " = [c_name]" & _
     " and " & FLD_ID_CONN_NAME & " <> [c_id]"

  Set qy = dbsAttTool.CreateQueryDef(gstrEmptyString, strSql)
  Call AssignParameters(qy)

  Set rstConnection = qy.OpenRecordset(dbOpenForwardOnly)

  If rstConnection![Connection_count] > 0 Then
     rstConnection.Close
     qy.Close
     ShowError errDupConnDtlName
     On Error GoTo 0
     Err.Raise vbObjectError + errDupConnDtlName, _
        mstrSource, LoadResString(errDupConnDtlName)
  End If

  rstConnection.Close
  qy.Close

  Exit Sub

CheckDupConnectionNameErr:
  LogErrors Errors
  mstrSource = mstrModuleName & "CheckDupConnectionName"
  On Error GoTo 0
  Err.Raise vbObjectError + errProgramError, _
     mstrSource, LoadResString(errProgramError)

End Sub
Public Property Let IndOperation(ByVal vdata As Operation)

  ' The valid operations are define in the cOperations
  ' class. Check if the operation is valid
  Select Case vdata
     Case QueryOp, InsertOp, UpdateOp, DeleteOp
        mintOperation = vdata

     Case Else
        BugAssert True
  End Select

End Property
Public Sub Validate()
  ' Each distinct object will have a Validate method which
  ' will check if the class properties are valid. This method
  ' will be used to check interdependant properties that
  ' cannot be validated by the let procedures.
```

```
  ' It should be called by the add and modify methods of the class

  If ConnName = gstrEmptyString Then

     ShowError errConnectionNameMandatory
     On Error GoTo 0
     ' Propogate this error back to the caller
     Err.Raise vbObjectError + errConnectionNameMandatory, _
        mstrSource, LoadResString(errConnectionNameMandatory)
  End If

  ' Raise an error if the Connection name already exists in the workspace
  Call CheckDupConnectionName

End Sub
Public Sub Add()

  Dim strInsert As String
  Dim qy As DAO.QueryDef

  On Error GoTo AddErr

  ' Validate the record before trying to insert the record
  Call Validate

  ' Create a temporary querydef object
  strInsert = "insert into " & TBL_CONNECTION_DTLS & _
         "( " & FLD_ID_WORKSPACE & _
         ", " & FLD_ID_CONN_NAME & _
         ", " & FLD_CONN_DTL_CONNECTION_NAME & _
         ", " & FLD_CONN_DTL_CONNECTION_STRING & _
         ", " & FLD_CONN_DTL_CONNECTION_TYPE & " ) " & _
        " values ( [w_id], [c_id], " & _
        " [c_name], [c_str], [c_type] ) "

  Set qy = dbsAttTool.CreateQueryDef(gstrEmptyString, strInsert)

  ' Call a procedure to assign the Connection values
  Call AssignParameters(qy)

  qy.Execute dbFailOnError
  qy.Close

  Exit Sub

AddErr:

  Call LogErrors(Errors)
  On Error GoTo 0
  Err.Raise vbObjectError + errInsertFailed, _
     mstrModuleName & "Add", LoadResString(errInsertFailed)

End Sub
Public Sub Delete()
```

```
  Dim strDelete As String
  Dim qy As DAO.QueryDef

  On Error GoTo DeleteErr

  strDelete = "delete from " & TBL_CONNECTION_DTLS & _
        " where " & FLD_ID_CONN_NAME & " = [c_id]"
  Set qy = dbsAttTool.CreateQueryDef(gstrEmptyString, strDelete)

  Call AssignParameters(qy)
  qy.Execute dbFailOnError

  qy.Close

  Exit Sub

DeleteErr:
  LogErrors Errors
  On Error GoTo 0
  Err.Raise vbObjectError + errDeleteFailed, _
        mstrModuleName & "Delete", LoadResString(errDeleteFailed)

End Sub

Public Sub Modify()

  Dim strUpdate As String
  Dim qy As QueryDef

  On Error GoTo ModifyErr

  ' Validate the updated values before trying to modify the db
  Call Validate

  ' Create a temporary querydef object with the modify string
  strUpdate = "update " & TBL_CONNECTION_DTLS & _
        " set " & FLD_ID_WORKSPACE & " = [w_id], " & _
        FLD_CONN_DTL_CONNECTION_NAME & " = [c_name], " & _
        FLD_CONN_DTL_CONNECTION_STRING & " = [c_str], " & _
        FLD_CONN_DTL_CONNECTION_TYPE & " = [c_type] " & _
        " where " & FLD_ID_CONN_NAME & " = [c_id]"
  Set qy = dbsAttTool.CreateQueryDef(gstrEmptyString, strUpdate)

  ' Call a procedure to assign the Connection values to the
  ' querydef object
  Call AssignParameters(qy)
  qy.Execute dbFailOnError

  qy.Close

  Exit Sub

ModifyErr:
```

```
  Call LogErrors(Errors)
  On Error GoTo 0
  Err.Raise vbObjectError + errModifyFailed, _
     mstrModuleName & "Modify", LoadResString(errModifyFailed)

End Sub
Public Property Get NextIdentifier() As Long

  Dim lngNextId As Long

  On Error GoTo NextIdentifierErr

  ' Retrieve the next identifier using the sequence class
  Set mConnectionSeq = New cSequence
  Set mConnectionSeq.IdDatabase = dbsAttTool
  mConnectionSeq.IdentifierColumn = FLD_ID_CONN_NAME
  lngNextId = mConnectionSeq.Identifier
  Set mConnectionSeq = Nothing

  NextIdentifier = lngNextId
  Exit Property

NextIdentifierErr:
  LogErrors Errors
  On Error GoTo 0
  Err.Raise vbObjectError + errIdGetFailed, _
     mstrModuleName & "NextIdentifier", LoadResString(errIdGetFailed)

End Property
Public Property Get IndOperation() As Operation

  IndOperation = mintOperation

End Property

Private Sub Class_Initialize()

  Set mFieldValue = New cStringSM

  ' Initialize the operation indicator variable to Query
  ' It will be modified later by the collection class when
  ' inserts, updates or deletes are performed
  mintOperation = QueryOp

  ConnType = giDefaultConnType

End Sub

Private Sub Class_Terminate()

  Set mFieldValue = Nothing

End Sub
```

```
VERSION 1.0 CLASS
BEGIN
 MultiUse = -1  'True
 Persistable = 0  'NotPersistable
 DataBindingBehavior = 0  'vbNone
 DataSourceBehavior  = 0  'vbNone
 MTSTransactionMode  = 0  'NotAnMTSObject
END
Attribute VB_Name = "cConnDtls"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
'  FILE:       cConnDtls.cls
'              Microsoft TPC-H Kit Ver. 2.7.0-1005
'              Copyright Microsoft, 2008
'              All Rights Reserved
'
'
'  PURPOSE:    Implements an array of cConnDtl objects.
'              Type-safe wrapper around cNodeCollections.
'              Also contains additional functions to determine the connection
'              string value, validation functions, etc.
'  Contact:    Reshma Tharamal (reshmat@microsoft.com)
'
Option Explicit

Private mcarrConnDtls As cNodeCollections

' Used to indicate the source module name when errors
' are raised by this class
Private mstrSource As String
Private Const mstrModuleName As String = "cConnDtls."

Public Property Set ConnDb(vdata As Database)

   Set mcarrConnDtls.NodeDB = vdata

End Property
Public Sub Modify(cModifiedConn As cConnDtl)

   ' First check if the parameter record is valid
   Call CheckDupConnName(cModifiedConn)

   Call mcarrConnDtls.Modify(cModifiedConn)

End Sub
Public Sub Load(ByRef cConnToAdd As cConnDtl)

   Call mcarrConnDtls.Load(cConnToAdd)

End Sub
Public Sub Add(ByRef cConnToAdd As cConnDtl)
```

```
  ' First check if the record is valid
  Call Validate(cConnToAdd)

  ' Retrieve a unique identifier
  cConnToAdd.ConnNameId = cConnToAdd.NextIdentifier

  Call mcarrConnDtls.Add(cConnToAdd)

End Sub

Public Sub Unload(lConnNameId As Long)

  Dim lngDeleteElement As Long

  lngDeleteElement = QueryIndex(lConnNameId)

  Call mcarrConnDtls.Unload(lngDeleteElement)

End Sub

Public Sub SaveConnDtlsInWsp(ByVal lngWorkspace As Long)
  ' Call a procedure to save all connection details records for the workspace
  Call mcarrConnDtls.Save(lngWorkspace)

End Sub
Public Function GetConnectionDtl(ByVal lngWorkspace As Long, _
     ByVal strConnectionName As String) As cConnDtl
  ' Returns the connection dtl for the passed in connection name

  Dim lngIndex As Long

  ' Find all parameters in the array with a matching workspace id
  For lngIndex = 0 To mcarrConnDtls.Count - 1
     If mcarrConnDtls(lngIndex).WorkspaceId = lngWorkspace And _
          mcarrConnDtls(lngIndex).ConnName = strConnectionName Then

        Set GetConnectionDtl = mcarrConnDtls(lngIndex)
        Exit For
     End If
  Next lngIndex

  If lngIndex > mcarrConnDtls.Count - 1 Then
     ' The parameter has not been defined for the workspace
     ' Raise an error
     On Error GoTo 0
     Err.Raise vbObjectError + errConnNameInvalid, mstrModuleName & "GetConnection", _
          LoadResString(errConnNameInvalid)
  End If

End Function
Public Sub Delete(lConnNameId As Long)
  ' Delete the passed in parameter

  Dim lngDeleteElement As Long
```

```
  lngDeleteElement = QueryIndex(lConnNameId)
  Call mcarrConnDtls.Delete(lngDeleteElement)

End Sub
Private Function QueryIndex(lConnNameId As Long) As Long

  Dim lngIndex As Long

  ' Find the matching parameter record in the array
  For lngIndex = 0 To mcarrConnDtls.Count - 1
    If mcarrConnDtls(lngIndex).ConnNameId = lConnNameId And _
        mcarrConnDtls(lngIndex).IndOperation <> DeleteOp Then
      QueryIndex = lngIndex
      Exit Function
    End If
  Next lngIndex

  ' Raise error that parameter has not been found
  On Error GoTo 0
  Err.Raise vbObjectError + errQueryIndexFailed, "cArrParameters.QueryIndex", _
    LoadResString(errQueryIndexFailed)

End Function

Public Function QueryConnDtl(lConnNameId As Long) As cConnDtl

  Dim lngQueryElement As Long

  lngQueryElement = QueryIndex(lConnNameId)

  ' Return the queried connection object
  Set QueryConnDtl = mcarrConnDtls(lngQueryElement)

End Function
Public Property Get Count() As Long

  Count = mcarrConnDtls.Count

End Property
Public Property Get Item(lngIndex As Long) As cConnDtl
Attribute Item.VB_UserMemId = 0

  Set Item = mcarrConnDtls(lngIndex)

End Property

Private Sub Validate(ByVal cConnToValidate As cConnDtl)
  ' This procedure is necessary since the class cannot validate
  ' all the connection_dtl properties on it's own. This is 'coz we
  ' might have created new connections in the workspace, but not
  ' saved them to the database yet - hence the duplicate check
  ' has to be repeated in the array
```

```
  Dim lngIndex As Long
  Dim cTempParam As cConnDtl

  ' Check if the parameter name already exists in the workspace
  For lngIndex = 0 To mcarrConnDtls.Count - 1
     Set cTempParam = mcarrConnDtls(lngIndex)
     If cTempParam.WorkspaceId = cConnToValidate.WorkspaceId And _
           cTempParam.ConnName = cConnToValidate.ConnName And _
           cTempParam.IndOperation <> DeleteOp Then
        On Error GoTo 0
        Err.Raise vbObjectError + errDupConnDtlName, _
           mstrSource, LoadResString(errDupConnDtlName)
     End If
  Next lngIndex

End Sub
Private Sub CheckDupConnName(ByVal cConnToValidate As cConnDtl)

  Dim lngIndex As Long
  Dim cTempParam As cConnDtl

  ' Check if the parameter name already exists in the workspace
  For lngIndex = 0 To mcarrConnDtls.Count - 1
     Set cTempParam = mcarrConnDtls(lngIndex)
     If cTempParam.WorkspaceId = cConnToValidate.WorkspaceId And _
           cTempParam.ConnName = cConnToValidate.ConnName And _
           cTempParam.ConnNameId <> cConnToValidate.ConnNameId And _
           cTempParam.IndOperation <> DeleteOp Then
        ShowError errDupConnDtlName
        On Error GoTo 0
        Err.Raise vbObjectError + errDupConnDtlName, _
           mstrSource, LoadResString(errDupConnDtlName)
     End If
  Next lngIndex

End Sub

Private Sub Class_Initialize()

  Set mcarrConnDtls = New cNodeCollections

End Sub

Private Sub Class_Terminate()

  Set mcarrConnDtls = Nothing

End Sub
VERSION 1.0 CLASS
BEGIN
 MultiUse = -1  'True
 Persistable = 0  'NotPersistable
 DataBindingBehavior = 0  'vbNone
 DataSourceBehavior  = 0  'vbNone
```

```
 MTSTransactionMode  = 0  'NotAnMTSObject
END
Attribute VB_Name = "cConnection"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
'  FILE:       cConnection.cls
'              Microsoft TPC-H Kit Ver. 2.7.0-1005
'              Copyright Microsoft, 2008
'              All Rights Reserved
'
'
'  PURPOSE:    Encapsulates the properties and methods of a connection string.
'              Contains functions to insert, update and delete
'              workspace_connections records from the database.
'  Contact:    Reshma Tharamal (reshmat@microsoft.com)
'
Option Explicit
Option Base 0

' Local variable(s) to hold property value(s)
Public WorkspaceId As Long
Public ConnectionId As Long
Public ConnectionValue As String
Public Description As String
Public NodeDB As Database
Public Position As Long
Public NoCountDisplay As Boolean
Public NoExecute As Boolean
Public ParseQueryOnly As Boolean
Public QuotedIdentifiers As Boolean
Public AnsiNulls As Boolean
Public ShowQueryPlan As Boolean
Public ShowStatsTime As Boolean
Public ShowStatsIO As Boolean
Public ParseOdbcMsg As Boolean
Public RowCount As Long
Public TsqlBatchSeparator As String
Public QueryTimeOut As Long
Public ServerLanguage As String
Public CharacterTranslation As Boolean
Public RegionalSettings As Boolean

Private mstrConnectionName As String
Private mintOperation As Operation

' Used to indicate the source module name when errors
' are raised by this class
Private mstrSource As String
Private Const mstrModuleName As String = "cConnection."

' The cSequence class is used to generate unique Connection identifiers
Private mConnectionSeq As cSequence
```

```
' The StringSM class is used to carry out string operations
Private mFieldValue As cStringSM

Private Sub AssignParameters(qyExec As DAO.QueryDef)
  ' Assigns values to the parameters in the querydef object
  ' The parameter names are cryptic to differentiate them from the field names.
  ' When the parameter names are the same as the field names, parameters in the where
  ' clause do not get created.

  Dim prmParam As DAO.Parameter

  On Error GoTo AssignParametersErr

  For Each prmParam In qyExec.Parameters
    Select Case prmParam.Name
      Case "[w_id]"
        prmParam.Value = WorkspaceId

      Case "[c_id]"
        prmParam.Value = ConnectionId

      Case "[c_name]"
        prmParam.Value = mstrConnectionName

      Case "[c_value]"
        prmParam.Value = ConnectionValue

      Case "[desc]"
        prmParam.Value = Description

      Case "[no_count]"
        prmParam.Value = NoCountDisplay

      Case "[no_exec]"
        prmParam.Value = NoExecute

      Case "[parse_only]"
        prmParam.Value = ParseQueryOnly

      Case "[quoted_id]"
        prmParam.Value = QuotedIdentifiers

      Case "[a_nulls]"
        prmParam.Value = AnsiNulls

      Case "[show_qp]"
        prmParam.Value = ShowQueryPlan

      Case "[stats_tm]"
        prmParam.Value = ShowStatsTime

      Case "[stats_io]"
        prmParam.Value = ShowStatsIO
```

```
        Case "[parse_odbc]"
            prmParam.Value = ParseOdbcMsg

        Case "[row_cnt]"
            prmParam.Value = RowCount

        Case "[batch_sep]"
            prmParam.Value = TsqlBatchSeparator

        Case "[qry_tmout]"
            prmParam.Value = QueryTimeOut

        Case "[lang]"
            prmParam.Value = ServerLanguage

        Case "[char_trans]"
            prmParam.Value = CharacterTranslation

        Case "[reg_settings]"
            prmParam.Value = RegionalSettings

        Case Else
            ' Write the parameter name that is faulty
            WriteError errInvalidParameter, mstrSource, prmParam.Name
            On Error GoTo 0
            Err.Raise errInvalidParameter, mstrModuleName & "AssignParameters", _
                LoadResString(errInvalidParameter)
    End Select
  Next prmParam

  Exit Sub

AssignParametersErr:

  Call LogErrors(Errors)
  On Error GoTo 0
  Err.Raise vbObjectError + errAssignParametersFailed, _
    mstrModuleName & "AssignParameters", LoadResString(errAssignParametersFailed)

End Sub

Public Function Clone() As cConnection

  ' Creates a copy of a given Connection

  Dim cCloneConn As cConnection

  On Error GoTo CloneErr

  Set cCloneConn = New cConnection

  ' Copy all the Connection properties to the newly
  ' created Connection
```

```
    Set cCloneConn.NodeDB = NodeDB
    cCloneConn.WorkspaceId = WorkspaceId
    cCloneConn.ConnectionId = ConnectionId
    cCloneConn.ConnectionName = mstrConnectionName
    cCloneConn.ConnectionValue = ConnectionValue
    cCloneConn.Description = Description
    cCloneConn.IndOperation = mintOperation
    cCloneConn.Position = Position
    cCloneConn.NoCountDisplay = NoCountDisplay
    cCloneConn.NoExecute = NoExecute
    cCloneConn.ParseQueryOnly = ParseQueryOnly
    cCloneConn.QuotedIdentifiers = QuotedIdentifiers
    cCloneConn.AnsiNulls = AnsiNulls
    cCloneConn.ShowQueryPlan = ShowQueryPlan
    cCloneConn.ShowStatsTime = ShowStatsTime
    cCloneConn.ShowStatsIO = ShowStatsIO
    cCloneConn.ParseOdbcMsg = ParseOdbcMsg
    cCloneConn.RowCount = RowCount
    cCloneConn.TsqlBatchSeparator = TsqlBatchSeparator
    cCloneConn.QueryTimeOut = QueryTimeOut
    cCloneConn.ServerLanguage = ServerLanguage
    cCloneConn.CharacterTranslation = CharacterTranslation
    cCloneConn.RegionalSettings = RegionalSettings

    ' And set the return value to the newly created Connection
    Set Clone = cCloneConn
    Set cCloneConn = Nothing

    Exit Function

CloneErr:
    LogErrors Errors
    mstrSource = mstrModuleName & "Clone"
    On Error GoTo 0
    Err.Raise vbObjectError + errCloneFailed, mstrSource, LoadResString(errCloneFailed)

End Function
Private Sub CheckDupConnectionName()
    ' Check if the Connection name already exists in the workspace

    Dim rstConnection As Recordset
    Dim strSql As String
    Dim qy As DAO.QueryDef

    On Error GoTo CheckDupConnectionNameErr
    mstrSource = mstrModuleName & "CheckDupConnectionName"

    ' Create a recordset object to retrieve the count of all Connections
    ' for the workspace with the same name
    strSql = "Select count(*) as Connection_count " & _
        " from workspace_connections " & _
        " where workspace_id = [w_id]" & _
        " and connection_name = [c_name]" & _
        " and connection_id <> [c_id]"
```

```
  Set qy = NodeDB.CreateQueryDef(gstrEmptyString, strSql)
  Call AssignParameters(qy)

  Set rstConnection = qy.OpenRecordset(dbOpenForwardOnly)

  If rstConnection![Connection_count] > 0 Then
     rstConnection.Close
     qy.Close
     ShowError errDuplicateConnectionName
     On Error GoTo 0
     Err.Raise vbObjectError + errDuplicateConnectionName, _
        mstrSource, LoadResString(errDuplicateConnectionName)
  End If

  rstConnection.Close
  qy.Close

  Exit Sub

CheckDupConnectionNameErr:
  LogErrors Errors
  mstrSource = mstrModuleName & "CheckDupConnectionName"
  On Error GoTo 0
  Err.Raise vbObjectError + errProgramError, _
     mstrSource, LoadResString(errProgramError)

End Sub
Private Sub CheckDB()
  ' Check if the database object has been initialized

  If NodeDB Is Nothing Then
     On Error GoTo 0
     Err.Raise vbObjectError + errInvalidDB, _
        mstrModuleName & "CheckDB", LoadResString(errInvalidDB)
  End If

End Sub
Public Property Let ConnectionName(vdata As String)

  If vdata = gstrEmptyString Then

     ShowError errConnectionNameMandatory
     On Error GoTo 0
     ' Propogate this error back to the caller
     Err.Raise vbObjectError + errConnectionNameMandatory, _
        mstrSource, LoadResString(errConnectionNameMandatory)
  Else
     mstrConnectionName = vdata
  End If

End Property

Public Property Let IndOperation(ByVal vdata As Operation)
```

```
  ' The valid operations are define in the cOperations
  ' class. Check if the operation is valid
  Select Case vdata
     Case QueryOp, InsertOp, UpdateOp, DeleteOp
        mintOperation = vdata

     Case Else
        BugAssert True
  End Select

End Property
Public Sub Validate()
  ' Each distinct object will have a Validate method which
  ' will check if the class properties are valid. This method
  ' will be used to check interdependant properties that
  ' cannot be validated by the let procedures.
  ' It should be called by the add and modify methods of the class

  ' Check if the db object is valid
  Call CheckDB

  ' Raise an error if the Connection name already exists in the workspace
  Call CheckDupConnectionName

End Sub
Public Sub Add()

  Dim strInsert As String
  Dim qy As DAO.QueryDef

  On Error GoTo AddErr

  ' Validate the record before trying to insert the record
  Call Validate

  ' Create a temporary querydef object
  strInsert = "insert into workspace_connections " & _
        "( workspace_id, connection_id, " & _
        "connection_name, connection_value, " & _
        "description, no_count_display, " & _
        "no_execute, parse_query_only, " & _
        "ANSI_quoted_identifiers, ANSI_nulls, " & _
        "show_query_plan, show_stats_time, " & _
        "show_stats_io, parse_odbc_msg_prefixes, " & _
        "row_count, tsql_batch_separator, " & _
        "query_time_out, server_language, " & _
        "character_translation, regional_settings ) " & _
       " values ( [w_id], [c_id], [c_name], [c_value], " & _
       " [desc], [no_count], [no_exec], [parse_only], " & _
       " [quoted_id], [a_nulls], [show_qp], [stats_tm], " & _
       " [stats_io], [parse_odbc], [row_cnt], [batch_sep], " & _
       " [qry_tmout], [lang], [char_trans], [reg_settings] ) "
```

```
  Set qy = NodeDB.CreateQueryDef(gstrEmptyString, strInsert)

  ' Call a procedure to assign the Connection values
  Call AssignParameters(qy)

  qy.Execute dbFailOnError
  qy.Close

  Exit Sub

AddErr:

  Call LogErrors(Errors)
  On Error GoTo 0
  Err.Raise vbObjectError + errInsertFailed, _
     mstrModuleName & "Add", LoadResString(errInsertFailed)

End Sub
Public Sub Delete()

  Dim strDelete As String
  Dim qy As DAO.QueryDef

  On Error GoTo DeleteErr

  ' Check if the db object is valid
  Call CheckDB

  strDelete = "delete from workspace_connections " & _
        " where connection_id = [c_id]"
  Set qy = NodeDB.CreateQueryDef(gstrEmptyString, strDelete)

  Call AssignParameters(qy)
  qy.Execute dbFailOnError

  qy.Close

  Exit Sub

DeleteErr:
  LogErrors Errors
  On Error GoTo 0
  Err.Raise vbObjectError + errDeleteFailed, _
        mstrModuleName & "Delete", LoadResString(errDeleteFailed)

End Sub

Public Sub Modify()

  Dim strUpdate As String
  Dim qy As QueryDef

  On Error GoTo ModifyErr
```

```
  ' Validate the updated values before trying to modify the db
  Call Validate

  ' Create a temporary querydef object with the modify string
  strUpdate = "update workspace_connections " & _
        " set workspace_id = [w_id], " & _
        "connection_name = [c_name], " & _
        "connection_value = [c_value], " & _
        "description = [desc], " & _
        "no_count_display = [no_count], " & _
        "no_execute = [no_exec], " & _
        "parse_query_only = [parse_only], " & _
        "ANSI_quoted_identifiers = [quoted_id], " & _
        "ANSI_nulls = [a_nulls], " & _
        "show_query_plan = [show_qp], " & _
        "show_stats_time = [stats_tm], " & _
        "show_stats_io = [stats_io], " & _
        "parse_odbc_msg_prefixes = [parse_odbc], " & _
        "row_count = [row_cnt], " & _
        "tsql_batch_separator = [batch_sep], " & _
        "query_time_out = [qry_tmout], " & _
        "server_language = [lang], " & _
        "character_translation = [char_trans], " & _
        "regional_settings = [reg_settings] " & _
        " where connection_id = [c_id]"
  Set qy = NodeDB.CreateQueryDef(gstrEmptyString, strUpdate)

  ' Call a procedure to assign the Connection values to the
  ' querydef object
  Call AssignParameters(qy)
  qy.Execute dbFailOnError

  qy.Close

  Exit Sub

ModifyErr:

  Call LogErrors(Errors)
  On Error GoTo 0
  Err.Raise vbObjectError + errModifyFailed, _
     mstrModuleName & "Modify", LoadResString(errModifyFailed)

End Sub
Public Property Get ConnectionName() As String

  ConnectionName = mstrConnectionName

End Property

Public Property Get NextIdentifier() As Long

  Dim lngNextId As Long
```

```
  On Error GoTo NextIdentifierErr

  ' First check if the database object is valid
  Call CheckDB

  ' Retrieve the next identifier using the sequence class
  Set mConnectionSeq = New cSequence
  Set mConnectionSeq.IdDatabase = NodeDB
  mConnectionSeq.IdentifierColumn = "connection_id"
  lngNextId = mConnectionSeq.Identifier
  Set mConnectionSeq = Nothing

  NextIdentifier = lngNextId
  Exit Property

NextIdentifierErr:
  LogErrors Errors
  On Error GoTo 0
  Err.Raise vbObjectError + errIdGetFailed, _
     mstrModuleName & "NextIdentifier", LoadResString(errIdGetFailed)

End Property
Public Property Get IndOperation() As Operation

  IndOperation = mintOperation

End Property

Private Sub Class_Initialize()

  Set mFieldValue = New cStringSM

  ' Initialize the operation indicator variable to Query
  ' It will be modified later by the collection class when
  ' inserts, updates or deletes are performed
  mintOperation = QueryOp

  ' Initialize connection properties to their default values
  NoCountDisplay = DEF_NO_COUNT_DISPLAY
  NoExecute = DEF_NO_EXECUTE
  ParseQueryOnly = DEF_PARSE_QUERY_ONLY
  QuotedIdentifiers = DEF_ANSI_QUOTED_IDENTIFIERS
  AnsiNulls = DEF_ANSI_NULLS
  ShowQueryPlan = DEF_SHOW_QUERY_PLAN
  ShowStatsTime = DEF_SHOW_STATS_TIME
  ShowStatsIO = DEF_SHOW_STATS_IO
  ParseOdbcMsg = DEF_PARSE_ODBC_MSG_PREFIXES
  RowCount = DEF_ROW_COUNT
  TsqlBatchSeparator = DEF_TSQL_BATCH_SEPARATOR
  QueryTimeOut = DEF_QUERY_TIME_OUT
  ServerLanguage = DEF_SERVER_LANGUAGE
  CharacterTranslation = DEF_CHARACTER_TRANSLATION
  RegionalSettings = DEF_REGIONAL_SETTINGS
```

```
End Sub

Private Sub Class_Terminate()

   Set NodeDB = Nothing
   Set mFieldValue = Nothing

End Sub
VERSION 1.0 CLASS
BEGIN
 MultiUse = -1  'True
 Persistable = 0  'NotPersistable
 DataBindingBehavior = 0  'vbNone
 DataSourceBehavior  = 0  'vbNone
 MTSTransactionMode  = 0  'NotAnMTSObject
END
Attribute VB_Name = "cConnections"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
'  FILE:       cConnections.cls
'              Microsoft TPC-H Kit Ver. 2.7.0-1005
'              Copyright Microsoft, 2008
'              All Rights Reserved
'
'
'  PURPOSE:    Implements an array of cConnection objects.
'              Type-safe wrapper around cNodeCollections.
'              Also contains validation functions, etc.
'  Contact:    Reshma Tharamal (reshmat@microsoft.com)
'
Option Explicit

Private mcarrConnections As cNodeCollections

' Used to indicate the source module name when errors
' are raised by this class
Private mstrSource As String
Private Const mstrModuleName As String = "cConnections."

Public Property Set ConnDb(vdata As Database)

   Set mcarrConnections.NodeDB = vdata

End Property
Public Sub Modify(cModifiedConn As cConnection)

   ' First check if the parameter record is valid
   Call CheckDupConnName(cModifiedConn)

   Call mcarrConnections.Modify(cModifiedConn)

End Sub
```

```
Public Sub Load(ByRef cConnToAdd As cConnection)

  Call mcarrConnections.Load(cConnToAdd)

End Sub
Public Sub Add(ByRef cConnToAdd As cConnection)

  Set cConnToAdd.NodeDB = mcarrConnections.NodeDB

  ' First check if the record is valid
  Call Validate(cConnToAdd)

  ' Retrieve a unique identifier
  cConnToAdd.ConnectionId = cConnToAdd.NextIdentifier

  Call mcarrConnections.Add(cConnToAdd)

End Sub

Public Sub Unload(lngConnId As Long)

  Dim lngDeleteElement As Long

  lngDeleteElement = QueryIndex(lngConnId)

  Call mcarrConnections.Unload(lngDeleteElement)

End Sub

Public Sub SaveConnectionsInWsp(ByVal lngWorkspace As Long)
  ' Call a procedure to save all connection records for the workspace
  Call mcarrConnections.Save(lngWorkspace)

End Sub
Public Function GetConnection(ByVal lngWorkspace As Long, _
      ByVal strConnectionName As String) As cConnection
  ' Returns the connection string for the passed in connection name

  Dim lngIndex As Long

  ' Find all parameters in the array with a matching workspace id
  For lngIndex = 0 To mcarrConnections.Count - 1
     If mcarrConnections(lngIndex).WorkspaceId = lngWorkspace And _
           mcarrConnections(lngIndex).ConnectionName = strConnectionName Then

        Set GetConnection = mcarrConnections(lngIndex)
        Exit For
     End If
  Next lngIndex

  If lngIndex > mcarrConnections.Count - 1 Then
     ' The parameter has not been defined for the workspace
     ' Raise an error
     On Error GoTo 0
```

```
      Err.Raise vbObjectError + errConnNameInvalid, mstrModuleName & "GetConnection", _
            LoadResString(errConnNameInvalid)
   End If

End Function
Public Sub Delete(lngConnId As Long)
   ' Delete the passed in parameter

   Dim lngDeleteElement As Long

   lngDeleteElement = QueryIndex(lngConnId)
   Call mcarrConnections.Delete(lngDeleteElement)

End Sub
Private Function QueryIndex(lngConnId As Long) As Long

   Dim lngIndex As Long

   ' Find the matching parameter record in the array
   For lngIndex = 0 To mcarrConnections.Count - 1
      If mcarrConnections(lngIndex).ConnectionId = lngConnId And _
            mcarrConnections(lngIndex).IndOperation <> DeleteOp Then
         QueryIndex = lngIndex
         Exit Function
      End If
   Next lngIndex

   ' Raise error that parameter has not been found
   On Error GoTo 0
   Err.Raise vbObjectError + errQueryIndexFailed, "cArrParameters.QueryIndex", _
      LoadResString(errQueryIndexFailed)

End Function

Public Function QueryConnection(lngConnId As Long) As cConnection

   Dim lngQueryElement As Long

   lngQueryElement = QueryIndex(lngConnId)

   ' Return the queried connection object
   Set QueryConnection = mcarrConnections(lngQueryElement)

End Function
Public Property Get Count() As Long

   Count = mcarrConnections.Count

End Property
Public Property Get Item(lngIndex As Long) As cConnection
Attribute Item.VB_UserMemId = 0

   Set Item = mcarrConnections(lngIndex)
```

```
End Property

Public Sub Validate(ByVal cConnToValidate As cConnection)
  ' This procedure is necessary since the class cannot validate
  ' all the parameter properties on it's own. This is 'coz we
  ' might have created new parameters in the workspace, but not
  ' saved them to the database yet - hence the duplicate check
  ' has to be repeated in the array

  Dim lngIndex As Long
  Dim cTempParam As cConnection

  ' Check if the parameter name already exists in the workspace
  For lngIndex = 0 To mcarrConnections.Count - 1
    Set cTempParam = mcarrConnections(lngIndex)
    If cTempParam.WorkspaceId = cConnToValidate.WorkspaceId And _
        cTempParam.ConnectionName = cConnToValidate.ConnectionName And _
        cTempParam.IndOperation <> DeleteOp Then
      On Error GoTo 0
      Err.Raise vbObjectError + errDuplicateConnectionName, _
        mstrSource, LoadResString(errDuplicateConnectionName)
    End If
  Next lngIndex

End Sub
Public Sub CheckDupConnName(ByVal cConnToValidate As cConnection)

  Dim lngIndex As Long
  Dim cTempParam As cConnection

  ' Check if the parameter name already exists in the workspace
  For lngIndex = 0 To mcarrConnections.Count - 1
    Set cTempParam = mcarrConnections(lngIndex)
    If cTempParam.WorkspaceId = cConnToValidate.WorkspaceId And _
        cTempParam.ConnectionName = cConnToValidate.ConnectionName And _
        cTempParam.ConnectionId <> cConnToValidate.ConnectionId And _
        cTempParam.IndOperation <> DeleteOp Then
      ShowError errDuplicateConnectionName
      On Error GoTo 0
      Err.Raise vbObjectError + errDuplicateConnectionName, _
        mstrSource, LoadResString(errDuplicateConnectionName)
    End If
  Next lngIndex

End Sub

Private Sub Class_Initialize()

  Set mcarrConnections = New cNodeCollections

End Sub

Private Sub Class_Terminate()
```

```
   Set mcarrConnections = Nothing

End Sub
VERSION 1.0 CLASS
BEGIN
 MultiUse = -1  'True
 Persistable = 0  'NotPersistable
 DataBindingBehavior = 0  'vbNone
 DataSourceBehavior  = 0  'vbNone
 MTSTransactionMode  = 0  'NotAnMTSObject
END
Attribute VB_Name = "cConstraint"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
'  FILE:       cConstraint.cls
'              Microsoft TPC-H Kit Ver. 2.7.0-1005
'              Copyright Microsoft, 2008
'              All Rights Reserved
'
'
'  PURPOSE:    Encapsulates the properties and methods of a constraint.
'              Contains functions to insert, update and delete
'              step_constraints records from the database.
'  Contact:    Reshma Tharamal (reshmat@microsoft.com)
'
Option Explicit

' Module level variables to store the property values
Private mlngConstraintId As Long
Private mlngStepId As Long
Private mstrVersionNo As String
Private mintConstraintType As Integer
Private mlngGlobalStepId As Long
Private mstrGlobalVersionNo As String
Private mintSequenceNo As Integer
Private mdbsConstraintDB As Database
Private mlngWorkspaceId As Integer
Private mintOperation As Operation
Private mlngPosition As Long

' The cSequence class is used to generate unique step identifiers
Private mConstraintSeq As cSequence

Private Const mstrModuleName As String = ".cConstraint."
Private mstrSource As String

Public Enum ConstraintType
   gintPreStep = 1
   gintPostStep = 2
End Enum

Private Const mstrSQ As String = """
```

```
Public Property Get WorkspaceId() As Long
  WorkspaceId = mlngWorkspaceId
End Property
Public Property Let WorkspaceId(ByVal vdata As Long)
  mlngWorkspaceId = vdata
End Property

Public Property Get IndOperation() As Operation

  IndOperation = mintOperation

End Property
Public Property Let IndOperation(ByVal vdata As Operation)

  On Error GoTo IndOperationErr
  mstrSource = mstrModuleName & "IndOperation"

  ' The valid operations are define in the cOperations
  ' class. Check if the operation is valid
  Select Case vdata
     Case QueryOp, InsertOp, UpdateOp, DeleteOp
        mintOperation = vdata

     Case Else
        On Error GoTo 0
        Err.Raise vbObjectError + errInvalidOperation, _
              mstrSource, LoadResString(errInvalidOperation)
  End Select

  Exit Property

IndOperationErr:
  LogErrors Errors
  mstrSource = mstrModuleName & "IndOperation"
  On Error GoTo 0
  Err.Raise vbObjectError + errLetOperationFailed, _
     mstrSource, LoadResString(errLetOperationFailed)

End Property

Public Function Clone() As cConstraint

  ' Creates a copy of a given constraint

  Dim cConsClone As cConstraint

  On Error GoTo CloneErr
  mstrSource = mstrModuleName & "Clone"

  Set cConsClone = New cConstraint

  ' Copy all the workspace properties to the newly
  ' created workspace
  cConsClone.ConstraintId = mlngConstraintId
```

```
  cConsClone.StepId = mlngStepId
  cConsClone.VersionNo = mstrVersionNo
  cConsClone.ConstraintType = mintConstraintType
  cConsClone.GlobalStepId = mlngGlobalStepId
  cConsClone.GlobalVersionNo = mstrGlobalVersionNo
  cConsClone.SequenceNo = mintSequenceNo
  cConsClone.WorkspaceId = mlngWorkspaceId
  cConsClone.IndOperation = mintOperation

  ' And set the return value to the newly created constraint
  Set Clone = cConsClone

  Exit Function

CloneErr:
  LogErrors Errors
  mstrSource = mstrModuleName & "Clone"
  On Error GoTo 0
  Err.Raise vbObjectError + errCloneFailed, _
        mstrSource, LoadResString(errCloneFailed)

End Function

Public Property Get SequenceNo() As Integer

  SequenceNo = mintSequenceNo

End Property

Public Property Let SequenceNo(ByVal vdata As Integer)
  mintSequenceNo = vdata
End Property

Public Sub Add()
  ' Inserts a new step constraint into the database

  Dim strInsert As String
  Dim qy As DAO.QueryDef

  On Error GoTo AddErr

  ' First check if the database object is valid
  Call CheckDB

  ' Any record validations
  Call Validate

  ' Create a temporary querydef object
  strInsert = "insert into step_constraints " & _
        "( constraint_id, step_id, version_no, " & _
        " constraint_type, global_step_id, global_version_no, sequence_no ) " & _
        " values ( [cons_id], [s_id], [ver_no], " & _
        " [cons_type], [g_step_id], [g_ver_no], " & _
        " [seq_no] )"
```

```
  Set qy = mdbsConstraintDB.CreateQueryDef(gstrEmptyString, strInsert)

  ' Call a procedure to execute the Querydef object
  Call AssignParameters(qy)

  qy.Execute dbFailOnError
  qy.Close

'   strInsert = "insert into step_constraints " & _
'       "( constraint_id, step_id, version_no, " & _
'       " constraint_type, global_step_id, global_version_no, sequence_no ) " & _
'       " values ( " & _
'       Str(mlngConstraintId) & ", " & Str(mlngStepId) & ", " & _
'       mstrSQ & mstrVersionNo & mstrSQ & ", " & Str(mintConstraintType) & ", " & _
'       Str(mlngGlobalStepId) & ", " & mstrSQ & mstrGlobalVersionNo & mstrSQ & ", " & _
'       Str(mintSequenceNo) & " ) "
'
'   BugMessage strInsert
'   mdbsConstraintDB.Execute strInsert, dbFailOnError
  Exit Sub

AddErr:
  LogErrors Errors
  mstrSource = mstrModuleName & "Add"
  On Error GoTo 0
  Err.Raise vbObjectError + errAddConstraintFailed, _
        mstrSource, _
        LoadResString(errAddConstraintFailed)
End Sub
Private Sub AssignParameters(qyExec As DAO.QueryDef)
  ' Assigns values to the parameters in the querydef object
  ' The parameter names are cryptic to make them different
  ' from the field names. When the parameter names are
  ' the same as the field names, parameters in the where
  ' clause do not get created.

  Dim prmParam As DAO.Parameter

  On Error GoTo AssignParametersErr
  mstrSource = mstrModuleName & "AssignParameters"

  For Each prmParam In qyExec.Parameters
     Select Case prmParam.Name
        Case "[cons_id]"
           prmParam.Value = mlngConstraintId

        Case "[s_id]"
           prmParam.Value = mlngStepId

        Case "[ver_no]"
           prmParam.Value = mstrVersionNo

        Case "[cons_type]"
           prmParam.Value = mintConstraintType
```

```
        Case "[g_step_id]"
           prmParam.Value = mlngGlobalStepId

        Case "[g_ver_no]"
           prmParam.Value = mstrGlobalVersionNo

        Case "[seq_no]"
           prmParam.Value = mintSequenceNo

        Case Else
           ' Write the parameter name that is faulty
           WriteError errInvalidParameter, mstrSource, _
                 prmParam.Name
           On Error GoTo 0
           Err.Raise errInvalidParameter, mstrSource, _
                 LoadResString(errInvalidParameter)
     End Select
  Next prmParam

  Exit Sub

AssignParametersErr:

  mstrSource = mstrModuleName & "AssignParameters"
  Call LogErrors(Errors)
  On Error GoTo 0
  Err.Raise vbObjectError + errAssignParametersFailed, _
     mstrSource, LoadResString(errAssignParametersFailed)

End Sub
Public Property Get NextIdentifier() As Long

  Dim lngNextId As Long

  On Error GoTo NextIdentifierErr

  ' First check if the database object is valid
  Call CheckDB

  ' Retrieve the next constraint identifier using the
  ' sequence class
  Set mConstraintSeq = New cSequence
  Set mConstraintSeq.IdDatabase = mdbsConstraintDB
  mConstraintSeq.IdentifierColumn = "constraint_id"
  lngNextId = mConstraintSeq.Identifier
  Set mConstraintSeq = Nothing

  NextIdentifier = lngNextId
  Exit Property

NextIdentifierErr:
  LogErrors Errors
  mstrSource = mstrModuleName & "NextIdentifier"
```

```
  On Error GoTo 0
  Err.Raise vbObjectError + errStepIdGetFailed, _
     mstrSource, LoadResString(errStepIdGetFailed)

End Property

Private Sub CheckDB()
  ' Check if the database object has been initialized

  If mdbsConstraintDB Is Nothing Then
     ShowError errInvalidDB
     On Error GoTo 0
     Err.Raise vbObjectError + errInvalidDB, _
        mstrModuleName, LoadResString(errInvalidDB)
  End If

End Sub

Public Sub Delete()
  ' Deletes the step constraint record from the database

  Dim strDelete As String
  Dim qy As DAO.QueryDef

  On Error GoTo DeleteErr
  mstrSource = mstrModuleName & "Delete"

  ' There can be multiple constraints for a step,
  ' meaning that there can be multiple constraint records
  ' with the same constraint_id. Only a combination
  ' of the step_id, version and constraint_id will be
  ' unique
  strDelete = "delete from step_constraints " & _
        " where constraint_id = [cons_id]" & _
        " and step_id = [s_id] " & _
        " and version_no = [ver_no] "
  Set qy = mdbsConstraintDB.CreateQueryDef(gstrEmptyString, strDelete)

  Call AssignParameters(qy)
  qy.Execute dbFailOnError

  qy.Close

'   strDelete = "Delete from step_constraints " & _
'          " where constraint_id = " & Str(mlngConstraintId) & _
'          " and step_id = " & Str(mlngStepId) & _
'          " and version_no = " & mstrSQ & mstrVersionNo & mstrSQ
'
'   'BugMessage strDelete
'   mdbsConstraintDB.Execute strDelete, dbFailOnError

  Exit Sub

DeleteErr:
```

```
  LogErrors Errors
  mstrSource = mstrModuleName & "Delete"
  On Error GoTo 0
  Err.Raise vbObjectError + errDeleteConstraintFailed, _
        mstrSource, _
        LoadResString(errDeleteConstraintFailed)
End Sub
Public Sub Modify()
  ' Updates the sequence no of the step constraint record
  ' in the database

  Dim strUpdate As String
  Dim qy As QueryDef

  On Error GoTo Modify

  ' First check if the database object is valid
  Call CheckDB

  ' Any record validations
  Call Validate

  ' There can be multiple constraints for a step,
  ' meaning that there can be multiple constraint records
  ' with the same constraint_id. Only a combination
  ' of the step_id, version and constraint_id will be
  ' unique
  ' Create a temporary querydef object with the modify string
  strUpdate = "Update step_constraints " & _
        " set sequence_no = [seq_no] " & _
        " where constraint_id = [cons_id] " & _
        " and step_id = [s_id] " & _
        " and version_no = [ver_no] "
  Set qy = mdbsConstraintDB.CreateQueryDef(gstrEmptyString, strUpdate)

  ' Call a procedure to assign the parameter values to the
  ' querydef object
  Call AssignParameters(qy)
  qy.Execute dbFailOnError

  qy.Close

'   strUpdate = "Update step_constraints " & _
'         " set sequence_no = " & Str(mintSequenceNo) & _
'         " where constraint_id = " & Str(mlngConstraintId) & _
'         " and step_id = " & Str(mlngStepId) & _
'         " and version_no = " & mstrSQ & mstrVersionNo & mstrSQ
'
'   'BugMessage strUpdate
'   mdbsConstraintDB.Execute strUpdate, dbFailOnError
  Exit Sub

Modify:
  LogErrors Errors
```

```
  mstrSource = mstrModuleName & "Modify"
  On Error GoTo 0
  Err.Raise vbObjectError + errUpdateConstraintFailed, _
        mstrSource, _
        LoadResString(errUpdateConstraintFailed)
End Sub
Public Property Get Position() As Long

  Position = mlngPosition

End Property
Public Property Let Position(ByVal RHS As Long)

  mlngPosition = RHS

End Property

Public Sub Validate()
  ' Each distinct object will have a Validate method which
  ' will check if the class properties are valid. This method
  ' will be used to check interdependant properties that
  ' cannot be validated by the let procedures.
  ' It should be called by the add and modify methods of the class

  ' No validations are necessary for the constraint object

End Sub

Public Property Set NodeDB(vdata As Database)

  Set mdbsConstraintDB = vdata

End Property

Public Property Get NodeDB() As Database

  Set NodeDB = mdbsConstraintDB

End Property

Public Property Get GlobalVersionNo() As String

  GlobalVersionNo = mstrGlobalVersionNo

End Property

Public Property Let GlobalVersionNo(ByVal vdata As String)

  mstrGlobalVersionNo = vdata

End Property

Public Property Get GlobalStepId() As Long
```

```
  GlobalStepId = mlngGlobalStepId

End Property

Public Property Get ConstraintId() As Long

  ConstraintId = mlngConstraintId

End Property

Public Property Get VersionNo() As String

  VersionNo = mstrVersionNo

End Property

Public Property Get StepId() As Long

  StepId = mlngStepId

End Property

Public Property Let VersionNo(ByVal vdata As String)

  mstrVersionNo = vdata

End Property

Public Property Let StepId(ByVal vdata As Long)

  mlngStepId = vdata

End Property

Public Property Let ConstraintId(ByVal vdata As Long)
  On Error GoTo ConstraintIdErr
  mstrSource = mstrModuleName & "ConstraintId"

  If (vdata > 0) Then
     mlngConstraintId = vdata
  Else
     ' Propogate this error back to the caller
     On Error GoTo 0
     Err.Raise vbObjectError + errConstraintIdInvalid, _
        mstrSource, LoadResString(errConstraintIdInvalid)
  End If

  Exit Property

ConstraintIdErr:
  LogErrors Errors
  mstrSource = mstrModuleName & "ConstraintId"
  On Error GoTo 0
  Err.Raise vbObjectError + errConstraintIdSetFailed, _
```

```
    mstrSource, LoadResString(errConstraintIdSetFailed)

End Property

Public Property Let GlobalStepId(ByVal vdata As Long)

  On Error GoTo GlobalStepIdErr
  mstrSource = mstrModuleName & "GlobalStepId"

  If (vdata > 0) Then
    mlngGlobalStepId = vdata
  Else
    ' Propogate this error back to the caller
    On Error GoTo 0
    Err.Raise vbObjectError + errGlobalStepIdInvalid, _
      mstrSource, LoadResString(errGlobalStepIdInvalid)
  End If

  Exit Property

GlobalStepIdErr:
  LogErrors Errors
  mstrSource = mstrModuleName & "GlobalStepId"
  On Error GoTo 0
  Err.Raise vbObjectError + errGlobalStepIdSetFailed, _
    mstrSource, LoadResString(errGlobalStepIdSetFailed)

End Property

Public Property Let ConstraintType(ByVal vdata As ConstraintType)

  On Error GoTo ConstraintTypeErr

  ' A global step can be either a pre- or a post-execution step.
  ' These constants have been defined in the enumeration,
  ' ConstraintType, which is exposed
  Select Case vdata
    Case gintPreStep, gintPostStep
      mintConstraintType = vdata

    Case Else
      On Error GoTo 0
      Err.Raise vbObjectError + errConstraintTypeInvalid, _
        mstrSource, LoadResString(errConstraintTypeInvalid)
  End Select

  Exit Property

ConstraintTypeErr:
  LogErrors Errors
  mstrSource = mstrModuleName & "ConstraintType"
  On Error GoTo 0
  Err.Raise vbObjectError + errConstraintTypeLetFailed, _
    mstrSource, LoadResString(errConstraintTypeLetFailed)
```

```
End Property

Public Property Get ConstraintType() As ConstraintType

   ConstraintType = mintConstraintType

End Property

Private Sub Class_Initialize()

   ' Initialize the operation indicator variable to Query
   ' It will be modified later by the collection class when
   ' inserts, updates or deletes are performed
   mintOperation = QueryOp

End Sub


VERSION 1.0 CLASS
BEGIN
 MultiUse = -1  'True
 Persistable = 0  'NotPersistable
 DataBindingBehavior = 0  'vbNone
 DataSourceBehavior  = 0  'vbNone
 MTSTransactionMode  = 0  'NotAnMTSObject
END
Attribute VB_Name = "cFailedStep"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
'  FILE:       cFailedStep.cls
'              Microsoft TPC-H Kit Ver. 2.7.0-1005
'              Copyright Microsoft, 2008
'              All Rights Reserved
'
'
'  PURPOSE:     Properties of a step execution failure.
'  Contact:     Reshma Tharamal (reshmat@microsoft.com)
'
Option Explicit

Public InstanceId As Long
Public StepId As Long
Public ParentStepId As Long
Public ContCriteria As ContinuationCriteria
Public EndTime As Currency
Public AskResponse As Long
VERSION 1.0 CLASS
BEGIN
 MultiUse = -1  'True
 Persistable = 0  'NotPersistable
 DataBindingBehavior = 0  'vbNone
```

```
 DataSourceBehavior  = 0  'vbNone
 MTSTransactionMode  = 0  'NotAnMTSObject
END
Attribute VB_Name = "cFailedSteps"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
'  FILE:       cFailedSteps.cls
'              Microsoft TPC-H Kit Ver. 2.7.0-1005
'              Copyright Microsoft, 2008
'              All Rights Reserved
'
'
'  PURPOSE:    This module encapsulates a collection of failed steps. It
'              also determines whether sub-steps of a passed in step need
'              to be skipped due to a failure.
'  Contact:    Reshma Tharamal (reshmat@microsoft.com)
'
Option Explicit

Private mcFailedSteps As cVector
Public Function ExecuteSubStep(lParentStepId As Long) As Boolean
  ' Returns False if there is any condition that prevents sub-steps of the passed
  ' in instance from being executed
  Dim lIndex As Long

  ExecuteSubStep = True

  For lIndex = 0 To Count() - 1
     If mcFailedSteps(lIndex).ContCriteria = gintOnFailureCompleteSiblings And _
           lParentStepId <> mcFailedSteps(lIndex).ParentStepId Then
        ExecuteSubStep = False
        Exit For
     End If

     If mcFailedSteps(lIndex).ContCriteria = gintOnFailureAbortSiblings And _
           lParentStepId = mcFailedSteps(lIndex).ParentStepId Then
        ExecuteSubStep = False
        Exit For
     End If

     If mcFailedSteps(lIndex).ContCriteria = gintOnFailureSkipSiblings And _
           lParentStepId = mcFailedSteps(lIndex).ParentStepId Then
        ExecuteSubStep = False
        Exit For
     End If

     If mcFailedSteps(lIndex).ContCriteria = gintOnFailureAbort Then
        ExecuteSubStep = False
        Exit For
     End If

  Next lIndex
```

```
End Function
Public Sub Add(ByVal objItem As cFailedStep)

  mcFailedSteps.Add objItem

End Sub
Public Function Delete(ByVal lPosition As Long) As cFailedStep

  Set Delete = mcFailedSteps.Delete(lPosition)

End Function

Public Sub Clear()

  mcFailedSteps.Clear

End Sub
Public Function Count() As Long

  Count = mcFailedSteps.Count

End Function
Public Property Get Item(ByVal Position As Long) As cFailedStep
Attribute Item.VB_UserMemId = 0

  Set Item = mcFailedSteps.Item(Position)

End Property

Public Function StepFailed(lStepId As Long) As Boolean

  ' Returns True if a failure record already exists for the passed in step
  Dim lIndex As Long

  StepFailed = False

  For lIndex = 0 To Count() - 1
    If mcFailedSteps(lIndex).StepId = lStepId Then
      StepFailed = True
      Exit For
    End If
  Next lIndex

End Function

Private Sub Class_Initialize()

  Set mcFailedSteps = New cVector

End Sub

Private Sub Class_Terminate()
```

```
   Set mcFailedSteps = Nothing

End Sub
VERSION 1.0 CLASS
BEGIN
 MultiUse = -1  'True
 Persistable = 0  'NotPersistable
 DataBindingBehavior = 0  'vbNone
 DataSourceBehavior  = 0  'vbNone
 MTSTransactionMode  = 0  'NotAnMTSObject
END
Attribute VB_Name = "cFileInfo"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
'  FILE:       cFileInfo.cls
'              Microsoft TPC-H Kit Ver. 2.7.0-1005
'              Copyright Microsoft, 2008
'              All Rights Reserved
'
'
'  PURPOSE:    File Properties viz. name, handle, etc.
'  Contact:    Reshma Tharamal (reshmat@microsoft.com)
'
Option Explicit

Private mstrFileName As String
Private mintFileHandle As Integer
Private mdbsNodeDb As Database ' Since it is used to form a cNodeCollection
Private mlngPosition As Long ' Since it is used to form a cNodeCollection
Public Property Get FileName() As String

   FileName = mstrFileName

End Property
Public Property Let FileName(ByVal vdata As String)

   mstrFileName = vdata

End Property
Public Property Let FileHandle(ByVal vdata As Integer)

   mintFileHandle = vdata

End Property
Public Property Set NodeDB(vdata As Database)

   Set mdbsNodeDb = vdata

End Property

Public Property Get NodeDB() As Database
```

```
   Set NodeDB = mdbsNodeDb

End Property
Public Property Get Position() As Long

   Position = mlngPosition

End Property
Public Property Let Position(ByVal vdata As Long)

   mlngPosition = vdata

End Property

Public Property Get FileHandle() As Integer

   FileHandle = mintFileHandle

End Property

VERSION 1.0 CLASS
BEGIN
 MultiUse = -1  'True
 Persistable = 0  'NotPersistable
 DataBindingBehavior = 0  'vbNone
 DataSourceBehavior  = 0  'vbNone
 MTSTransactionMode  = 0  'NotAnMTSObject
END
Attribute VB_Name = "cFileSM"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
Attribute VB_Ext_KEY = "SavedWithClassBuilder" ,"Yes"
Attribute VB_Ext_KEY = "Top_Level" ,"Yes"
'  FILE:       cFileSM.cls
'              Microsoft TPC-H Kit Ver. 2.7.0-1005
'              Copyright Microsoft, 2008
'              All Rights Reserved
'
'
'  PURPOSE:    Encapsulates functions to open a file and write to it.
'  Contact:    Reshma Tharamal (reshmat@microsoft.com)
'
Option Explicit

' Used to indicate the source module name when errors
' are raised by this class
Private Const mstrModuleName As String = "cFileSM."
Private mstrSource As String

Private mstrFileName As String
Private mintHFile As Integer
Private mstrFileHeader As String
```

```
Private mstrProjectName As String

Public Sub CloseFile()

  ' Close the file
  If mintHFile > 0 Then
     Call CloseFileSM(mstrFileName)
     mintHFile = 0
  End If

End Sub

Public Property Let ProjectName(ByVal vdata As String)
  ' An optional field - will be appended to the file
  ' header string if specified

  Const strProjectHdr As String = "Project Name:"

  mstrProjectName = vdata
  mstrFileHeader = mstrFileHeader & _
        Space$(1) & strProjectHdr & Space$(1) & _
        gstrSQ & vdata & gstrSQ

End Property
Public Property Get ProjectName() As String

  ProjectName = mstrProjectName

End Property
Public Property Get FileName() As String

  FileName = mstrFileName

End Property
Public Property Let FileName(ByVal vdata As String)

  mstrFileName = vdata

End Property
Public Sub WriteLine(strMsg As String)

  ' Writes the passed in string to the file
  Call WriteToFile(strMsg, False)

End Sub

Public Sub WriteField(strMsg As String)

  ' Writes the passed in string to the file
  Call WriteToFile(strMsg, True)

End Sub

Private Sub WriteToFile(strMsg As String, _
```

```
    blnContinue As Boolean)
' Writes the passed in string to the file - the
' Continue flag indicates whether the next line will
' be continued on the same line or printed on a new one

On Error GoTo WriteToFileErr

' Open the file if it hasn't been already
If mintHFile = 0 Then

    ' If the filename has not been initialized, do not
    ' attempt to open it
    If mstrFileName <> gstrEmptyString Then

        mintHFile = OpenFileSM(mstrFileName)

        If mintHFile = 0 Then
            ' The Open File command failed for some reason
            ' No point in trying to write the file header
        Else
            ' Print a file header, if a header string has been
            ' initialized
            If mstrFileHeader <> gstrEmptyString Then
                Print #mintHFile,
                Print #mintHFile, mstrFileHeader
                Print #mintHFile,
            End If
        End If
    End If
End If

If mintHFile <> 0 Then
    If strMsg = gstrEmptyString Then
        Print #mintHFile,
    Else
        If blnContinue Then
            ' Write the message to the file - continue
            ' all subsequent characters on the same line
            Print #mintHFile, strMsg;
        Else
            ' Write the message to the file
            Print #mintHFile, strMsg
        End If
    End If
Else
    ' Display the string to the user instead of
    ' trying to write it to the file
    ' This could be the project error log that we were
    ' trying to open! Play it safe and display errors - do
    ' not try to log them.
    MsgBox strMsg, vbOKOnly
End If

Exit Sub
```

```
WriteToFileErr:
  ' Log the error code raised by Visual Basic
  Call DisplayErrors(Errors)

  ' Display the string to the user instead of
  ' trying to write it to the file
  MsgBox strMsg, vbOKOnly

End Sub
Public Property Let FileHeader(ByVal vdata As String)

  mstrFileHeader = vdata

End Property
Public Property Get FileHeader() As String

  FileHeader = mstrFileHeader

End Property

Private Sub Class_Terminate()

  ' Close the file opened by this instance
  Call CloseFile

End Sub


VERSION 1.0 CLASS
BEGIN
 MultiUse = -1  'True
 Persistable = 0  'NotPersistable
 DataBindingBehavior = 0  'vbNone
 DataSourceBehavior  = 0  'vbNone
 MTSTransactionMode  = 0  'NotAnMTSObject
END
Attribute VB_Name = "cGlobalStep"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
'  FILE:       cGlobalStep.cls
'              Microsoft TPC-H Kit Ver. 2.7.0-1005
'              Copyright Microsoft, 2008
'              All Rights Reserved
'
'
'  PURPOSE:    Encapsulates the properties and methods of a global step.
'              Implements the cStep class - carries out initializations
'              and validations that are specific to global steps.
'  Contact:    Reshma Tharamal (reshmat@microsoft.com)
'
Option Explicit
```

```
Implements cStep

' Object variable to keep the reference in
Private mcStep As cStep

' Used to indicate the source module name when errors
' are raised by this class
Private mstrSource As String
Private Const mstrModuleName As String = "cGlobalStep."

Private Sub cStep_AddAllIterators()

  Call mcStep.AddAllIterators

End Sub

Private Sub cStep_AddIterator(cItRecord As cIterator)

  Call mcStep.AddIterator(cItRecord)

End Sub

Private Property Let cStep_ArchivedFlag(ByVal RHS As Boolean)

  mcStep.ArchivedFlag = RHS

End Property

Private Property Get cStep_ArchivedFlag() As Boolean

  cStep_ArchivedFlag = mcStep.ArchivedFlag

End Property

Private Sub Class_Initialize()

  ' Create the object
  Set mcStep = New cStep

  ' Initialize the object with valid values for a global step
  ' The global flag should be the first field to be initialized
  ' since subsequent validations might try to check if the
  ' step being created is global
  mcStep.GlobalFlag = True
  mcStep.StepType = gintGlobalStep

  ' A global step cannot have any sub-steps associated with it
  ' Hence, it will always be at Step Level 0
  mcStep.ParentStepId = 0
  mcStep.ParentVersionNo = gstrMinVersion
  mcStep.StepLevel = 0

  ' The enabled flag must be False for all global steps
```

```
  ' Global steps can be of two types
  ' a. Those that are run globally within a workspace either
  '    before every step, after every step or during the entire
  '    run, depending on the global run method
  ' b. Those that are not run globally, but qualify to be either
  '    pre or post-execution steps for other steps in the workspace.
  '    Whether or not such a step will be executed depends on
  '    whether the step for which it is defined as a pre/post
  '    step will be executed
  mcStep.EnabledFlag = False

  mcStep.ContinuationCriteria = gintNoOption
  mcStep.DegreeParallelism = gstrGlobalParallelism

End Sub
Private Sub Class_Terminate()

  ' Remove the step object
  Set mcStep = Nothing

End Sub

Private Sub cStep_Add()

  ' Call a private procedure to see if the step text has been
  ' entered - since a global step actually executes a step, entry
  ' of the text is mandatory
  Call StepTextOrFileEntered

  ' Call the Add method of the step class to carry out the insert
  mcStep.Add

End Sub

Private Function cStep_Clone(Optional cCloneStep As cStep) As cStep

  Dim cNewGlobal As cGlobalStep

  Set cNewGlobal = New cGlobalStep
  Set cStep_Clone = mcStep.Clone(cNewGlobal)

End Function


Private Property Get cStep_ContinuationCriteria() As ContinuationCriteria

  cStep_ContinuationCriteria = mcStep.ContinuationCriteria

End Property

Private Property Let cStep_ContinuationCriteria(ByVal RHS As ContinuationCriteria)

  ' The continuation criteria field will always be empty for a
  ' global step
```

```
  mcStep.ContinuationCriteria = 0

End Property

Private Property Let cStep_DegreeParallelism(ByVal RHS As String)

  ' Will always be zero for a global step
  mcStep.DegreeParallelism = gstrGlobalParallelism

End Property

Private Property Get cStep_DegreeParallelism() As String

  cStep_DegreeParallelism = mcStep.DegreeParallelism

End Property

Private Sub cStep_DeleteIterator(cItRecord As cIterator)

  Call mcStep.DeleteIterator(cItRecord)

End Sub

Private Sub cStep_Delete()

  mcStep.Delete

End Sub

Private Property Get cStep_EnabledFlag() As Boolean

  cStep_EnabledFlag = mcStep.EnabledFlag

End Property

Private Property Let cStep_EnabledFlag(ByVal RHS As Boolean)

  ' The enabled flag must be False for all global steps
  ' Global steps can be of two types
  ' a. Those that are run globally within a workspace either
  '    before every step, after every step or during the entire
  '    run, depending on the global run method
  ' b. Those that are not run globally, but qualify to be either
  '    pre or post-execution steps for other steps in the workspace.
  '    Whether or not such a step will be executed depends on
  '    whether the step for which it is defined as a pre/post
  '    step will be executed
  mcStep.EnabledFlag = False

End Property

Private Property Let cStep_ErrorFile(ByVal RHS As String)

  mcStep.ErrorFile = RHS
```

```
End Property

Private Property Get cStep_ErrorFile() As String

  cStep_ErrorFile = mcStep.ErrorFile

End Property

Private Property Let cStep_ExecutionMechanism(ByVal RHS As ExecutionMethod)

  ' Whether or not the Execution Mechanism is valid will be
  ' checked by the Step class
  mcStep.ExecutionMechanism = RHS

End Property

Private Property Get cStep_ExecutionMechanism() As ExecutionMethod

  cStep_ExecutionMechanism = mcStep.ExecutionMechanism

End Property

Private Property Let cStep_FailureDetails(ByVal RHS As String)

  ' Whether or not the Failure Details are valid for the
  ' selected failure criteria will be checked by the Step class
  mcStep.FailureDetails = RHS

End Property

Private Property Get cStep_FailureDetails() As String

  cStep_FailureDetails = mcStep.FailureDetails

End Property

Private Property Get cStep_GlobalFlag() As Boolean

  cStep_GlobalFlag = mcStep.GlobalFlag

End Property

Private Property Let cStep_GlobalFlag(ByVal RHS As Boolean)

  ' Set the global flag to true
  mcStep.GlobalFlag = True

End Property

Private Function cStep_IncVersionX() As String

  cStep_IncVersionX = mcStep.IncVersionX
```

```
End Function

Private Function cStep_IncVersionY() As String

  cStep_IncVersionY = mcStep.IncVersionY

End Function


'Private Property Let cStep_GlobalRunMethod(ByVal RHS As Integer)
'
'    ' Whether or not the Global Run Method is valid for the step
'    ' will be checked by the Step class
'    mcStep.GlobalRunMethod = RHS
'
'End Property
'
'Private Property Get cStep_GlobalRunMethod() As Integer
'
'    cStep_GlobalRunMethod = mcStep.GlobalRunMethod
'
'End Property
'
Private Property Get cStep_IndOperation() As Operation

  cStep_IndOperation = mcStep.IndOperation

End Property

Private Property Let cStep_IndOperation(ByVal RHS As Operation)

  mcStep.IndOperation = RHS

End Property

Private Sub cStep_InsertIterator(cItRecord As cIterator)

  Call mcStep.InsertIterator(cItRecord)

End Sub

Private Function cStep_IsNewVersion() As Boolean
  cStep_IsNewVersion = mcStep.IsNewVersion
End Function

Private Function cStep_IteratorCount() As Long

  cStep_IteratorCount = mcStep.IteratorCount

End Function

Private Property Let cStep_IteratorName(ByVal RHS As String)

  mcStep.IteratorName = RHS
```

```
End Property

Private Property Get cStep_IteratorName() As String

  cStep_IteratorName = mcStep.IteratorName

End Property

Private Function cStep_Iterators() As Variant

  cStep_Iterators = mcStep.Iterators

End Function

Private Sub cStep_LoadIterator(cItRecord As cIterator)

  Call mcStep.LoadIterator(cItRecord)

End Sub

'Private Property Let cStep_LogFile(ByVal RHS As String)
'
'    mcStep.LogFile = RHS
'
'End Property
'
'Private Property Get cStep_LogFile() As String
'
'    cStep_LogFile = mcStep.LogFile
'
'End Property

Private Sub cStep_ModifyIterator(cItRecord As cIterator)

  Call mcStep.ModifyIterator(cItRecord)

End Sub

Private Sub cStep_Modify()

  ' Call a private procedure to see if the step text has been
  ' entered - since a global step actually executes a step,
  ' entry of the text is mandatory
  Call StepTextOrFileEntered

  ' Call the Modify method of the step class to carry out the update
  mcStep.Modify

End Sub

Private Property Get cStep_NextStepId() As Long

  cStep_NextStepId = mcStep.NextStepId
```

```
End Property

Private Property Set cStep_NodeDB(RHS As DAO.Database)

  Set mcStep.NodeDB = RHS

End Property

Private Property Get cStep_NodeDB() As DAO.Database

  Set cStep_NodeDB = mcStep.NodeDB

End Property

Private Function cStep_OldVersionNo() As String
  cStep_OldVersionNo = mcStep.OldVersionNo
End Function

Private Property Let cStep_OutputFile(ByVal RHS As String)

  mcStep.OutputFile = RHS

End Property

Private Property Get cStep_OutputFile() As String

  cStep_OutputFile = mcStep.OutputFile

End Property

Private Property Let cStep_ParentStepId(ByVal RHS As Long)

  ' A global step cannot have any sub-steps associated with it
  ' Hence, the parent step id and parent version number will be zero
  mcStep.ParentStepId = 0

End Property

Private Property Get cStep_ParentStepId() As Long

  cStep_ParentStepId = mcStep.ParentStepId

End Property

Private Property Let cStep_ParentVersionNo(ByVal RHS As String)

  ' A global step cannot have any sub-steps associated with it
  ' Hence, the parent step id and parent version number will be zero
  mcStep.ParentVersionNo = gstrMinVersion

End Property

Private Property Get cStep_ParentVersionNo() As String
```

```
  cStep_ParentVersionNo = mcStep.ParentVersionNo
End Property
Private Property Let cStep_Position(ByVal RHS As Long)
  mcStep.Position = RHS
End Property
Private Property Get cStep_Position() As Long
  cStep_Position = mcStep.Position
End Property
Private Sub cStep_RemoveIterator(cItRecord As cIterator)
  Call mcStep.RemoveIterator(cItRecord)
End Sub
Private Sub cStep_SaveIterators()
  Call mcStep.SaveIterators
End Sub
Private Property Let cStep_SequenceNo(ByVal RHS As Integer)
  mcStep.SequenceNo = RHS
End Property
Private Property Get cStep_SequenceNo() As Integer
  cStep_SequenceNo = mcStep.SequenceNo
End Property
Private Property Let cStep_StepId(ByVal RHS As Long)
  mcStep.StepId = RHS
End Property
Private Property Get cStep_StepId() As Long
  cStep_StepId = mcStep.StepId
End Property

Private Property Let cStep_StepLabel(ByVal RHS As String)
```

```
  mcStep.StepLabel = RHS

End Property

Private Property Get cStep_StepLabel() As String

  cStep_StepLabel = mcStep.StepLabel

End Property

Private Property Let cStep_StartDir(ByVal RHS As String)

  mcStep.StartDir = RHS

End Property

Private Property Get cStep_StartDir() As String

  cStep_StartDir = mcStep.StartDir

End Property

Private Property Let cStep_StepLevel(ByVal RHS As Integer)

  ' A global step cannot have any sub-steps associated with it
  ' Hence, it will always be at step level 0
  mcStep.StepLevel = 0

End Property

Private Property Get cStep_StepLevel() As Integer

  cStep_StepLevel = mcStep.StepLevel

End Property

Private Property Let cStep_StepText(ByVal RHS As String)

  mcStep.StepText = RHS

End Property

Private Property Get cStep_StepText() As String

  cStep_StepText = mcStep.StepText

End Property

Private Property Let cStep_StepTextFile(ByVal RHS As String)

  mcStep.StepTextFile = RHS

End Property
```

```
Private Property Get cStep_StepTextFile() As String

  cStep_StepTextFile = mcStep.StepTextFile

End Property

Private Property Let cStep_StepType(RHS As gintStepType)

  mcStep.StepType = gintGlobalStep

End Property

Private Property Get cStep_StepType() As gintStepType

  cStep_StepType = mcStep.StepType

End Property

Private Sub cStep_UnloadIterators()

  Call mcStep.UnloadIterators

End Sub

Private Sub cStep_UpdateIterator(cItRecord As cIterator)

  Call mcStep.UpdateIterator(cItRecord)

End Sub

Private Sub cStep_UpdateIteratorVersion()

  Call mcStep.UpdateIteratorVersion

End Sub

Private Sub cStep_Validate()
  ' The validate routines for each of the steps will
  ' carry out the specific validations for the type and
  ' call the generic validation routine

  On Error GoTo cStep_ValidateErr
  mstrSource = mstrModuleName & "cStep_Validate"

  ' Validations specific to global steps

  ' Check if the step text or a file name has been
  ' specified
  Call StepTextOrFileEntered

  ' The step level must be zero for all globals
  If mcStep.StepLevel <> 0 Then
     ShowError errStepLevelZeroForGlobal
```

```
      On Error GoTo 0
      Err.Raise vbObjectError + errValidateFailed, _
            gstrSource, _
            LoadResString(errValidateFailed)
   End If

   If mcStep.EnabledFlag Then
      ShowError errEnabledFlagFalseForGlobal
      On Error GoTo 0
      Err.Raise vbObjectError + errValidateFailed, _
            gstrSource, _
            LoadResString(errValidateFailed)
   End If

   If mcStep.DegreeParallelism > 0 Then
      ShowError errDegParallelismNullForGlobal
      On Error GoTo 0
      Err.Raise vbObjectError + errValidateFailed, _
            gstrSource, _
            LoadResString(errValidateFailed)
   End If

   If mcStep.ContinuationCriteria > 0 Then
      ShowError errContCriteriaNullForGlobal
      On Error GoTo 0
      Err.Raise vbObjectError + errValidateFailed, _
            gstrSource, _
            LoadResString(errValidateFailed)
   End If

   mcStep.Validate

   Exit Sub

cStep_ValidateErr:
   LogErrors Errors
   mstrSource = mstrModuleName & "cStep_Validate"
   On Error GoTo 0
   Err.Raise vbObjectError + errValidateFailed, _
         mstrSource, _
         LoadResString(errValidateFailed)
End Sub
Private Sub StepTextOrFileEntered()
   ' Checks if either the step text or the name of the file containing
   ' the text has been entered
   ' If both of them are null or both of them are not null,
   ' the global step is invalid and an error is raised

   If StringEmpty(mcStep.StepText) And StringEmpty(mcStep.StepTextFile) Then
      ShowError errStepTextAndFileNull
      On Error GoTo 0
      Err.Raise vbObjectError + errStepTextAndFileNull, _
         mstrSource, LoadResString(errStepTextAndFileNull)
   ElseIf Not StringEmpty(mcStep.StepText) And Not StringEmpty(mcStep.StepTextFile) Then
```

```
      ShowError errStepTextOrFile
      On Error GoTo 0
      Err.Raise vbObjectError + errStepTextOrFile, _
         mstrSource, LoadResString(errStepTextOrFile)
   End If

End Sub

Private Property Let cStep_VersionNo(ByVal RHS As String)

   mcStep.VersionNo = RHS

End Property

Private Property Get cStep_VersionNo() As String

   cStep_VersionNo = mcStep.VersionNo

End Property

Private Property Let cStep_WorkspaceId(ByVal RHS As Long)

   mcStep.WorkspaceId = RHS

End Property

Private Property Get cStep_WorkspaceId() As Long

   cStep_WorkspaceId = mcStep.WorkspaceId

End Property
VERSION 1.0 CLASS
BEGIN
 MultiUse = -1  'True
 Persistable = 0  'NotPersistable
 DataBindingBehavior = 0  'vbNone
 DataSourceBehavior  = 0  'vbNone
 MTSTransactionMode  = 0  'NotAnMTSObject
END
Attribute VB_Name = "cInstance"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
'  FILE:       cInstance.cls
'              Microsoft TPC-H Kit Ver. 2.7.0-1005
'              Copyright Microsoft, 2008
'              All Rights Reserved
'
'
'  PURPOSE:    Encapsulates the properties and methods of an instance.
'              An instance is created when a step is executed for a
'              particular iterator value (if applicable) at 'run' time.
'              Contains functions to determine if an instance is running,
```

```
'               complete, and so on.
'  Contact:     Reshma Tharamal (reshmat@microsoft.com)
'
Option Explicit

' Used to indicate the source module name when errors
' are raised by this class
Private Const mstrModuleName As String = "cInstance."
Private mstrSource As String

Private mcStep As cStep
Public Key As String ' Node key for the step being executed
Public InstanceId As Long
Public ParentInstanceId As Long ' The parent instance
Private mblnNoMoreToStart As Boolean
Private mblnComplete As Boolean
Public StartTime As Currency
Public EndTime As Currency
Public ElapsedTime As Currency
Private mintStatus As InstanceStatus
Public DegreeParallelism As Integer
Private mcIterators As cRunColIt

' A collection of all the sub-steps for this step
Private mcSubSteps As cSubSteps
Public Sub UpdateStartTime(lStepId As Long, Optional ByVal StartTm As Currency = gdtmEmpty, _
      Optional ByVal EndTm As Currency = gdtmEmpty, _
      Optional ByVal Elapsed As Currency = 0)
  ' We do not maintain start and end timestamps for the constraint
  ' of a step. Hence we check if the process that just started/
  ' terminated is the worker step that is being executed. If so,
  ' we update the start/end time and status on the instance record.

  BugAssert (StartTm <> gdtmEmpty) Or (EndTm <> gdtmEmpty), "Mandatory parameter missing."

  ' Make sure that we are executing the actual step and not
  ' a pre or post-execution constraint
  If mcStep.StepId = lStepId Then
     If StartTm <> 0 Then
        StartTime = StartTm
        mintStatus = gintRunning
     Else
        EndTime = EndTm
        ElapsedTime = Elapsed
        mintStatus = gintComplete
     End If
  End If

End Sub
Public Function ValidForIteration(cParentInstance As cInstance, _
      ByVal intConsType As ConstraintType) As Boolean
  ' Returns true if the instance passed in is the first or
  ' last iteration for the step, depending on the constraint type
```

```
  Dim cSubStepRec As cSubStep
  Dim vntIterators As Variant

  On Error GoTo ValidForIterationErr

  If cParentInstance Is Nothing Then
     ' This will only be true for the dummy instance, which
     ' cannot have any iterators defined for it
     ValidForIteration = True
     Exit Function
  End If

  vntIterators = mcStep.Iterators

  If Not StringEmpty(mcStep.IteratorName) And Not IsEmpty(vntIterators) Then

     Set cSubStepRec = cParentInstance.QuerySubStep(mcStep.StepId)

     If intConsType = gintPreStep Then
        ' Pre-execution constraints will only be executed
        ' before the first iteration
        If cSubStepRec.LastIterator.IteratorType = gintValue Then
           ValidForIteration = (cSubStepRec.LastIterator.Sequence = _
                 gintMinIteratorSequence)
        Else
           ValidForIteration = (cSubStepRec.LastIterator.Value = _
                 cSubStepRec.LastIterator.RangeFrom)
        End If
     Else
        ' Post-execution constraints will only be executed
        ' after the last iteration - check if there are any
        ' pending iterations
        ValidForIteration = cSubStepRec.NextIteration(mcStep) Is Nothing
     End If
  Else
     ValidForIteration = True
  End If

  Exit Function

ValidForIterationErr:
  ' Log the error code raised by Visual Basic
  Call LogErrors(Errors)
  On Error GoTo 0
  mstrSource = mstrModuleName & "ValidForIteration"
  Err.Raise vbObjectError + errExecInstanceFailed, _
        mstrSource, LoadResString(errExecInstanceFailed)

End Function

Public Sub CreateSubStep(cSubStepDtls As cStep, RunParams As cArrParameters)

  Dim cNewSubStep As cSubStep
```

```
  On Error GoTo CreateSubStepErr

  Set cNewSubStep = New cSubStep

  cNewSubStep.StepId = cSubStepDtls.StepId
  cNewSubStep.TasksComplete = 0
  cNewSubStep.TasksRunning = 0

  ' Initialize the iterator for the instance
  Set cNewSubStep.LastIterator = New cRunItDetails
  Call cNewSubStep.InitializeIt(cSubStepDtls, RunParams)

  ' Add add the substep to the collection
  mcSubSteps.Add cNewSubStep

  Set cNewSubStep = Nothing

  Exit Sub

CreateSubStepErr:
  ' Log the error code raised by Visual Basic
  Call LogErrors(Errors)
  On Error GoTo 0
  mstrSource = mstrModuleName & "CreateSubStep"
  Err.Raise vbObjectError + errProgramError, mstrSource, _
     LoadResString(errProgramError)

End Sub

Public Function QuerySubStep(ByVal SubStepId As Long) As cSubStep
  ' Retrieves the sub-step record for the passed in sub-step id

  Dim lngIndex As Long

  On Error GoTo QuerySubStepErr

  ' Find the sub-step node with the matching step id
  For lngIndex = 0 To mcSubSteps.Count - 1
     If mcSubSteps(lngIndex).StepId = SubStepId Then
        Set QuerySubStep = mcSubSteps(lngIndex)
        Exit For
     End If
  Next lngIndex

  Exit Function

QuerySubStepErr:
  ' Log the error code raised by Visual Basic
  Call LogErrors(Errors)
  On Error GoTo 0
  mstrSource = mstrModuleName & "QuerySubStep"
  Err.Raise vbObjectError + errNavInstancesFailed, _
        mstrSource, LoadResString(errNavInstancesFailed)
```

```
End Function
Public Property Let AllStarted(ByVal vdata As Boolean)

  'bugmessage "Set All Started to " & vData & " for : " & _
     mstrKey

  mblnNoMoreToStart = vdata

End Property
Public Property Get AllStarted() As Boolean

  AllStarted = mblnNoMoreToStart

End Property
Public Property Let AllComplete(ByVal vdata As Boolean)

  'bugmessage "Set All Complete to " & vData & " for : " & _
     mstrKey

  mblnComplete = vdata

End Property

Public Property Get AllComplete() As Boolean

  AllComplete = mblnComplete

End Property

Public Sub ChildExecuted(mlngStepId As Long)
  ' This procedure is called when a sub-step executes.

  Dim lngIndex As Long

  On Error GoTo ChildExecutedErr

  BugAssert mcStep.StepType = gintManagerStep

  For lngIndex = 0 To mcSubSteps.Count - 1
     If mcSubSteps(lngIndex).StepId = mlngStepId Then
        mcSubSteps(lngIndex).TasksRunning = _
              mcSubSteps(lngIndex).TasksRunning + 1
'         BugMessage "Tasks Running for Step Id : " & _
'               CStr(mcSubSteps(lngIndex).StepId) & _
'               " Instance Id: " & InstanceId & _
'               " = " & mcSubSteps(lngIndex).TasksRunning
        Exit For
     End If
  Next lngIndex

  If lngIndex > mcSubSteps.Count - 1 Then
     ' The child step wasn't found - raise an error
     On Error GoTo 0
     Err.Raise vbObjectError + errInvalidChild, mstrModuleName, _
```

```
            LoadResString(errInvalidChild)
    End If

    Exit Sub

ChildExecutedErr:
    ' Log the error code raised by Visual Basic
    Call LogErrors(Errors)
    On Error GoTo 0
    Err.Raise vbObjectError + errInstanceOpFailed, mstrModuleName & "ChildExecuted", _
          LoadResString(errInstanceOpFailed)

End Sub
Public Sub ChildTerminated(mlngStepId As Long)
    ' This procedure is called when any sub-step process
    ' terminates. Note: The TasksComplete field will be
    ' updated only when all the instances for a sub-step
    ' complete execution.
    Dim lngIndex As Long

    On Error GoTo ChildTerminatedErr

    BugAssert mcStep.StepType = gintManagerStep

    For lngIndex = 0 To mcSubSteps.Count - 1

        If mcSubSteps(lngIndex).StepId = mlngStepId Then
            mcSubSteps(lngIndex).TasksRunning = _
                mcSubSteps(lngIndex).TasksRunning - 1
'           BugMessage "Tasks Running for Step Id : " & _
'                CStr(mcSubSteps(lngIndex).StepId) & _
'                " Instance Id: " & InstanceId & _
'                " = " & mcSubSteps(lngIndex).TasksRunning

            BugAssert mcSubSteps(lngIndex).TasksRunning >= 0, _
                "Tasks running for " & CStr(mlngStepId) & _
                " Instance Id " & InstanceId & " is less than 0."
            Exit For
        End If
    Next lngIndex

    If lngIndex > mcSubSteps.Count - 1 Then
        ' The child step wasn't found - raise an error
        On Error GoTo 0
        Err.Raise errInvalidChild, mstrModuleName & "ChildTerminated", _
            LoadResString(errInvalidChild)
    End If

    Exit Sub

ChildTerminatedErr:
    ' Log the error code raised by Visual Basic
    Call LogErrors(Errors)
    On Error GoTo 0
```

```
  mstrSource = mstrModuleName & "ChildTerminated"
  Err.Raise vbObjectError + errInstanceOpFailed, mstrSource, _
        LoadResString(errInstanceOpFailed)

End Sub
Public Sub ChildCompleted(mlngStepId As Long)
  ' This procedure is called when any a sub-step completes
  ' execution. Note: The TasksComplete field will be
  ' incremented.
  Dim lngIndex As Long

  On Error GoTo ChildCompletedErr

  BugAssert mcStep.StepType = gintManagerStep

  For lngIndex = 0 To mcSubSteps.Count - 1
     BugAssert mcSubSteps(lngIndex).TasksComplete >= 0, _
           "Tasks complete for " & CStr(mcSubSteps(lngIndex).StepId) & _
           " Instance Id " & InstanceId & " is less than 0."

     If mcSubSteps(lngIndex).StepId = mlngStepId Then
        mcSubSteps(lngIndex).TasksComplete = _
              mcSubSteps(lngIndex).TasksComplete + 1
'         BugMessage "Tasks Complete for Step Id : " & _
'               CStr(mcSubSteps(lngIndex).StepId) & _
'               " Instance Id: " & InstanceId & _
'               " = " & mcSubSteps(lngIndex).TasksComplete
        Exit For
     End If
  Next lngIndex

  If lngIndex > mcSubSteps.Count - 1 Then
     ' The child step wasn't found - raise an error
     On Error GoTo 0
     Err.Raise errInvalidChild, mstrModuleName, _
           LoadResString(errInvalidChild)
  End If

  Exit Sub

ChildCompletedErr:
  ' Log the error code raised by Visual Basic
  Call LogErrors(Errors)
  On Error GoTo 0
  Err.Raise vbObjectError + errInstanceOpFailed, mstrModuleName & "ChildCompleted", _
        LoadResString(errInstanceOpFailed)

End Sub
Public Sub ChildDeleted(mlngStepId As Long)
  ' This procedure is called when a sub-step needs to be re-executed
  ' Note: The TasksComplete field is decremented. We needn't worry about
  ' the TasksRunning field since no steps are currently running.
  Dim lngIndex As Long
```

```
  On Error GoTo ChildDeletedErr

  BugAssert mcStep.StepType = gintManagerStep

  For lngIndex = 0 To mcSubSteps.Count - 1

    If mcSubSteps(lngIndex).StepId = mlngStepId Then
      mcSubSteps(lngIndex).TasksRunning = _
          mcSubSteps(lngIndex).TasksRunning - 1

      BugAssert mcSubSteps(lngIndex).TasksRunning >= 0, _
          "Tasks running for " & CStr(mcSubSteps(lngIndex).StepId) & _
          " Instance Id " & InstanceId & " is less than 0."
      Exit For
    End If
  Next lngIndex

  If lngIndex > mcSubSteps.Count - 1 Then
    ' The child step wasn't found - raise an error
    On Error GoTo 0
    Err.Raise errInvalidChild, mstrModuleName, _
        LoadResString(errInvalidChild)
  End If

  Exit Sub

ChildDeletedErr:
  ' Log the error code raised by Visual Basic
  Call LogErrors(Errors)
  On Error GoTo 0
  Err.Raise vbObjectError + errInstanceOpFailed, mstrModuleName & "ChildDeleted", _
      LoadResString(errInstanceOpFailed)

End Sub
Private Sub RaiseErrForWorker()

  If mcStep.StepType <> gintManagerStep Then
    On Error GoTo 0
    mstrSource = mstrModuleName & "RaiseErrForWorker"
    Err.Raise vbObjectError + errInvalidForWorker, _
        mstrSource, _
        LoadResString(errInvalidForWorker)
  End If

End Sub

Public Property Get Step() As cStep

  Set Step = mcStep

End Property
Public Property Get Iterators() As cRunColIt

  Set Iterators = mcIterators
```

```
End Property
Public Property Get SubSteps() As cSubSteps

  Call RaiseErrForWorker

  Set SubSteps = mcSubSteps

End Property
Public Property Set Step(cRunStep As cStep)

  Set mcStep = cRunStep

End Property

Public Property Set Iterators(cIts As cRunColIt)

  Set mcIterators = cIts

End Property
Public Property Get IsPending() As Boolean
  ' Returns true if the step has any substeps that need
  ' execution
  Dim lngIndex As Long
  Dim lngRunning As Long

  Call RaiseErrForWorker

  If Not mblnComplete And Not mblnNoMoreToStart Then
     ' Get a count of all the substeps that are already being
     ' executed
     lngRunning = 0
     For lngIndex = 0 To mcSubSteps.Count - 1
        lngRunning = lngRunning + mcSubSteps(lngIndex).TasksRunning
     Next lngIndex

     IsPending = (lngRunning < DegreeParallelism)
  Else
     ' This should be sufficient to prove that there r no
     ' more sub-steps to be executed.
     ' mblnComplete: Handles the case where all steps have
     ' been executed
     ' mblnNoMoreToStart: Handles the case where the step
     ' has a degree of parallelism greater than the total
     ' number of sub-steps available to execute
     IsPending = False
  End If

End Property
Public Property Get IsRunning() As Boolean
  ' Returns true if the any one of the substeps is still
  ' executing
  Dim lngIndex As Long
```

```
  Call RaiseErrForWorker

  IsRunning = False

  ' If a substep has no currently executing tasks and
  ' the tasks completed is greater than zero, then we can
  ' assume that it has completed execution (otherwise we
  ' would've run a new task the moment one completed!)
  For lngIndex = 0 To mcSubSteps.Count - 1
     If mcSubSteps(lngIndex).TasksRunning > 0 Then
        IsRunning = True
        Exit For
     End If
  Next lngIndex

End Property
Public Property Get TotalRunning() As Long
  ' Returns the total number of substeps that are executing
  Dim lngTotalProcesses As Long
  Dim lngIndex As Long

  Call RaiseErrForWorker

  lngTotalProcesses = 0
  For lngIndex = 0 To mcSubSteps.Count - 1
     BugAssert mcSubSteps(lngIndex).TasksRunning >= 0, _
           "Tasks running for " & CStr(mcSubSteps(lngIndex).StepId) & _
           " is less than 0."
     lngTotalProcesses = lngTotalProcesses + mcSubSteps(lngIndex).TasksRunning
  Next lngIndex

  TotalRunning = lngTotalProcesses
End Property
Public Property Get RunningForStep(lngSubStepId As Long) As Long
  ' Returns the total number of instances of the substep
  ' that are executing
  Dim lngIndex As Long

  Call RaiseErrForWorker

  For lngIndex = 0 To mcSubSteps.Count - 1
     BugAssert mcSubSteps(lngIndex).TasksRunning >= 0, _
           "Tasks running for " & CStr(mcSubSteps(lngIndex).StepId) & _
           " is less than 0."

     If mcSubSteps(lngIndex).StepId = lngSubStepId Then
        RunningForStep = mcSubSteps(lngIndex).TasksRunning
        Exit For
     End If
  Next lngIndex

  If lngIndex > mcSubSteps.Count - 1 Then
     ' The child step wasn't found - raise an error
     On Error GoTo 0
```

```
      Err.Raise errInvalidChild, mstrSource, _
            LoadResString(errInvalidChild)
   End If

End Property

Public Property Let Status(ByVal vdata As InstanceStatus)

   mintStatus = vdata

End Property

Public Property Get Status() As InstanceStatus

   Status = mintStatus

End Property
Private Sub Class_Initialize()

   Set mcSubSteps = New cSubSteps

   mblnNoMoreToStart = False
   mblnComplete = False
   StartTime = gdtmEmpty
   EndTime = gdtmEmpty

End Sub

Private Sub Class_Terminate()

   mcSubSteps.Clear
   Set mcSubSteps = Nothing

End Sub
VERSION 1.0 CLASS
BEGIN
 MultiUse = -1  'True
 Persistable = 0  'NotPersistable
 DataBindingBehavior = 0  'vbNone
 DataSourceBehavior  = 0  'vbNone
 MTSTransactionMode  = 0  'NotAnMTSObject
END
Attribute VB_Name = "cInstances"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
'  FILE:       cInstances.cls
'              Microsoft TPC-H Kit Ver. 2.7.0-1005
'              Copyright Microsoft, 2008
'              All Rights Reserved
'
'
'  PURPOSE:    Implements a collection of cInstance objects.
```

```
'             Type-safe wrapper around cVector.
'             Also contains additional functions to query an instance, etc.
'  Contact:    Reshma Tharamal (reshmat@microsoft.com)
'
Option Explicit

' Used to indicate the source module name when errors
' are raised by this class
Private Const mstrModuleName As String = "cInstance."
Private mstrSource As String

Private mcInstances As cVector

Public Function QueryInstance(ByVal InstanceId As Long) As cInstance
  ' Retrieves the record for the passed in instance from
  ' the collection

  Dim lngIndex As Long

  On Error GoTo QueryInstanceErr

  ' Check for valid values of the instance id
  If InstanceId > 0 Then
     ' Find the run node with the matching step id
     For lngIndex = 0 To Count() - 1
        If mcInstances(lngIndex).InstanceId = InstanceId Then
           Set QueryInstance = mcInstances(lngIndex)
           Exit For
        End If
     Next lngIndex

     If lngIndex > mcInstances.Count - 1 Then
        On Error GoTo 0
        Err.Raise vbObjectError + errQueryFailed, mstrSource, _
              LoadResString(errQueryFailed)
     End If
  Else
     On Error GoTo 0
     Err.Raise vbObjectError + errQueryFailed, mstrSource, _
           LoadResString(errQueryFailed)
  End If

  Exit Function

QueryInstanceErr:
  ' Log the error code raised by Visual Basic
  Call LogErrors(Errors)
  On Error GoTo 0
  mstrSource = mstrModuleName & "QueryInstance"
  Err.Raise vbObjectError + errQueryFailed, _
        mstrSource, LoadResString(errQueryFailed)

End Function
```

```
Public Function QueryPendingInstance(ByVal ParentInstanceId As Long, _
      ByVal lngSubStepId As Long) As cInstance
  ' Retrieves a pending instance for the passed in substep
  ' and the given parent instance id.

  Dim lngIndex As Long

  On Error GoTo QueryPendingInstanceErr

  ' Find the run node with the matching step id
  For lngIndex = 0 To Count() - 1
     If mcInstances(lngIndex).ParentInstanceId = ParentInstanceId And _
           mcInstances(lngIndex).Step.StepId = lngSubStepId Then
        ' Put in a separate if condition since the IsPending
        ' property is valid only for manager steps. If the
        ' calling procedure does not pass a manager step
        ' identifier, the procedure will error out.
        If mcInstances(lngIndex).IsPending Then
           Set QueryPendingInstance = mcInstances(lngIndex)
           Exit For
        End If
     End If
  Next lngIndex

  Exit Function

QueryPendingInstanceErr:
  ' Log the error code raised by Visual Basic
  Call LogErrors(Errors)
  On Error GoTo 0
  mstrSource = mstrModuleName & "QueryPendingInstance"
  Err.Raise vbObjectError + errQueryFailed, _
        mstrSource, LoadResString(errQueryFailed)

End Function
Public Function InstanceAborted(cSubStepRec As cSubStep) As Boolean

  Dim lIndex As Long

  InstanceAborted = False

  For lIndex = 0 To Count() - 1
     If mcInstances(lIndex).Step.StepId = cSubStepRec.StepId And _
           mcInstances(lIndex).Status = gintAborted Then
        InstanceAborted = True
        Exit For
     End If
  Next lIndex

End Function
Public Function CompletedInstanceExists(lParentInstance As Long, _
      cSubStepDtls As cStep) As Boolean
  ' Checks if there is a completed instance of the passed in step
```

```
  Dim lngIndex As Long

  CompletedInstanceExists = False

  If cSubStepDtls.StepType = gintManagerStep Then
     ' Find the run node with the matching step id
     For lngIndex = 0 To Count() - 1
        If mcInstances(lngIndex).ParentInstanceId = lParentInstance And _
              mcInstances(lngIndex).Step.StepId = cSubStepDtls.StepId Then
           ' Put in a separate if condition since the IsPending
           ' property is valid only for manager steps.
           BugAssert (Not mcInstances(lngIndex).IsPending), "Pending instance exists!"

           CompletedInstanceExists = True
           Exit Function
        End If
     Next lngIndex
  End If

End Function
Public Sub Add(ByVal objItem As cInstance)

  mcInstances.Add objItem

End Sub


Public Sub Clear()

  mcInstances.Clear

End Sub


Public Function Count() As Long

  Count = mcInstances.Count

End Function


Public Function Delete(ByVal lngDelete As Long) As cInstance

  Set Delete = mcInstances.Delete(lngDelete)

End Function


Public Property Set Item(Optional ByVal Position As Long, _
     RHS As cInstance)

  If Position = -1 Then
     Position = 0
  End If
```

```
  Set mcInstances(Position) = RHS

End Property

Public Property Get Item(Optional ByVal Position As Long = -1) _
    As cInstance
Attribute Item.VB_UserMemId = 0

  If Position = -1 Then
    Position = 0
  End If
  Set Item = mcInstances.Item(Position)

End Property

Private Sub Class_Initialize()

  Set mcInstances = New cVector

End Sub


Private Sub Class_Terminate()

  Set mcInstances = Nothing

End Sub


VERSION 1.0 CLASS
BEGIN
 MultiUse = -1  'True
 Persistable = 0  'NotPersistable
 DataBindingBehavior = 0  'vbNone
 DataSourceBehavior  = 0  'vbNone
 MTSTransactionMode  = 0  'NotAnMTSObject
END
Attribute VB_Name = "cIterator"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
'  FILE:       cIterator.cls
'              Microsoft TPC-H Kit Ver. 2.7.0-1005
'              Copyright Microsoft, 2008
'              All Rights Reserved
'
'
'  PURPOSE:    Encapsulates the properties and methods of an iterator.
'              Contains functions to insert, update and delete
'              iterator_values records from the database.
'  Contact:    Reshma Tharamal (reshmat@microsoft.com)
'
Option Explicit
```

```
Implements cNode

' Module level variables to store the property values
Private mintType As Integer
Private mintSequenceNo As Integer
Private mstrValue As String
Private mdbsIteratorDB As Database
Private mintOperation As Integer
Private mlngPosition As Long

Private Const mstrModuleName As String = "cIterator."
Private mstrSource As String

Public Enum ValueType
  gintFrom = 1
  gintTo
  gintStep
  gintValue
End Enum
Public Property Get Value() As String

  Value = mstrValue

End Property
Public Property Let Value(ByVal vdata As String)

  mstrValue = vdata

End Property

Public Property Get IndOperation() As Operation

  IndOperation = mintOperation

End Property
Public Property Let IndOperation(ByVal vdata As Operation)

  On Error GoTo IndOperationErr
  mstrSource = mstrModuleName & "IndOperation"

  ' The valid operations are define in the cOperations
  ' class. Check if the operation is valid
  Select Case vdata
     Case QueryOp, InsertOp, UpdateOp, DeleteOp
        mintOperation = vdata

     Case Else
        On Error GoTo 0
        Err.Raise vbObjectError + errInvalidOperation, _
              mstrSource, LoadResString(errInvalidOperation)
  End Select

  Exit Property
```

```
IndOperationErr:
  LogErrors Errors
  mstrSource = mstrModuleName & "IndOperation"
  On Error GoTo 0
  Err.Raise vbObjectError + errLetOperationFailed, _
     mstrSource, LoadResString(errLetOperationFailed)

End Property

Public Function Clone() As cIterator

  ' Creates a copy of a given Iterator

  Dim cItClone As cIterator

  On Error GoTo CloneErr

  Set cItClone = New cIterator

  ' Copy all the iterator properties to the newly
  ' created object
  cItClone.IteratorType = mintType
  cItClone.SequenceNo = mintSequenceNo
  cItClone.IndOperation = mintOperation
  cItClone.Value = mstrValue

  ' And set the return value to the newly created Iterator
  Set Clone = cItClone

  Exit Function

CloneErr:
  LogErrors Errors
  mstrSource = mstrModuleName & "Clone"
  On Error GoTo 0
  Err.Raise vbObjectError + errCloneFailed, _
        mstrSource, LoadResString(errCloneFailed)

End Function
Public Property Get SequenceNo() As Integer

  SequenceNo = mintSequenceNo

End Property

Public Property Let SequenceNo(ByVal vdata As Integer)
  mintSequenceNo = vdata
End Property

Public Sub Add(ByVal lngStepId As Long, _
     strVersion As String)
  ' Inserts a new iterator values record into the database
```

```
  Dim strInsert As String
  Dim qy As DAO.QueryDef

  On Error GoTo AddIteratorErr

  ' First check if the database object is valid
  Call CheckDB

  ' Create a temporary querydef object
  strInsert = "insert into iterator_values " & _
        "( step_id, version_no, type, " & _
        " iterator_value, sequence_no ) " & _
        " values ( [st_id], [ver_no], [it_typ], " & _
        " [it_val], [seq_no] )"
  Set qy = mdbsIteratorDB.CreateQueryDef(gstrEmptyString, strInsert)

  ' Call a procedure to execute the Querydef object
  Call AssignParameters(qy, lngStepId, strVersion)

  qy.Execute dbFailOnError
  qy.Close

  Exit Sub

AddIteratorErr:
  LogErrors Errors
  mstrSource = mstrModuleName & "AddIterator"
  On Error GoTo 0
  Err.Raise vbObjectError + errInsertIteratorFailed, _
        mstrSource, _
        LoadResString(errInsertIteratorFailed)
End Sub

Private Sub AssignParameters(qyExec As DAO.QueryDef, _
      ByVal lngStepId As Long, _
      strVersion As String)
  ' Assigns values to the parameters in the querydef object
  ' The parameter names are cryptic to make them different
  ' from the field names. When the parameter names are
  ' the same as the field names, parameters in the where
  ' clause do not get created.

  Dim prmParam As DAO.Parameter

  On Error GoTo AssignParametersErr
  mstrSource = mstrModuleName & "AssignParameters"

  For Each prmParam In qyExec.Parameters
     Select Case prmParam.Name
        Case "[st_id]"
           prmParam.Value = lngStepId

        Case "[ver_no]"
           prmParam.Value = strVersion
```

```
        Case "[it_typ]"
           prmParam.Value = mintType

        Case "[it_val]"
           prmParam.Value = mstrValue

        Case "[seq_no]"
           prmParam.Value = mintSequenceNo

        Case Else
           ' Write the parameter name that is faulty
           WriteError errInvalidParameter, mstrSource, _
                 prmParam.Name
           On Error GoTo 0
           Err.Raise errInvalidParameter, mstrSource, _
                 LoadResString(errInvalidParameter)
     End Select
  Next prmParam

  Exit Sub

AssignParametersErr:

  mstrSource = mstrModuleName & "AssignParameters"
  Call LogErrors(Errors)
  On Error GoTo 0
  Err.Raise vbObjectError + errAssignParametersFailed, _
     mstrSource, LoadResString(errAssignParametersFailed)

End Sub
Private Sub CheckDB()
  ' Check if the database object has been initialized

  If mdbsIteratorDB Is Nothing Then
     ShowError errInvalidDB
     On Error GoTo 0
     Err.Raise vbObjectError + errInvalidDB, _
        mstrModuleName, LoadResString(errInvalidDB)
  End If

End Sub

Public Sub Delete(ByVal lngStepId As Long, _
     strVersion As String)
  ' Deletes the step iterator record from the database

  Dim strDelete As String
  Dim qy As DAO.QueryDef

  On Error GoTo DeleteIteratorErr
  mstrSource = mstrModuleName & "DeleteIterator"

  ' There can be multiple iterators for a step.
```

```
  ' However the values that an iterator for a step can
  ' assume will be unique, meaning that a combination of
  ' the iterator_id and value will be unique.
  strDelete = "delete from iterator_values " & _
        " where step_id = [st_id]" & _
        " and version_no = [ver_no]" & _
        " and iterator_value = [it_val] "
  Set qy = mdbsIteratorDB.CreateQueryDef(gstrEmptyString, strDelete)

  Call AssignParameters(qy, lngStepId, strVersion)
  qy.Execute dbFailOnError

  qy.Close

  Exit Sub

DeleteIteratorErr:
  LogErrors Errors
  mstrSource = mstrModuleName & "DeleteIterator"
  On Error GoTo 0
  Err.Raise vbObjectError + errDeleteIteratorFailed, _
        mstrSource, _
        LoadResString(errDeleteIteratorFailed)
End Sub
Public Sub Update(ByVal lngStepId As Long, strVersion As String)
  ' Updates the sequence no of the step iterator record
  ' in the database

  Dim strUpdate As String
  Dim qy As QueryDef

  On Error GoTo UpdateErr

  ' First check if the database object is valid
  Call CheckDB

  If mintType = gintValue Then
     ' If the iterator is of type value, only the sequence of the values can get updated
     strUpdate = "Update iterator_values " & _
           " set sequence_no = [seq_no] " & _
           " where step_id = [st_id]" & _
           " and version_no = [ver_no]" & _
           " and iterator_value = [it_val] "
  Else
     ' If the iterator is of type range, only the values can get updated
     strUpdate = "Update iterator_values " & _
           " set iterator_value = [it_val] " & _
           " where step_id = [st_id]" & _
           " and version_no = [ver_no]" & _
           " and type = [it_typ] "
  End If

  Set qy = mdbsIteratorDB.CreateQueryDef(gstrEmptyString, strUpdate)
```

```
  ' Call a procedure to assign the parameter values to the
  ' querydef object
  Call AssignParameters(qy, lngStepId, strVersion)
  qy.Execute dbFailOnError

  qy.Close

  Exit Sub

UpdateErr:
  LogErrors Errors
  mstrSource = mstrModuleName & "Update"
  On Error GoTo 0
  Err.Raise vbObjectError + errUpdateConstraintFailed, _
        mstrSource, _
        LoadResString(errUpdateConstraintFailed)

End Sub
Public Property Set NodeDB(vdata As Database)

  Set mdbsIteratorDB = vdata

End Property

Public Property Get NodeDB() As Database

  Set NodeDB = mdbsIteratorDB

End Property
Public Property Get Position() As Long

  Position = mlngPosition

End Property
Public Property Let Position(ByVal vdata As Long)

  mlngPosition = vdata

End Property

Public Property Let IteratorType(ByVal vdata As ValueType)

  On Error GoTo TypeErr
  mstrSource = mstrModuleName & "Type"

  ' These constants have been defined in the enumeration,
  ' Type, which is exposed
  Select Case vdata
     Case gintFrom, gintTo, gintStep, gintValue
        mintType = vdata

     Case Else
        On Error GoTo 0
        Err.Raise vbObjectError + errTypeInvalid, _
```

```
            mstrSource, LoadResString(errTypeInvalid)
  End Select

  Exit Property

TypeErr:
  LogErrors Errors
  mstrSource = mstrModuleName & "Type"
  On Error GoTo 0
  Err.Raise vbObjectError + errTypeInvalid, _
     mstrSource, LoadResString(errTypeInvalid)

End Property

Public Property Get IteratorType() As ValueType

  IteratorType = mintType

End Property
Public Sub Validate()

  ' No validations necessary for the iterator class

End Sub

Private Sub Class_Initialize()

  ' Initialize the operation indicator variable to Query
  ' It will be modified later by the collection class when
  ' inserts, updates or deletes are performed
  mintOperation = QueryOp

End Sub


Private Property Let cNode_IndOperation(ByVal vdata As Operation)

  On Error GoTo IndOperationErr
  mstrSource = mstrModuleName & "IndOperation"

  ' The valid operations are define in the cOperations
  ' class. Check if the operation is valid
  Select Case vdata
     Case QueryOp, InsertOp, UpdateOp, DeleteOp
        mintOperation = vdata

     Case Else
        On Error GoTo 0
        Err.Raise vbObjectError + errInvalidOperation, _
              mstrSource, LoadResString(errInvalidOperation)
  End Select

  Exit Property
```

```
IndOperationErr:
  LogErrors Errors
  mstrSource = mstrModuleName & "IndOperation"
  On Error GoTo 0
  Err.Raise vbObjectError + errLetOperationFailed, _
     mstrSource, LoadResString(errLetOperationFailed)

End Property

Private Property Get cNode_IndOperation() As Operation

  IndOperation = mintOperation

End Property

Private Property Set cNode_NodeDB(RHS As DAO.Database)

  Set mdbsIteratorDB = RHS

End Property

Private Property Get cNode_NodeDB() As DAO.Database

  Set cNode_NodeDB = mdbsIteratorDB

End Property


Private Property Let cNode_Position(ByVal vdata As Long)

  mlngPosition = vdata

End Property


Private Property Get cNode_Position() As Long

  cNode_Position = mlngPosition

End Property


Private Sub cNode_Validate()

  ' No validations necessary for the iterator class

End Sub


Private Property Let cNode_Value(ByVal vdata As String)

  mstrValue = vdata

End Property
```

```
Private Property Get cNode_Value() As String

   Value = mstrValue

End Property
VERSION 1.0 CLASS
BEGIN
 MultiUse = -1  'True
 Persistable = 0  'NotPersistable
 DataBindingBehavior = 0  'vbNone
 DataSourceBehavior  = 0  'vbNone
 MTSTransactionMode  = 0  'NotAnMTSObject
END
Attribute VB_Name = "cManager"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
'  FILE:       cManager.cls
'              Microsoft TPC-H Kit Ver. 2.7.0-1005
'              Copyright Microsoft, 2008
'              All Rights Reserved
'
'
'  PURPOSE:    Encapsulates the properties and methods of a manager step.
'              Implements the cStep class - carries out initializations
'              and validations that are specific to manager steps.
'  Contact:    Reshma Tharamal (reshmat@microsoft.com)
'
Option Explicit

Implements cStep

' Object variable to keep the step reference in
Private mcStep As cStep

' Used to indicate the source module name when errors
' are raised by this class
Private mstrSource As String
Private Const mstrModuleName As String = "cManager."
Private Sub cStep_AddAllIterators()

   Call mcStep.AddAllIterators

End Sub

Private Property Let cStep_StartDir(ByVal RHS As String)

   mcStep.StartDir = RHS

End Property

Private Property Get cStep_StartDir() As String
```

```
  cStep_StartDir = mcStep.StartDir

End Property
Private Sub cStep_Delete()

  Call mcStep.Delete

End Sub

Private Property Set cStep_NodeDB(RHS As DAO.Database)

  Set mcStep.NodeDB = RHS

End Property

Private Function cStep_IncVersionY() As String

  cStep_IncVersionY = mcStep.IncVersionY

End Function
Private Function cStep_IsNewVersion() As Boolean
  cStep_IsNewVersion = mcStep.IsNewVersion
End Function
Private Function cStep_OldVersionNo() As String
  cStep_OldVersionNo = mcStep.OldVersionNo
End Function

Private Function cStep_IncVersionX() As String

  cStep_IncVersionX = mcStep.IncVersionX

End Function
Private Sub cStep_UpdateIteratorVersion()

  Call mcStep.UpdateIteratorVersion

End Sub

Private Function cStep_IteratorCount() As Long

  cStep_IteratorCount = mcStep.IteratorCount

End Function

Private Sub cStep_UnloadIterators()

  Call mcStep.UnloadIterators

End Sub

Private Sub cStep_DeleteIterator(cItRecord As cIterator)

  Call mcStep.DeleteIterator(cItRecord)
```

```
End Sub
Private Property Get cStep_IteratorName() As String

  cStep_IteratorName = mcStep.IteratorName

End Property
Private Property Let cStep_IteratorName(ByVal RHS As String)

  mcStep.IteratorName = RHS

End Property

Private Sub cStep_SaveIterators()

  Call mcStep.SaveIterators

End Sub
Private Sub cStep_LoadIterator(cItRecord As cIterator)

  Call mcStep.LoadIterator(cItRecord)

End Sub

Private Property Let cStep_Position(ByVal RHS As Long)

  mcStep.Position = RHS

End Property
Private Sub cStep_InsertIterator(cItRecord As cIterator)

  Call mcStep.InsertIterator(cItRecord)

End Sub
Private Function cStep_Iterators() As Variant

  cStep_Iterators = mcStep.Iterators

End Function
Private Sub cStep_ModifyIterator(cItRecord As cIterator)

  Call mcStep.ModifyIterator(cItRecord)

End Sub
Private Sub cStep_RemoveIterator(cItRecord As cIterator)

  Call mcStep.RemoveIterator(cItRecord)

End Sub
Private Sub cStep_UpdateIterator(cItRecord As cIterator)

  Call mcStep.UpdateIterator(cItRecord)

End Sub
```

```
Private Sub cStep_AddIterator(cItRecord As cIterator)

  Call mcStep.AddIterator(cItRecord)

End Sub

Private Property Get cStep_Position() As Long

  cStep_Position = mcStep.Position

End Property

Private Function cStep_Clone(Optional cCloneStep As cStep) As cStep

  Dim cNewManager As cManager

  Set cNewManager = New cManager
  Set cStep_Clone = mcStep.Clone(cNewManager)

End Function

Private Property Get cStep_IndOperation() As Operation

  cStep_IndOperation = mcStep.IndOperation

End Property

Private Property Let cStep_IndOperation(ByVal RHS As Operation)

  mcStep.IndOperation = RHS

End Property

Private Property Get cStep_NextStepId() As Long

  cStep_NextStepId = mcStep.NextStepId

End Property

Private Property Let cStep_OutputFile(ByVal RHS As String)

  mcStep.OutputFile = RHS

End Property

Private Property Get cStep_OutputFile() As String

  cStep_OutputFile = mcStep.OutputFile

End Property

Private Property Let cStep_ErrorFile(ByVal RHS As String)

  mcStep.ErrorFile = RHS
```

```
End Property

Private Property Get cStep_ErrorFile() As String

  cStep_ErrorFile = mcStep.ErrorFile

End Property
'Private Property Let cStep_LogFile(ByVal RHS As String)
'
'    mcStep.LogFile = RHS
'
'End Property
'
'Private Property Get cStep_LogFile() As String
'
'    cStep_LogFile = mcStep.LogFile
'
'End Property

Private Property Let cStep_ArchivedFlag(ByVal RHS As Boolean)

  mcStep.ArchivedFlag = RHS

End Property

Private Property Get cStep_ArchivedFlag() As Boolean

  cStep_ArchivedFlag = mcStep.ArchivedFlag

End Property

Private Property Get cStep_NodeDB() As DAO.Database

  Set cStep_NodeDB = mcStep.NodeDB

End Property

Private Sub Class_Initialize()

  ' Create the object
  Set mcStep = New cStep

  ' Initialize the object with valid values for a manager step
  ' The global flag should be the first field to be initialized
  ' since subsequent validations might try to check if the
  ' step being created is global
  mcStep.GlobalFlag = False
'   mcStep.GlobalRunMethod = gintNoOption
  mcStep.StepType = gintManagerStep

  ' Since the manager step does not take any action, the step
  ' text and file name will always be empty
  mcStep.StepText = gstrEmptyString
```

```
  mcStep.StepTextFile = gstrEmptyString

  ' Since the manager step does not take any action, execution
  ' properties for the step will be empty
  mcStep.ExecutionMechanism = gintNoOption
  mcStep.FailureDetails = gstrEmptyString
  mcStep.ContinuationCriteria = gintNoOption

End Sub
Private Sub Class_Terminate()

  ' Remove the step object
  Set mcStep = Nothing

End Sub
Private Sub cStep_Add()

  ' Call the Add method of the step class to carry out the insert
  mcStep.Add

End Sub
Private Property Get cStep_ContinuationCriteria() As ContinuationCriteria

  cStep_ContinuationCriteria = mcStep.ContinuationCriteria

End Property

Private Property Let cStep_ContinuationCriteria(ByVal RHS As ContinuationCriteria)

  ' Since a manager step cannot take any action, the continuation
  ' criteria property does not apply to it
  mcStep.ContinuationCriteria = gintNoOption

End Property

Private Property Let cStep_DegreeParallelism(ByVal RHS As String)

  mcStep.DegreeParallelism = RHS

End Property

Private Property Get cStep_DegreeParallelism() As String

  cStep_DegreeParallelism = mcStep.DegreeParallelism

End Property

Private Sub cStep_DeleteStep()

  On Error GoTo cStep_DeleteStepErr
  mstrSource = mstrModuleName & "cStep_DeleteStep"

  mcStep.Delete
  Exit Sub
```

```
cStep_DeleteStepErr:
  LogErrors Errors
  mstrSource = mstrModuleName & "cStep_DeleteStep"
  On Error GoTo 0
  Err.Raise vbObjectError + errDeleteStepFailed, _
        mstrSource, _
        LoadResString(errDeleteStepFailed)

End Sub

Private Property Get cStep_EnabledFlag() As Boolean

  cStep_EnabledFlag = mcStep.EnabledFlag

End Property

Private Property Let cStep_EnabledFlag(ByVal RHS As Boolean)

  mcStep.EnabledFlag = RHS

End Property

Private Property Let cStep_ExecutionMechanism(ByVal RHS As ExecutionMethod)

  ' Since a manager step cannot take any action, the Execution
  ' Mechanism property does not apply to it
  mcStep.ExecutionMechanism = gintNoOption

End Property

Private Property Get cStep_ExecutionMechanism() As ExecutionMethod

  cStep_ExecutionMechanism = mcStep.ExecutionMechanism

End Property

Private Property Let cStep_FailureDetails(ByVal RHS As String)

  ' Since a manager step cannot take any action, the Failure
  ' Details property does not apply to it
  mcStep.FailureDetails = gstrEmptyString

End Property

Private Property Get cStep_FailureDetails() As String

  cStep_FailureDetails = mcStep.FailureDetails

End Property

Private Property Get cStep_GlobalFlag() As Boolean

  cStep_GlobalFlag = mcStep.GlobalFlag
```

```
End Property

Private Property Let cStep_GlobalFlag(ByVal RHS As Boolean)

  ' Set the global flag to false - this flag is initialized when
  ' an instance of the class is created. Just making sure that
  ' nobody changes the value inadvertently
  mcStep.GlobalFlag = False

End Property
Private Sub cStep_Modify()

  ' Call the Modify method of the step class to carry out the update
  mcStep.Modify

End Sub

Private Property Let cStep_ParentStepId(ByVal RHS As Long)

  mcStep.ParentStepId = RHS

End Property

Private Property Get cStep_ParentStepId() As Long

  cStep_ParentStepId = mcStep.ParentStepId

End Property

Private Property Let cStep_ParentVersionNo(ByVal RHS As String)

  mcStep.ParentVersionNo = RHS

End Property

Private Property Get cStep_ParentVersionNo() As String

  cStep_ParentVersionNo = mcStep.ParentVersionNo

End Property

Private Property Let cStep_SequenceNo(ByVal RHS As Integer)

  mcStep.SequenceNo = RHS

End Property

Private Property Get cStep_SequenceNo() As Integer

  cStep_SequenceNo = mcStep.SequenceNo

End Property
```

```
Private Property Let cStep_StepId(ByVal RHS As Long)
  mcStep.StepId = RHS
End Property
Private Property Get cStep_StepId() As Long
  cStep_StepId = mcStep.StepId
End Property

Private Property Let cStep_StepLabel(ByVal RHS As String)
  mcStep.StepLabel = RHS
End Property
Private Property Get cStep_StepLabel() As String
  cStep_StepLabel = mcStep.StepLabel
End Property

Private Property Let cStep_StepLevel(ByVal RHS As Integer)
  mcStep.StepLevel = RHS
End Property
Private Property Get cStep_StepLevel() As Integer
  cStep_StepLevel = mcStep.StepLevel
End Property
Private Property Let cStep_StepText(ByVal RHS As String)
  ' Since the manager step does not take any action, the step
  ' text and file name will always be empty
  mcStep.StepText = gstrEmptyString
End Property
Private Property Get cStep_StepText() As String
  cStep_StepText = mcStep.StepText
End Property
Private Property Let cStep_StepTextFile(ByVal RHS As String)
```

```
  ' Since the manager step does not take any action, the step
  ' text and file name will always be empty
  mcStep.StepTextFile = gstrEmptyString

End Property

Private Property Get cStep_StepTextFile() As String

  cStep_StepTextFile = mcStep.StepTextFile

End Property

Private Property Let cStep_StepType(RHS As gintStepType)

  mcStep.StepType = gintManagerStep

End Property

Private Property Get cStep_StepType() As gintStepType

  cStep_StepType = mcStep.StepType

End Property

Private Sub cStep_Validate()
  ' The validate routines for each of the steps will
  ' carry out the specific validations for the type and
  ' call the generic validation routine

  On Error GoTo cStep_ValidateErr
  mstrSource = mstrModuleName & "cStep_Validate"

  ' Validations specific to manager steps

  ' Check if the step text or a file name has been
  ' specified
  If Not StringEmpty(mcStep.StepText) Or Not StringEmpty(mcStep.StepTextFile) Then
     ShowError errTextAndFileNullForManager
     On Error GoTo 0
     Err.Raise vbObjectError + errValidateFailed, _
           gstrSource, _
           LoadResString(errValidateFailed)
  End If

  If mcStep.ExecutionMechanism <> gintNoOption Then
     ShowError errExecutionMechanismInvalid
     On Error GoTo 0
     Err.Raise vbObjectError + errValidateFailed, _
           gstrSource, _
           LoadResString(errValidateFailed)
  End If

  If mcStep.FailureDetails <> gstrEmptyString Then
     ShowError errFailureDetailsNullForMgr
```

```
      On Error GoTo 0
      Err.Raise vbObjectError + errValidateFailed, _
            gstrSource, _
            LoadResString(errValidateFailed)
   End If

   If mcStep.ContinuationCriteria <> gintNoOption Then
      ShowError errContCriteriaInvalid
      On Error GoTo 0
      Err.Raise vbObjectError + errValidateFailed, _
            gstrSource, _
            LoadResString(errValidateFailed)
   End If

   mcStep.Validate

   Exit Sub

cStep_ValidateErr:
   LogErrors Errors
   mstrSource = mstrModuleName & "cStep_Validate"
   On Error GoTo 0
   Err.Raise vbObjectError + errValidateFailed, _
         mstrSource, _
         LoadResString(errValidateFailed)
End Sub

Private Property Let cStep_VersionNo(ByVal RHS As String)

   mcStep.VersionNo = RHS

End Property

Private Property Get cStep_VersionNo() As String

   cStep_VersionNo = mcStep.VersionNo

End Property

Private Property Let cStep_WorkspaceId(ByVal RHS As Long)

   mcStep.WorkspaceId = RHS

End Property

Private Property Get cStep_WorkspaceId() As Long

   cStep_WorkspaceId = mcStep.WorkspaceId

End Property
VERSION 1.0 CLASS
BEGIN
 MultiUse = -1  'True
 Persistable = 0  'NotPersistable
```

```
 DataBindingBehavior = 0  'vbNone
 DataSourceBehavior  = 0  'vbNone
 MTSTransactionMode  = 0  'NotAnMTSObject
END
Attribute VB_Name = "cNode"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
'  FILE:       cNode.cls
'              Microsoft TPC-H Kit Ver. 2.7.0-1005
'              Copyright Microsoft, 2008
'              All Rights Reserved
'
'
'  PURPOSE:    Defines the properties that an object has to implement.
'  Contact:    Reshma Tharamal (reshmat@microsoft.com)
'
Option Explicit

Public Property Get IndOperation() As Operation
End Property
Public Property Let IndOperation(ByVal vdata As Operation)
End Property
Public Sub Validate()
End Sub
Public Property Get Value() As String
End Property
Public Property Let Value(ByVal vdata As String)
End Property

Public Property Get NodeDB() As Database
End Property
Public Property Set NodeDB(vdata As Database)
End Property

Public Property Get Position() As Long
End Property
Public Property Let Position(ByVal vdata As Long)
End Property

VERSION 1.0 CLASS
BEGIN
 MultiUse = -1  'True
 Persistable = 0  'NotPersistable
 DataBindingBehavior = 0  'vbNone
 DataSourceBehavior  = 0  'vbNone
 MTSTransactionMode  = 0  'NotAnMTSObject
END
Attribute VB_Name = "cNodeCollections"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
```

```
'  FILE:      cNodeCollections.cls
'             Microsoft TPC-H Kit Ver. 2.7.0-1005
'             Copyright Microsoft, 2008
'             All Rights Reserved
'
'
'  PURPOSE:    Implements an array of objects.
'  Contact:    Reshma Tharamal (reshmat@microsoft.com)
'
Option Explicit

' Node counter
Private mlngNodeCount As Long
Private mdbsNodeDb As Database
Private mcarrNodes() As Object

' Used to indicate the source module name when errors
' are raised by this class
Private mstrSource As String
Private Const mstrModuleName As String = "cNodeCollections."

Public Property Set Item(ByVal Position As Long, _
      ByVal objNode As Object)

   ' Returns the element at the passed in position in the array
   If Position >= 0 And Position < mlngNodeCount Then
      Set mcarrNodes(Position) = objNode
   Else
      On Error GoTo 0
      Err.Raise vbObjectError + errItemDoesNotExist, mstrSource, _
         LoadResString(errItemDoesNotExist)
   End If

End Property
Public Property Get Item(ByVal Position As Long) As Object
Attribute Item.VB_UserMemId = 0

   ' Returns the element at the passed in position in the array
   If Position >= 0 And Position < mlngNodeCount Then
      Set Item = mcarrNodes(Position)
   Else
      On Error GoTo 0
      Err.Raise vbObjectError + errItemDoesNotExist, mstrSource, _
         LoadResString(errItemDoesNotExist)
   End If

End Property

Public Sub Commit(ByVal cSaveObj As Object, _
      ByVal lngIndex As Long)
   ' This procedure checks if any changes have been made to the
   ' passed in object. If so, it calls the corresponding method
   ' to commit the changes.
```

```
  On Error GoTo CommitErr
  mstrSource = mstrModuleName & "Commit"

  Select Case cSaveObj.IndOperation
     Case QueryOp
        ' No changes were made to the queried parameter.
        ' Do nothing

     Case InsertOp
        cSaveObj.Add
        cSaveObj.IndOperation = QueryOp

     Case UpdateOp
        cSaveObj.Modify
        cSaveObj.IndOperation = QueryOp

     Case DeleteOp
        cSaveObj.Delete
        ' Now we can remove the record from the array
        Call Unload(lngIndex)

  End Select

  Exit Sub

CommitErr:
  LogErrors Errors
  mstrSource = mstrModuleName & "Commit"
  On Error GoTo 0
  Err.Raise vbObjectError + errCommitFailed, _
        mstrSource, _
        LoadResString(errCommitFailed)

End Sub
Public Sub Save(ByVal lngWorkspace As Long)
  ' Calls a procedure to commit all changes for the passed
  ' in workspace.

  Dim lngIndex As Long

  On Error GoTo SaveErr

  ' Find all parameters in the array with a matching workspace id
  ' It is important to step backwards through the array, since
  ' we delete parameter records as we go along!
  For lngIndex = mlngNodeCount - 1 To 0 Step -1
     If mcarrNodes(lngIndex).WorkspaceId = lngWorkspace Then

        ' Call a procedure to commit all changes to the
        ' parameter record, if any
        Call Commit(mcarrNodes(lngIndex), lngIndex)

     End If
  Next lngIndex
```

```
  Exit Sub

SaveErr:
  LogErrors Errors
  mstrSource = mstrModuleName & "Save"
  On Error GoTo 0
  Err.Raise vbObjectError + errSaveFailed, _
        mstrSource, _
        LoadResString(errSaveFailed)

End Sub
Public Property Get Count() As Long

  Count = mlngNodeCount

End Property

Public Property Get NodeDB() As Database

  Set NodeDB = mdbsNodeDb

End Property
Public Property Set NodeDB(vdata As Database)

  Set mdbsNodeDb = vdata

End Property

Public Sub Load(cNodeToLoad As Object)
  ' Adds the passed in object to the array

  On Error GoTo LoadErr

  ' If this procedure is called by the add to array procedure,
  ' the database object has already been initialized
  If cNodeToLoad.NodeDB Is Nothing Then

     ' All the Nodes will be initialized with the database
     ' objects before being added to the array
     Set cNodeToLoad.NodeDB = mdbsNodeDb

  End If

  ReDim Preserve mcarrNodes(mlngNodeCount)

  ' Set the newly added element in the array to the passed in Node
  cNodeToLoad.Position = mlngNodeCount
  Set mcarrNodes(mlngNodeCount) = cNodeToLoad

  mlngNodeCount = mlngNodeCount + 1

  Exit Sub
```

```
LoadErr:
  LogErrors Errors
  On Error GoTo 0
  Err.Raise vbObjectError + errLoadFailed, mstrModuleName & "Load", _
        LoadResString(errLoadFailed)

End Sub
Public Sub Unload(lngDeletePosition As Long)
  ' Unloads the passed in object from the array

  On Error GoTo UnloadErr

  If lngDeletePosition < (mlngNodeCount - 1) Then

     ' Set the Node at the position being deleted to
     ' the last Node in the Node array
     Set mcarrNodes(lngDeletePosition) = mcarrNodes(mlngNodeCount - 1)
     mcarrNodes(lngDeletePosition).Position = lngDeletePosition
  End If

  ' Delete the last Node from the array
  mlngNodeCount = mlngNodeCount - 1
  If mlngNodeCount > 0 Then
     ReDim Preserve mcarrNodes(0 To mlngNodeCount - 1)
  Else
     ReDim mcarrNodes(0)
  End If

  Exit Sub

UnloadErr:
  LogErrors Errors
  mstrSource = mstrModuleName & "Unload"
  On Error GoTo 0
  Err.Raise vbObjectError + errUnloadFailed, _
        mstrSource, _
        LoadResString(errUnloadFailed)

End Sub
Public Sub Delete(lngDeletePosition As Long)
  ' Deletes the object at the specified position in the
  ' array

  Dim cDeleteObj As Object

  On Error GoTo DeleteErr
  mstrSource = mstrModuleName & "Delete"

  Set cDeleteObj = mcarrNodes(lngDeletePosition)

  If cDeleteObj.IndOperation = InsertOp Then
     ' If we are deleting a record that has just been inserted,
     ' blow it away
     Call Unload(lngDeletePosition)
```

```
  Else
     ' Set the operation for the deleted object to indicate a
     ' delete - we actually delete the element only at the time
     ' of a save operation
     cDeleteObj.IndOperation = DeleteOp
  End If

  Exit Sub

DeleteErr:
  LogErrors Errors
  mstrSource = mstrModuleName & "Delete"
  On Error GoTo 0
  Err.Raise vbObjectError + errDeleteFailed, _
        mstrSource, _
        LoadResString(errDeleteFailed)

End Sub
Public Sub Modify(cModifiedNode As Object)
  ' Sets the object at the passed in position to the
  ' modified object passed in

  On Error GoTo ModifyErr

  ' First check if the record is valid - all objects that
  ' use this collection class must have a Validate routine
  cModifiedNode.Validate

  ' If we are updating a record that hasn't yet been inserted,
  ' do not change the operation indicator - or we try to update
  ' a non-existant record
  If cModifiedNode.IndOperation <> InsertOp Then
     ' Set the operations to indicate an update
     cModifiedNode.IndOperation = UpdateOp
  End If

  ' Modify the object at the queried position - the Position
  ' will be maintained by this class
  Set mcarrNodes(cModifiedNode.Position) = cModifiedNode

  Exit Sub

ModifyErr:
  LogErrors Errors
  mstrSource = mstrModuleName & "Modify"
  On Error GoTo 0
  Err.Raise vbObjectError + errModifyFailed, _
        mstrSource, _
        LoadResString(errModifyFailed)

End Sub
Public Sub Add(cNodeToAdd As Object)

  On Error GoTo AddErr
```

```
    Set cNodeToAdd.NodeDB = mdbsNodeDb

    ' First check if the record is valid
    cNodeToAdd.Validate

    ' Set the operation to indicate an insert
    cNodeToAdd.IndOperation = InsertOp

    ' Call a procedure to load the record in the array
    Call Load(cNodeToAdd)

    Exit Sub

AddErr:
    LogErrors Errors
    mstrSource = mstrModuleName & "Add"
    On Error GoTo 0
    Err.Raise vbObjectError + errAddFailed, _
          mstrSource, _
          LoadResString(errAddFailed)

End Sub

Private Sub Class_Terminate()

    ReDim mcarrNodes(0)
    mlngNodeCount = 0

End Sub


Attribute VB_Name = "Common"
'  FILE:      Common.bas
'             Microsoft TPC-H Kit Ver. 2.7.0-1005
'             Copyright Microsoft, 2008
'             All Rights Reserved
'
'
'  PURPOSE:    Module containing common functionality throughout
'             StepMaster
'  Contact:    Reshma Tharamal (reshmat@microsoft.com)
'
Option Explicit

Private Const mstrModuleName As String = "Common."

' Used to separate the variable data from the constant error
' message being raised when a context-sensitive error is displayed
Private Const mintDelimiter As String = " : "
Private Const mstrFormatString = "mmddyy"

' Identifiers for the different labels that need to be loaded
' into the tree view for each workspace
```

```
Public Const mstrWorkspacePrefix = "W"
Public Const mstrParameterPrefix = "P"
Public Const mstrParamConnectionPrefix = "C"
Public Const mstrConnectionDtlPrefix = "N"
Public Const mstrParamExtensionPrefix = "E"
Public Const mstrParamBuiltInPrefix = "B"
Public Const gstrGlobalStepPrefix = "G"
Public Const gstrManagerStepPrefix = "M"
Public Const gstrWorkerStepPrefix = "S"
Public Const gstrDummyPrefix = "D"
Public Const mstrLabelPrefix = "L"
Public Const mstrInstancePrefix = "I"
Public Function LabelStep(lngWorkspaceIdentifier As Long) As String
  ' Returns the step label for the workspace identifier passed in
  ' Basically this is a wrapper around the MakeKeyValid function

  LabelStep = MakeKeyValid(gintStepLabel, gintStepLabel, lngWorkspaceIdentifier)

End Function


Public Function JulianDateToString(dt64Bit As Currency) As String

  Dim lYear As Long
  Dim lMonth As Long
  Dim lDay As Long
  Dim lHour As Long
  Dim lMin As Long
  Dim lSec As Long
  Dim lMs As Long

  Call JulianToTime(dt64Bit, lYear, lMonth, lDay, lHour, lMin, lSec, lMs)
  JulianDateToString = Format$(lYear, gsYearFormat) & gsDateSeparator & _
        Format$(lMonth, gsDtFormat) & gsDateSeparator & _
        Format$(lDay, gsDtFormat) & gstrBlank & _
        Format$(lHour, gsTmFormat) & gsTimeSeparator & _
        Format$(lMin, gsTmFormat) & gsTimeSeparator & _
        Format$(lSec, gsTmFormat) & gsMsSeparator & _
        Format$(lMs, gsMSecondFormat)

End Function
Public Sub DeleteFile(strFile As String, Optional ByVal bCheckIfEmpty As Boolean = False)

  ' Ensure that there is only a single file of the name before delete, since
  ' Kill supports wildcards and can potentially delete a number of files
  Dim strTemp As String

  If CheckFileExists(strFile) Then
     If bCheckIfEmpty Then
        If FileLen(strFile) = 0 Then
           Kill strFile
        End If
     Else
        Kill strFile
```

```
    End If
  End If

End Sub
Public Function CheckFileExists(strFile As String) As Boolean

  ' Returns true if the passed in file exists
  ' Raises an error if multiple files are found (filename contains a wildcard)
  CheckFileExists = False

  If Not StringEmpty(Dir(strFile)) Then
    If Not StringEmpty(Dir()) Then
      On Error GoTo 0
      Err.Raise vbObjectError + errDeleteSingleFile, _
        mstrModuleName & "DeleteFile", LoadResString(errDeleteSingleFile)
    End If

    CheckFileExists = True
  End If

End Function

Public Function GetVersionString() As String
GetVersionString = "Version " & gsVersion
End Function

Function IsLabel(strKey As String) As Boolean

  ' The tree view control on frmMain can contain two types of
  ' nodes -
  ' 1. Nodes that contain data for the workspace - this could
  ' be data for the different types of steps or parameters
  ' 2. Nodes that display static data - these kind of nodes
  ' are referred to as label nodes e.g. "Global Steps" is a
  ' label node
  ' This function returns True if the passed in key corresponds
  ' to a label node

  IsLabel = InStr(strKey, mstrLabelPrefix) > 0

End Function

Function MakeKeyValid(lngIdentifier As Long, _
  intTypeOfNode As Integer, _
  Optional ByVal WorkspaceId As Long = 0, _
  Optional ByVal InstanceId As Long = 0) As String

  ' We use a numbering scheme while loading the tree view with
  ' all node data, since it needs a unique key and we want to
  ' use the key to identify the data it contains.
  ' Moreover, add a character to the beginning of the identifier
  ' so that the tree view control accepts it as a valid string,
  ' viz. "456" doesn't work, so change it to "W456"
  ' The general scheme is to concatenate a Label with the Identifier
```

```
' e.g A Global Step Node will have the Label, G and the Step Id
' concatenated to form the unique key
' The list of all such node types is given below
' 1. "W" + Workspace_Id for Workspace nodes
' 2. "P" + Parameter_Id for Parameter nodes
' 3. "M" + Step_Id for Manager Step nodes
' 4. "S" + Step_Id for Worker Step nodes
' 5. "G" + Step_Id for Global Step nodes
' 6. Instance_id + "I" + Step_Id for Instance nodes
' 7. Workspace_id + "L" + the label identifier = node type for all Label nodes
' Since the manager, worker and global steps are stored in the
' same table and the step identifiers will always be unique, we
' can use the same character as the prefix, but this is a
' convenient way to know the type of step being processed.
' The workspace id is appended to the label identifier to make
' it unique, since multiple workspaces may be open during a session
' Strip the prefix characters off while saving the Ids to the db

Dim strPrefixChar As String

On Error GoTo MakeKeyValidErr
gstrSource = mstrModuleName & "MakeKeyValid"

Select Case intTypeOfNode
   Case gintWorkspace
      strPrefixChar = mstrWorkspacePrefix
   Case gintGlobalStep
      strPrefixChar = gstrGlobalStepPrefix
   Case gintManagerStep
      strPrefixChar = gstrManagerStepPrefix
   Case gintWorkerStep
      strPrefixChar = gstrWorkerStepPrefix
   Case gintRunManager, gintRunWorker
      If InstanceId = 0 Then
         On Error GoTo 0
         Err.Raise vbObjectError + errMandatoryParameterMissing, _
            gstrSource, _
            LoadResString(errMandatoryParameterMissing)
      End If
      ' Concatenate the instance identifier and the step
      ' identifier to form a unique key
      strPrefixChar = Trim$(Str$(InstanceId)) & mstrInstancePrefix
   Case gintParameter
      strPrefixChar = mstrParameterPrefix
   Case gintNodeParamConnection
      strPrefixChar = mstrParamConnectionPrefix
   Case gintConnectionDtl
      strPrefixChar = mstrConnectionDtlPrefix
   Case gintNodeParamExtension
      strPrefixChar = mstrParamExtensionPrefix
   Case gintNodeParamBuiltIn
      strPrefixChar = mstrParamBuiltInPrefix
   Case gintGlobalsLabel, gintParameterLabel, gintParamConnectionLabel, _
        gintConnDtlLabel, _
```

```
            gintParamExtensionLabel, gintParamBuiltInLabel, gintGlobalStepLabel, _
            gintStepLabel
        If WorkspaceId = 0 Then
            ' The Workspace Id has to be specified for a label node
            ' Otherwise it will not be possible to generate unique label
            ' identifiers if multiple workspaces are open
            On Error GoTo 0
            Err.Raise vbObjectError + errWorkspaceIdMandatory, _
                gstrSource, _
                LoadResString(errWorkspaceIdMandatory)
        End If
        ' For all labels, the workspace identifier and the
        ' label prefix are concatenated to form the key
        strPrefixChar = Trim$(Str$(WorkspaceId)) & mstrLabelPrefix
    Case Else
            On Error GoTo 0
            Err.Raise vbObjectError + errInvalidNodeType, _
                gstrSource, _
                LoadResString(errInvalidNodeType)
  End Select

  MakeKeyValid = strPrefixChar & Trim$(Str$(lngIdentifier))

  Exit Function

MakeKeyValidErr:
  Call LogErrors(Errors)
  On Error GoTo 0
  Err.Raise vbObjectError + errMakeKeyValidFailed, _
        gstrSource, _
        LoadResString(errMakeKeyValidFailed)

End Function

Function MakeIdentifierValid(strKey As String) As Long

  ' Returns the Identifier corresponding to the passed in key
  ' (Reverse of what was done in MakeKeyValid)

  On Error GoTo MakeIdentifierValidErr

  If IsLabel(strKey) Then
     ' If the key corresponds to a label node, the identifier
     ' appears to the right of the label prefix
     MakeIdentifierValid = Val(Mid(strKey, InStr(strKey, mstrLabelPrefix) + 1))
  ElseIf InStr(strKey, mstrInstancePrefix) = 0 Then
     ' For all other nodes, stripping the first character off
     ' returns a valid Id
     MakeIdentifierValid = Val(Mid(strKey, 2))
  Else
     ' Instance node - strip of all characters till the
     ' instance prefix
     MakeIdentifierValid = Val(Mid(strKey, InStr(strKey, mstrInstancePrefix) + 1))
  End If
```

```
  Exit Function

MakeIdentifierValidErr:
  Call LogErrors(Errors)
  On Error GoTo 0
  Err.Raise vbObjectError + errMakeIdentifierValidFailed, _
        mstrModuleName & "MakeIdentifierValid", _
        LoadResString(errMakeIdentifierValidFailed)

End Function
Public Function IsInstanceNode(strNodeKey As String) As Boolean

  ' Returns true if the passed in node key corresponds to a step instance
  IsInstanceNode = InStr(strNodeKey, mstrInstancePrefix) > 0

End Function
Public Function IsBuiltInLabel(strNodeKey As String) As Boolean

  ' Returns true if the passed in node key corresponds to a step instance
  IsBuiltInLabel = (IsLabel(strNodeKey) And _
     (MakeIdentifierValid(strNodeKey) = gintParamBuiltInLabel))

End Function

Public Sub ShowBusy()
  ' Modifies the mousepointer to indicate that the
  ' application is busy

  On Error Resume Next

  Screen.MousePointer = vbHourglass

End Sub
Public Sub ShowFree()
  ' Modifies the mousepointer to indicate that the
  ' application has finished processing and is ready
  ' to accept user input

  On Error Resume Next

  Screen.MousePointer = vbDefault

End Sub

Public Function InstrR(strMain As String, _
      strSearch As String) As Integer
  ' Finds the last occurrence of the passed in string

  Dim intPos As Integer
  Dim intPrev As Integer

  On Error GoTo InstrRErr
```

```
  intPrev = intPos
  intPos = InStr(1, strMain, strSearch)

  Do While intPos > 0
    intPrev = intPos
    intPos = InStr(intPos + 1, strMain, strSearch)
  Loop
  InstrR = intPrev

  Exit Function

InstrRErr:
  Call LogErrors(Errors)
  gstrSource = mstrModuleName & "InstrR"
  On Error GoTo 0
  Err.Raise vbObjectError + errInstrRFailed, _
    gstrSource, _
    LoadResString(errInstrRFailed)

End Function

Public Function GetDefaultDir(lWspId As Long, WspParameters As cArrParameters) As String

  Dim sDir As String
  sDir = SubstituteParameters( _
      gstrEnvVarSeparator & PARAM_DEFAULT_DIR & gstrEnvVarSeparator, _
      lWspId, WspParameters:=WspParameters)
  MakePathValid (sDir & gstrFileSeparator & "a.txt")
  GetDefaultDir = GetShortName(sDir)
  If StringEmpty(GetDefaultDir) Then
    GetDefaultDir = App.Path
  End If

End Function

Public Sub AddArrayElement(ByRef arrNodes() As Object, _
    ByVal objToAdd As Object, _
    ByRef lngCount As Long)
  ' Adds the passed in object to the array

  On Error GoTo AddArrayElementErr

  ' Increase the array dimension and add the object to it
  ReDim Preserve arrNodes(lngCount)
  Set arrNodes(lngCount) = objToAdd
  lngCount = lngCount + 1

  Exit Sub

AddArrayElementErr:
  LogErrors Errors
  gstrSource = mstrModuleName & "AddArrayElement"
  On Error GoTo 0
  Err.Raise vbObjectError + errAddArrayElementFailed, _
```

```
        gstrSource, _
        LoadResString(errAddArrayElementFailed)

End Sub


Public Function CheckForNullField(rstRecords As Recordset, strFieldName As String) As String

  ' Returns an empty string if a given field is null
  On Error GoTo CheckForNullFieldErr

  If IsNull(rstRecords.Fields(strFieldName)) Then
     CheckForNullField = gstrEmptyString
  Else
     CheckForNullField = rstRecords.Fields(strFieldName)
  End If
  Exit Function

CheckForNullFieldErr:
  Call LogErrors(Errors)
  On Error GoTo 0
  Err.Raise vbObjectError + errCheckForNullFieldFailed, _
        mstrModuleName & "CheckForNullField", _
        LoadResString(errCheckForNullFieldFailed)

End Function

Public Function ErrorOnNullField(rstRecords As Recordset, strFieldName As String) As Variant

  ' If a given field is null, raises an error
  ' Else, returns the field value in a variant
  ' The calling function must convert the return value to the
  ' appropriate type
  On Error GoTo ErrorOnNullFieldErr
  gstrSource = mstrModuleName & "ErrorOnNullField"

  If IsNull(rstRecords.Fields(strFieldName)) Then
     On Error GoTo 0
     Err.Raise vbObjectError + errMandatoryFieldNull, _
        gstrSource, _
        strFieldName & mintDelimiter & LoadResString(errMandatoryFieldNull)
  Else
     ErrorOnNullField = rstRecords.Fields(strFieldName)
  End If
  Exit Function

ErrorOnNullFieldErr:
  Call LogErrors(Errors)
  On Error GoTo 0
  Err.Raise vbObjectError + errUnableToCheckNull, _
     gstrSource, _
     strFieldName & mintDelimiter & LoadResString(errUnableToCheckNull)

End Function
```

```
Public Function StringEmpty(strCheckString As String) As Boolean

  StringEmpty = (strCheckString = gstrEmptyString)

End Function
Public Function GetIteratorValue(cStepIterators As cRunColIt, _
    ByVal strItName As String)

  Dim lngIndex As Long
  Dim strValue As String

  On Error GoTo GetIteratorValueErr
  gstrSource = mstrModuleName & "GetIteratorValue"

  ' Find the iterator in the Iterators collection
  For lngIndex = 0 To cStepIterators.Count - 1
    If cStepIterators(lngIndex).IteratorName = strItName Then
      strValue = cStepIterators(lngIndex).Value
      Exit For
    End If
  Next lngIndex

  If lngIndex > cStepIterators.Count - 1 Then
    ' The iterator has not been defined for the branch
    ' Raise an error
    On Error GoTo 0
    Err.Raise vbObjectError + errParamNameInvalid, _
        gstrSource, _
        LoadResString(errParamNameInvalid)
  End If

  GetIteratorValue = strValue
  Exit Function

GetIteratorValueErr:
  ' Log the error code raised by Visual Basic
  Call LogErrors(Errors)
  gstrSource = mstrModuleName & "GetIteratorValue"
  On Error GoTo 0
  Err.Raise vbObjectError + errGetParamValueFailed, _
      gstrSource, _
      LoadResString(errGetParamValueFailed)

End Function
Public Function SubstituteParameters(ByVal strComString As String, _
    ByVal lngWorkspaceId As Long, _
    Optional StepIterators As cRunColIt = Nothing, _
    Optional WspParameters As cArrParameters = Nothing) As String
  ' This function substitutes all parameter names and
  ' environment variables in the passed in string with
  ' their values. It also substitutes the value for the
  ' iterators, if any.
  ' Since the syntax is to enclose parameter names and
  ' environment variables in "%", we check if a given
```

```
' variable is a parameter - if so, we substitute the
' parameter value - else we try to get the value from
' the environment

Dim intPos As Integer
Dim intEndPos As Integer
Dim strEnvVariable As String
Dim strValue As String
Dim strCommand As String
Dim cTempStr As cStringSM

' Initialize the return value of the function to the
' passed in command
strCommand = strComString

If WspParameters Is Nothing Then Set WspParameters = gcParameters

Set cTempStr = New cStringSM

intPos = InStr(strCommand, gstrEnvVarSeparator)
Do While intPos <> 0
   If Mid(strCommand, intPos + 1, 1) = gstrEnvVarSeparator Then
      ' Wildcard character - to be substituted by a single % - later!
      intPos = intPos + 2
      If intPos > Len(strCommand) Then Exit Do
   Else
      ' Extract the environment variable from the passed
      ' in string
      intEndPos = InStr(intPos + 1, strCommand, gstrEnvVarSeparator)

      If intEndPos > 0 Then
         strEnvVariable = Mid(strCommand, intPos + 1, intEndPos - intPos - 1)
      Else
         On Error GoTo 0
         Err.Raise vbObjectError + errParamSeparatorMissing, _
               gstrSource, _
               LoadResString(errParamSeparatorMissing)
      End If
      strValue = gstrEmptyString

      ' Get the value of the variable and call a function
      ' to replace the variable with it's value
      strValue = GetValue(strEnvVariable, lngWorkspaceId, StepIterators, WspParameters)
      ' The function raises an error if the variable is
      ' not found
      strCommand = cTempStr.ReplaceSubString(strCommand, _
            gstrEnvVarSeparator & strEnvVariable & gstrEnvVarSeparator, _
            strValue)
   End If

   intPos = InStr(intPos, strCommand, gstrEnvVarSeparator)
Loop

strCommand = cTempStr.ReplaceSubString(strCommand, _
```

```
        gstrEnvVarSeparator & gstrEnvVarSeparator, gstrEnvVarSeparator)

  Set cTempStr = Nothing
  SubstituteParameters = strCommand

End Function
Private Function GetValue(ByVal strParameter As String, _
      ByVal lngWorkspaceId As Long, _
      cStepIterators As cRunColIt, _
      WspParameters As cArrParameters) As String
  ' This function returns the value for the passed in
  ' parameter - it may be a workspace parameter, an
  ' environment variable or an iterator

  Dim intPos As Integer
  Dim intEndPos As Integer
  Dim strVariable As String
  Dim strValue As String
  Dim cParamRec As cParameter

  On Error GoTo GetValueErr

  ' Initialize the return value of the function to the
  ' empty
  strValue = gstrEmptyString

  intPos = InStr(strParameter, gstrEnvVarSeparator)
  If intPos > 0 Then
     ' Extract the variable from the passed in string
     intEndPos = InStr(intPos + 1, strParameter, gstrEnvVarSeparator)
     If intEndPos = 0 Then
        intEndPos = Len(strParameter)
     End If

     strVariable = Mid(strParameter, intPos + 1, intEndPos - intPos - 1)
  Else
     ' The separator charactor has not been passed in -
     ' try to find the value of the passed in parameter
     strVariable = strParameter
  End If

  If Not StringEmpty(strVariable) Then
     ' Check if this is the timestamp parameter first
     If strVariable = gstrTimeStamp Then
        strValue = Format$(Now, mstrFormatString, _
              vbUseSystemDayOfWeek, vbUseSystem)
     Else
        ' Try to find a parameter for the workspace with
        ' the same name
        Set cParamRec = WspParameters.GetParameterValue(lngWorkspaceId, _
              strVariable)
        If cParamRec Is Nothing Then
           If Not cStepIterators Is Nothing Then
              ' If the string is not a parameter, then check
```

```
            ' if it is an iterator
            strValue = GetIteratorValue(cStepIterators, strVariable)
          End If

          If StringEmpty(strValue) Then
            ' Neither - Check if it is an environment variable
            strValue = Environ$(strVariable)
            If StringEmpty(strValue) Then
              On Error GoTo 0
              WriteError errSubValuesFailed, _
                  OptArgs:="Invalid parameter: " & gstrSQ & strVariable & gstrSQ
              Err.Raise vbObjectError + errSubValuesFailed, _
                  mstrModuleName & "GetValue", _
                  LoadResString(errSubValuesFailed) & "Invalid parameter: " & gstrSQ & strVariable & gstrSQ
            End If
          End If
        Else
          strValue = cParamRec.ParameterValue
        End If
      End If
    End If

    GetValue = strValue

    Exit Function

GetValueErr:
    If Err.Number = vbObjectError + errParamNameInvalid Then
      ' If the parameter has not been defined for the
      ' workspace then check if it is an environment
      ' variable
      Resume Next
    End If

    ' Log the error code raised by Visual Basic
    Call LogErrors(Errors)
    gstrSource = mstrModuleName & "GetValue"
    WriteError errSubValuesFailed, gstrSource, "Parameter: " & gstrSQ & strVariable & gstrSQ
    On Error GoTo 0
    Err.Raise vbObjectError + errSubValuesFailed, _
        gstrSource, _
        LoadResString(errSubValuesFailed) & "Parameter: " & gstrSQ & strVariable & gstrSQ

End Function
Public Function SQLFixup(strField As String) As String
    ' Returns a string that can be executed by SQL Server

    Dim cMyStr As New cStringSM
    Dim strTemp As String

    On Error GoTo SQLFixupErr

    strTemp = strField
    SQLFixup = strTemp
```

```
  ' Single-quotes have to be replaced by two single-quotes,
  ' since a single-quote is the identifier delimiter
  ' character - call a procedure to do the replace
'   SQLFixup = cMyStr.ReplaceSubString(strTemp, gstrDQ, "\" & gstrDQ)

  ' Replace pipe characters with the corresponding chr function
  ' SQLFixup = cMyStr.ReplaceSubString(strTemp, gstrDQ, gstrDQ & gstrDQ)

  Exit Function

SQLFixupErr:
  gstrSource = mstrModuleName & "SQLFixup"
  LogErrors Errors
  On Error GoTo 0
  Err.Raise vbObjectError + errMakeFieldValidFailed, _
        gstrSource, LoadResString(errMakeFieldValidFailed)

End Function
Public Function TranslateStepLabel(sLabel As String) As String
  ' Translates the passed in step label to a valid file name
  ' All characters in the label that are invalid for filenames (viz. \ / : * ? " < > |)
  ' and spaces are substituted with underscores - also ensure that the resulting filename
  ' is not greater than 255 characters
  Dim cTempStr As New cStringSM
  TranslateStepLabel = cTempStr.ReplaceSubString(sLabel, gstrFileSeparator, "_")
  TranslateStepLabel = cTempStr.ReplaceSubString(TranslateStepLabel, "/", gstrUnderscore)
  TranslateStepLabel = cTempStr.ReplaceSubString(TranslateStepLabel, ":", gstrUnderscore)
  TranslateStepLabel = cTempStr.ReplaceSubString(TranslateStepLabel, "*", gstrUnderscore)
  TranslateStepLabel = cTempStr.ReplaceSubString(TranslateStepLabel, "?", gstrUnderscore)
  TranslateStepLabel = cTempStr.ReplaceSubString(TranslateStepLabel, gstrDQ, gstrUnderscore)
  TranslateStepLabel = cTempStr.ReplaceSubString(TranslateStepLabel, "<", gstrUnderscore)
  TranslateStepLabel = cTempStr.ReplaceSubString(TranslateStepLabel, ">", gstrUnderscore)
  TranslateStepLabel = cTempStr.ReplaceSubString(TranslateStepLabel, "|", gstrUnderscore)
  TranslateStepLabel = cTempStr.ReplaceSubString(TranslateStepLabel, gstrBlank, gstrUnderscore)

  ' Commas are substituted with underscores since the command shell uses a comma to
  ' delimit commands
  TranslateStepLabel = cTempStr.ReplaceSubString(TranslateStepLabel, ",", gstrUnderscore)

  If Len(TranslateStepLabel) > MAX_PATH Then
     TranslateStepLabel = Mid(TranslateStepLabel, 1, MAX_PATH)
  End If

End Function

Public Function TypeOfObject(ByVal objNode As Object) As Integer
  ' Determines the type of object that is passed in

  On Error GoTo TypeOfObjectErr
  gstrSource = mstrModuleName & "TypeOfObject"

  Select Case TypeName(objNode)
     Case "cWorkspace"
```

```
            TypeOfObject = gintWorkspace

        Case "cParameter"
            TypeOfObject = gintParameter

        Case "cConnection"
            TypeOfObject = gintParameterConnect

        Case "cConnDtl"
            TypeOfObject = gintConnectionDtl

        Case "cGlobalStep"
            TypeOfObject = gintGlobalStep

        Case "cManager"
            TypeOfObject = gintManagerStep

        Case "cWorker"
            TypeOfObject = gintWorkerStep

        Case "cStep"
            ' If a step record is passed in, call a function
            ' to determine the type of step
            TypeOfObject = TypeOfStep(StepClass:=objNode)

        Case Else
            WriteError errTypeOfObjectFailed, gstrSource, _
                TypeName(objNode)
            On Error GoTo 0
            Err.Raise vbObjectError + errTypeOfObjectFailed, _
                gstrSource, _
                LoadResString(errTypeOfObjectFailed)
    End Select

    Exit Function

TypeOfObjectErr:
    ' Log the error code raised by Visual Basic
    Call LogErrors(Errors)
    On Error GoTo 0
    Err.Raise vbObjectError + errTypeOfObjectFailed, _
        gstrSource, _
        LoadResString(errTypeOfObjectFailed)

End Function
Attribute VB_Name = "ConnDtlCommon"
'  FILE:      ConnDtlCommon.bas
'             Microsoft TPC-H Kit Ver. 2.7.0-1005
'             Copyright Microsoft, 2008
'             All Rights Reserved
'
'
'  PURPOSE:    Contains functionality common across StepMaster and
'             SMRunOnly, pertaining to connections
```

```
'           Specifically, functions to load connections in an array
'           and so on.
'  Contact:    Reshma Tharamal (reshmat@microsoft.com)
'
Option Explicit

' Used to indicate the source module name when errors
' are raised by this module
Private Const mstrModuleName As String = "ConnDtlCommon."

Public Sub LoadRSInConnDtlArray(rstConns As Recordset, cConns As cConnDtls)

  Dim cNewConnDtl As cConnDtl

  On Error GoTo LoadRSInConnDtlArrayErr

  If rstConns.RecordCount = 0 Then
     Exit Sub
  End If

  rstConns.MoveFirst
  While Not rstConns.EOF

     Set cNewConnDtl = New cConnDtl

     ' Initialize ConnDtl values
     ' Call a procedure to raise an error if mandatory fields are null.
     cNewConnDtl.ConnNameId = ErrorOnNullField(rstConns, FLD_ID_CONN_NAME)
     cNewConnDtl.WorkspaceId = ErrorOnNullField(rstConns, FLD_ID_WORKSPACE)
     cNewConnDtl.ConnName = CStr(ErrorOnNullField(rstConns, FLD_CONN_DTL_CONNECTION_NAME))
     cNewConnDtl.ConnectionString = CheckForNullField(rstConns,
FLD_CONN_DTL_CONNECTION_STRING)
     cNewConnDtl.ConnType = CheckForNullField(rstConns, FLD_CONN_DTL_CONNECTION_TYPE)

     cConns.Load cNewConnDtl

     Set cNewConnDtl = Nothing
     rstConns.MoveNext
  Wend

  Exit Sub

LoadRSInConnDtlArrayErr:
  LogErrors Errors
  gstrSource = mstrModuleName & "LoadRSInConnDtlArray"
  On Error GoTo 0
  Err.Raise vbObjectError + errLoadRsInArrayFailed, gstrSource, _
        LoadResString(errLoadRsInArrayFailed)
End Sub
Attribute VB_Name = "ConnectionCommon"
'  FILE:      ConnnectionCommon.bas
'           Microsoft TPC-H Kit Ver. 2.7.0-1005
'           Copyright Microsoft, 2008
'           All Rights Reserved
```

```
'
'
'  PURPOSE:    Contains functionality common across StepMaster and
'              SMRunOnly, pertaining to connection strings
'              Specifically, functions to load connections strings
'              in an array and so on.
'  Contact:    Reshma Tharamal (reshmat@microsoft.com)
'
Option Explicit

' Used to indicate the source module name when errors
' are raised by this module
Private Const mstrModuleName As String = "ConnectionCommon."

Public Sub LoadRecordsetInConnectionArray(rstConns As Recordset, cConns As cConnections)

   Dim cNewConnection As cConnection

   On Error GoTo LoadRecordsetInConnectionArrayErr

   If rstConns.RecordCount = 0 Then
      Exit Sub
   End If

   rstConns.MoveFirst
   While Not rstConns.EOF

      Set cNewConnection = New cConnection

      ' Initialize Connection values
      ' Call a procedure to raise an error if mandatory fields are null.
      cNewConnection.ConnectionId = ErrorOnNullField(rstConns, "connection_id")
      cNewConnection.WorkspaceId = CStr(ErrorOnNullField(rstConns, FLD_ID_WORKSPACE))
      cNewConnection.ConnectionName = CStr(ErrorOnNullField(rstConns, "connection_name"))
      cNewConnection.ConnectionValue = CheckForNullField(rstConns, "connection_value")
      cNewConnection.Description = CheckForNullField(rstConns, "description")

      cNewConnection.NoCountDisplay = CheckForNullField(rstConns, "no_count_display")
      cNewConnection.NoExecute = CheckForNullField(rstConns, "no_execute")
      cNewConnection.ParseQueryOnly = CheckForNullField(rstConns, "parse_query_only")
      cNewConnection.QuotedIdentifiers = CheckForNullField(rstConns, "ANSI_quoted_identifiers")
      cNewConnection.AnsiNulls = CheckForNullField(rstConns, "ANSI_nulls")
      cNewConnection.ShowQueryPlan = CheckForNullField(rstConns, "show_query_plan")
      cNewConnection.ShowStatsTime = CheckForNullField(rstConns, "show_stats_time")
      cNewConnection.ShowStatsIO = CheckForNullField(rstConns, "show_stats_io")
      cNewConnection.ParseOdbcMsg = CheckForNullField(rstConns, "parse_odbc_msg_prefixes")
      cNewConnection.RowCount = CheckForNullField(rstConns, "row_count")
      cNewConnection.TsqlBatchSeparator = CheckForNullField(rstConns, "tsql_batch_separator")
      cNewConnection.QueryTimeOut = CheckForNullField(rstConns, "query_time_out")
      cNewConnection.ServerLanguage = CheckForNullField(rstConns, "server_language")
      cNewConnection.CharacterTranslation = CheckForNullField(rstConns, "character_translation")
      cNewConnection.RegionalSettings = CheckForNullField(rstConns, "regional_settings")

      cConns.Load cNewConnection
```

```
      Set cNewConnection = Nothing
      rstConns.MoveNext
    Wend

    Exit Sub

LoadRecordsetInConnectionArrayErr:
    LogErrors Errors
    gstrSource = mstrModuleName & "LoadRecordsetInConnectionArray"
    On Error GoTo 0
    Err.Raise vbObjectError + errLoadRsInArrayFailed, gstrSource, _
          LoadResString(errLoadRsInArrayFailed)
End Sub
VERSION 1.0 CLASS
BEGIN
  MultiUse = -1  'True
  Persistable = 0  'NotPersistable
  DataBindingBehavior = 0  'vbNone
  DataSourceBehavior  = 0  'vbNone
  MTSTransactionMode  = 0  'NotAnMTSObject
END
Attribute VB_Name = "cParameter"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
'  FILE:       cParameter.cls
'              Microsoft TPC-H Kit Ver. 2.7.0-1005
'              Copyright Microsoft, 2008
'              All Rights Reserved
'
'
'  PURPOSE:    Encapsulates the properties and methods of a parameter.
'              Contains functions to insert, update and delete
'              workspace_parameters records from the database.
'  Contact:    Reshma Tharamal (reshmat@microsoft.com)
'
Option Explicit
Option Base 0

' Local variable(s) to hold property value(s)
Private mlngWorkspaceId As Long
Private mlngParameterId As Long
Private mstrParameterName As String
Private mstrParameterValue As String
Private mstrDescription As String
Private mintParameterType As Integer
Private mdbsStepMaster As Database
Private mintOperation As Operation
Private mlngPosition As Long

' Used to indicate the source module name when errors
' are raised by this class
```

```
Private mstrSource As String
Private Const mstrModuleName As String = "cParameter."

' The cSequence class is used to generate unique parameter identifiers
Private mParameterSeq As cSequence

' The StringSM class is used to carry out string operations
Private mFieldValue As cStringSM

' Parameter types
Public Enum ParameterType
  gintParameterGeneric = 0
  gintParameterConnect
  gintParameterApplication
  gintParameterBuiltIn
End Enum


Private Sub AssignParameters(qyExec As DAO.QueryDef)
  ' Assigns values to the parameters in the querydef object
  ' The parameter names are cryptic to make them different
  ' from the field names. When the parameter names are
  ' the same as the field names, parameters in the where
  ' clause do not get created.

  Dim prmParam As DAO.Parameter

  On Error GoTo AssignParametersErr

  For Each prmParam In qyExec.Parameters
    Select Case prmParam.Name
      Case "[w_id]"
        prmParam.Value = mlngWorkspaceId

      Case "[p_id]"
        prmParam.Value = mlngParameterId

      Case "[p_name]"
        prmParam.Value = mstrParameterName

      Case "[p_value]"
        prmParam.Value = mstrParameterValue

      Case "[desc]"
        prmParam.Value = mstrDescription

      Case "[p_type]"
        prmParam.Value = mintParameterType

      Case Else
        ' Write the parameter name that is faulty
        WriteError errInvalidParameter, mstrSource, _
            prmParam.Name
        On Error GoTo 0
```

```
            Err.Raise errInvalidParameter, mstrModuleName & "AssignParameters", _
                LoadResString(errInvalidParameter)
        End Select
    Next prmParam

'    qyExec.Parameters("w_id").Value = mlngWorkspaceId
'    qyExec.Parameters("p_id").Value = mlngParameterId
'    qyExec.Parameters("p_name").Value = mstrParameterName
'    qyExec.Parameters("p_value").Value = mstrParameterValue
'

    Exit Sub

AssignParametersErr:

    mstrSource = mstrModuleName & "AssignParameters"
    Call LogErrors(Errors)
    On Error GoTo 0
    Err.Raise vbObjectError + errAssignParametersFailed, _
        mstrSource, LoadResString(errAssignParametersFailed)

End Sub

Public Property Let Position(ByVal RHS As Long)

    mlngPosition = RHS

End Property

Public Property Get Position() As Long

    Position = mlngPosition

End Property

Public Function Clone() As cParameter

    ' Creates a copy of a given parameter

    Dim cCloneParam As cParameter

    On Error GoTo CloneErr
    mstrSource = mstrModuleName & "Clone"

    Set cCloneParam = New cParameter

    ' Copy all the parameter properties to the newly
    ' created parameter
    Set cCloneParam.NodeDB = mdbsStepMaster
    cCloneParam.WorkspaceId = mlngWorkspaceId
    cCloneParam.ParameterId = mlngParameterId
    cCloneParam.ParameterName = mstrParameterName
    cCloneParam.ParameterValue = mstrParameterValue
    cCloneParam.Description = mstrDescription
```

```
    cCloneParam.ParameterType = mintParameterType
    cCloneParam.IndOperation = mintOperation
    cCloneParam.Position = mlngPosition

    ' And set the return value to the newly created parameter
    Set Clone = cCloneParam
    Set cCloneParam = Nothing

    Exit Function

CloneErr:
    LogErrors Errors
    mstrSource = mstrModuleName & "Clone"
    On Error GoTo 0
    Err.Raise vbObjectError + errCloneFailed, _
          mstrSource, LoadResString(errCloneFailed)

End Function
Public Property Set NodeDB(vdata As Database)

    Set mdbsStepMaster = vdata

End Property
Public Property Get NodeDB() As Database

    Set NodeDB = mdbsStepMaster

End Property

Private Sub CheckDupParameterName()
    ' Check if the parameter name already exists in the workspace

    Dim rstParameter As Recordset
    Dim strSql As String
    Dim qy As DAO.QueryDef

    On Error GoTo CheckDupParameterNameErr
    mstrSource = mstrModuleName & "CheckDupParameterName"

    ' Create a recordset object to retrieve the count of all parameters
    ' for the workspace with the same name
    strSql = "Select count(*) as parameter_count " & _
       " from workspace_parameters " & _
       " where workspace_id = [w_id]" & _
       " and parameter_name = [p_name]" & _
       " and parameter_id <> [p_id]"

    Set qy = mdbsStepMaster.CreateQueryDef(gstrEmptyString, strSql)
    Call AssignParameters(qy)

    Set rstParameter = qy.OpenRecordset(dbOpenForwardOnly)

    If rstParameter![parameter_count] > 0 Then
       rstParameter.Close
```

```
      qy.Close
      ShowError errDuplicateParameterName
      On Error GoTo 0
      Err.Raise vbObjectError + errDuplicateParameterName, _
         mstrSource, LoadResString(errDuplicateParameterName)
   End If

   rstParameter.Close
   qy.Close

   Exit Sub

CheckDupParameterNameErr:
   LogErrors Errors
   mstrSource = mstrModuleName & "CheckDupParameterName"
   On Error GoTo 0
   Err.Raise vbObjectError + errCheckDupParameterNameFailed, _
      mstrSource, LoadResString(errCheckDupParameterNameFailed)

End Sub
Private Sub CheckDB()
   ' Check if the database object has been initialized

   If mdbsStepMaster Is Nothing Then
      On Error GoTo 0
      Err.Raise vbObjectError + errInvalidDB, _
         mstrModuleName & "CheckDB", LoadResString(errInvalidDB)
   End If

End Sub
Public Property Let ParameterValue(vdata As String)

   mstrParameterValue = vdata

End Property
Public Property Let Description(vdata As String)

   mstrDescription = vdata

End Property
Public Property Let ParameterType(vdata As ParameterType)

   mintParameterType = vdata

End Property

Public Property Let ParameterName(vdata As String)

   If vdata = gstrEmptyString Then

      ShowError errParameterNameMandatory
      On Error GoTo 0
      ' Propogate this error back to the caller
      Err.Raise vbObjectError + errParameterNameMandatory, _
```

```
        mstrSource, LoadResString(errParameterNameMandatory)
  Else
     mstrParameterName = vdata
  End If

End Property

Public Property Let ParameterId(vdata As Long)
  mlngParameterId = vdata
End Property

Public Property Let IndOperation(ByVal vdata As Operation)

  ' The valid operations are define in the cOperations
  ' class. Check if the operation is valid
  Select Case vdata
     Case QueryOp, InsertOp, UpdateOp, DeleteOp
        mintOperation = vdata

     Case Else
        On Error GoTo 0
        Err.Raise vbObjectError + errInvalidOperation, _
              mstrSource, LoadResString(errInvalidOperation)
  End Select

End Property
Public Sub Validate()
  ' Each distinct object will have a Validate method which
  ' will check if the class properties are valid. This method
  ' will be used to check interdependant properties that
  ' cannot be validated by the let procedures.
  ' It should be called by the add and modify methods of the class

  On Error GoTo ValidateErr

  ' Check if the db object is valid
  Call CheckDB

  ' Call procedure to raise an error if the parameter name
  ' already exists in the workspace -
  ' if there are duplicates, we don't know what value for the
  ' parameter to use at runtime
  Call CheckDupParameterName

  Exit Sub

ValidateErr:

  mstrSource = mstrModuleName & "Validate"
  Call LogErrors(Errors)
  On Error GoTo 0
  Err.Raise vbObjectError + errValidateFailed, _
     mstrSource, LoadResString(errValidateFailed)
```

```
End Sub
Public Property Let WorkspaceId(vdata As Long)

  mlngWorkspaceId = vdata

End Property

Public Sub Add()

  Dim strInsert As String
  Dim qy As DAO.QueryDef

  On Error GoTo AddErr

  ' Validate the record before trying to insert the record
  Call Validate

  ' Create a temporary querydef object
  strInsert = "insert into workspace_parameters " & _
        "( workspace_id, parameter_id, " & _
        " parameter_name, parameter_value, " & _
        " description, parameter_type ) " & _
        " values ( [w_id], [p_id], [p_name], [p_value], [desc], [p_type] ) "
  Set qy = mdbsStepMaster.CreateQueryDef(gstrEmptyString, strInsert)

  ' Call a procedure to assign the parameter values
  Call AssignParameters(qy)

  qy.Execute dbFailOnError
  qy.Close

'   strInsert = "insert into workspace_parameters " & _
'          "( workspace_id, parameter_id, " & _
'          " parameter_name, parameter_value ) " & _
'          " values ( " & _
'          Str(mlngWorkspaceId) & ", " & Str(mlngParameterId) & _
'          ", " & mFieldValue.MakeStringFieldValid(mstrParameterName) & _
'          ", " & mFieldValue.MakeStringFieldValid(mstrParameterValue) & " ) "
'   mdbsStepMaster.Execute strInsert, dbFailOnError + dbSQLPassThrough

  Exit Sub

AddErr:

  mstrSource = mstrModuleName & "Add"
  Call LogErrors(Errors)
  On Error GoTo 0
  Err.Raise vbObjectError + errParameterInsertFailed, _
     mstrSource, LoadResString(errParameterInsertFailed)

End Sub
Public Sub Delete()

  Dim strDelete As String
```

```
  Dim qy As DAO.QueryDef

  On Error GoTo DeleteErr

  ' Check if the db object is valid
  Call CheckDB

  strDelete = "delete from workspace_parameters " & _
        " where parameter_id = [p_id]"
  Set qy = mdbsStepMaster.CreateQueryDef(gstrEmptyString, strDelete)

  Call AssignParameters(qy)
  qy.Execute dbFailOnError

  qy.Close

  Exit Sub

DeleteErr:
  LogErrors Errors
  mstrSource = mstrModuleName & "Delete"
  On Error GoTo 0
  Err.Raise vbObjectError + errDeleteParameterFailed, _
        mstrSource, _
        LoadResString(errDeleteParameterFailed)

End Sub

Public Sub Modify()

  Dim strUpdate As String
  Dim qy As QueryDef

  On Error GoTo ModifyErr

  ' Validate the updated values before trying to modify the db
  Call Validate

  ' Create a temporary querydef object with the modify string
  strUpdate = "update workspace_parameters " & _
        " set workspace_id = [w_id], " & _
        "parameter_name = [p_name], " & _
        "parameter_value = [p_value], " & _
        "description = [desc], " & _
        "parameter_type = [p_type] " & _
        " where parameter_id = [p_id]"
  Set qy = mdbsStepMaster.CreateQueryDef(gstrEmptyString, strUpdate)

  ' Call a procedure to assign the parameter values to the
  ' querydef object
  Call AssignParameters(qy)
  qy.Execute dbFailOnError

  qy.Close
```

```
'    mdbsStepMaster.Execute strUpdate, dbFailOnError
'
   Exit Sub

ModifyErr:

   mstrSource = mstrModuleName & "Modify"
   Call LogErrors(Errors)
   On Error GoTo 0
   Err.Raise vbObjectError + errParameterUpdateFailed, _
      mstrSource, LoadResString(errParameterUpdateFailed)

End Sub
Public Property Get ParameterName() As String

   ParameterName = mstrParameterName

End Property

Public Property Get ParameterId() As Long

   ParameterId = mlngParameterId

End Property
Public Property Get NextIdentifier() As Long

   Dim lngNextId As Long

   On Error GoTo NextIdentifierErr

   ' First check if the database object is valid
   Call CheckDB

   ' Retrieve the next identifier using the sequence class
   Set mParameterSeq = New cSequence
   Set mParameterSeq.IdDatabase = mdbsStepMaster
   mParameterSeq.IdentifierColumn = FLD_ID_PARAMETER
   lngNextId = mParameterSeq.Identifier
   Set mParameterSeq = Nothing

   NextIdentifier = lngNextId
   Exit Property

NextIdentifierErr:
   LogErrors Errors
   mstrSource = mstrModuleName & "NextIdentifier"
   On Error GoTo 0
   Err.Raise vbObjectError + errIdGetFailed, _
      mstrSource, LoadResString(errIdGetFailed)

End Property
Public Property Get IndOperation() As Operation
```

```
    IndOperation = mintOperation

End Property

Public Property Get WorkspaceId() As Long

    WorkspaceId = mlngWorkspaceId

End Property

Public Property Get ParameterValue() As String

    ParameterValue = mstrParameterValue

End Property
Public Property Get Description() As String

    Description = mstrDescription

End Property
Public Property Get ParameterType() As ParameterType

    ParameterType = mintParameterType

End Property


Private Sub Class_Initialize()

    Set mFieldValue = New cStringSM

    ' Initialize the operation indicator variable to Query
    ' It will be modified later by the collection class when
    ' inserts, updates or deletes are performed
    mintOperation = QueryOp

End Sub

Private Sub Class_Terminate()

    Set mdbsStepMaster = Nothing
    Set mFieldValue = Nothing

End Sub
VERSION 1.0 CLASS
BEGIN
  MultiUse = -1  'True
  Persistable = 0  'NotPersistable
  DataBindingBehavior = 0  'vbNone
  DataSourceBehavior  = 0  'vbNone
  MTSTransactionMode  = 0  'NotAnMTSObject
END
Attribute VB_Name = "cRunColIt"
Attribute VB_GlobalNameSpace = False
```

```
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
'  FILE:       cRunColIt.cls
'              Microsoft TPC-H Kit Ver. 2.7.0-1005
'              Copyright Microsoft, 2008
'              All Rights Reserved
'
'
'  PURPOSE:    This module implements a stack of Iterator nodes.
'              Ensures that only cRunItNode objects are stored in the stack.
'  Contact:    Reshma Tharamal (reshmat@microsoft.com)
'
Option Explicit

' Used to indicate the source module name when errors
' are raised by this class
Private Const mstrModuleName As String = "cRunColIt."
Private mstrSource As String

Private mcIterators As cStack
Public Sub Clear()

  mcIterators.Clear

End Sub

Private Sub Class_Initialize()

  Set mcIterators = New cStack

End Sub

Private Sub Class_Terminate()

  Set mcIterators = Nothing

End Sub


Public Function Value(strItName As String) As String

  Dim lngIndex As Long

  For lngIndex = 0 To mcIterators.Count - 1
     If mcIterators(lngIndex).IteratorName = strItName Then
        Value = mcIterators(lngIndex).Value
        Exit For
     End If
  Next lngIndex

End Function

Public Property Get Item(ByVal Position As Long) As cRunItNode
```

```
Attribute Item.VB_UserMemId = 0

  Set Item = mcIterators(Position)

End Property


Public Function Count() As Long

  Count = mcIterators.Count

End Function

Public Function Pop() As cRunItNode

  Set Pop = mcIterators.Pop

End Function

Public Sub Push(objToPush As cRunItNode)

  Call mcIterators.Push(objToPush)

End Sub


VERSION 1.0 CLASS
BEGIN
 MultiUse = -1  'True
 Persistable = 0  'NotPersistable
 DataBindingBehavior = 0  'vbNone
 DataSourceBehavior  = 0  'vbNone
 MTSTransactionMode  = 0  'NotAnMTSObject
END
Attribute VB_Name = "cRunInst"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
'  FILE:       cRunColIt.cls
'              Microsoft TPC-H Kit Ver. 2.7.0-1005
'              Copyright Microsoft, 2008
'              All Rights Reserved
'
'
'  PURPOSE:    This module controls the run processing. It runs a branch
'              at a time and raises events when each step completes execution.
'  Contact:    Reshma Tharamal (reshmat@microsoft.com)
'
Option Explicit

' Used to indicate the source module name when errors
' are raised by this class
Private Const mstrModuleName As String = "cRunInst."
```

```
Private mstrSource As String

' Local variable(s) to hold property value(s)
Private mstrRootKey As String
Public WspId As Long
Private mcParameters As cArrParameters
Private mcRunSteps As cArrSteps
Private mcRunConstraints As cArrConstraints
Public RunConnections As cConnections
Public RunConnDtls As cConnDtls
Private mcvntWspPreCons As Variant
Private mcvntWspPostCons As Variant
Private mcNavSteps As cStepTree

Private mcInstances As cInstances
Private mcFreeSteps As cVectorLng
Private mcFailures As cFailedSteps
Private mblnAsk As Boolean   ' Set to True when the a step with continuation criteria=Ask fails
Private mblnAbort As Boolean ' Set to True when the run is aborted
Private msAbortDtls As String
Private mbarrFree() As Byte
Private WithEvents mcTermSteps As cTermSteps
Attribute mcTermSteps.VB_VarHelpID = -1
Public RunId As Long
Public CreateInputFiles As Boolean

Private Enum WspLogEvents
  mintRunStart
  mintRunComplete
  mintStepStart
  mintStepComplete
End Enum

Private mcWspLog As cFileSM

Private mstrCurBranchRoot As String
Private mcDummyRootInstance As cInstance

' Key for the dummy root instance - Should be a key that is invalid for an actual step record
Private Const mstrDummyRootKey As String = "D"

' Public events to notify the calling function of the
' start and end time for each step
Public Event RunStart(dtmStartTime As Currency, strWspLog As String)
Public Event RunComplete(dtmEndTime As Currency)
Public Event StepStart(cStepRecord As cStep, dtmStartTime As Currency, _
      lngInstanceId As Long, lParentInstanceId As Long, sPath As String, _
      sIts As String, sItValue As String)
Public Event StepComplete(cStepRecord As cStep, dtmEndTime As Currency, lngInstanceId As Long, lElapsed As
Long)
Public Event ProcessStart(cStepRecord As cStep, strCommand As String, _
      dtmStartTime As Currency, lngInstanceId As Long, lParentInstanceId As Long, _
      sItValue As String)
Public Event ProcessComplete(cStepRecord As cStep, dtmEndTime As Currency, lngInstanceId As Long, lElapsed
```

```
As Long)

' The class that will execute each step - we trap the events
' that are raised by it when a step starts/completes
' execution
Private WithEvents cExecStep1 As cRunStep
Attribute cExecStep1.VB_VarHelpID = -1
Private WithEvents cExecStep2 As cRunStep
Attribute cExecStep2.VB_VarHelpID = -1
Private WithEvents cExecStep3 As cRunStep
Attribute cExecStep3.VB_VarHelpID = -1
Private WithEvents cExecStep4 As cRunStep
Attribute cExecStep4.VB_VarHelpID = -1
Private WithEvents cExecStep5 As cRunStep
Attribute cExecStep5.VB_VarHelpID = -1
Private WithEvents cExecStep6 As cRunStep
Attribute cExecStep6.VB_VarHelpID = -1
Private WithEvents cExecStep7 As cRunStep
Attribute cExecStep7.VB_VarHelpID = -1
Private WithEvents cExecStep8 As cRunStep
Attribute cExecStep8.VB_VarHelpID = -1
Private WithEvents cExecStep9 As cRunStep
Attribute cExecStep9.VB_VarHelpID = -1

Private WithEvents cExecStep10 As cRunStep
Attribute cExecStep10.VB_VarHelpID = -1
Private WithEvents cExecStep11 As cRunStep
Attribute cExecStep11.VB_VarHelpID = -1
Private WithEvents cExecStep12 As cRunStep
Attribute cExecStep12.VB_VarHelpID = -1
Private WithEvents cExecStep13 As cRunStep
Attribute cExecStep13.VB_VarHelpID = -1
Private WithEvents cExecStep14 As cRunStep
Attribute cExecStep14.VB_VarHelpID = -1
Private WithEvents cExecStep15 As cRunStep
Attribute cExecStep15.VB_VarHelpID = -1
Private WithEvents cExecStep16 As cRunStep
Attribute cExecStep16.VB_VarHelpID = -1
Private WithEvents cExecStep17 As cRunStep
Attribute cExecStep17.VB_VarHelpID = -1
Private WithEvents cExecStep18 As cRunStep
Attribute cExecStep18.VB_VarHelpID = -1
Private WithEvents cExecStep19 As cRunStep
Attribute cExecStep19.VB_VarHelpID = -1

Private WithEvents cExecStep20 As cRunStep
Attribute cExecStep20.VB_VarHelpID = -1
Private WithEvents cExecStep21 As cRunStep
Attribute cExecStep21.VB_VarHelpID = -1
Private WithEvents cExecStep22 As cRunStep
Attribute cExecStep22.VB_VarHelpID = -1
Private WithEvents cExecStep23 As cRunStep
Attribute cExecStep23.VB_VarHelpID = -1
Private WithEvents cExecStep24 As cRunStep
```

```
Attribute cExecStep24.VB_VarHelpID = -1
Private WithEvents cExecStep25 As cRunStep
Attribute cExecStep25.VB_VarHelpID = -1
Private WithEvents cExecStep26 As cRunStep
Attribute cExecStep26.VB_VarHelpID = -1
Private WithEvents cExecStep27 As cRunStep
Attribute cExecStep27.VB_VarHelpID = -1
Private WithEvents cExecStep28 As cRunStep
Attribute cExecStep28.VB_VarHelpID = -1
Private WithEvents cExecStep29 As cRunStep
Attribute cExecStep29.VB_VarHelpID = -1

Private WithEvents cExecStep30 As cRunStep
Attribute cExecStep30.VB_VarHelpID = -1
Private WithEvents cExecStep31 As cRunStep
Attribute cExecStep31.VB_VarHelpID = -1
Private WithEvents cExecStep32 As cRunStep
Attribute cExecStep32.VB_VarHelpID = -1
Private WithEvents cExecStep33 As cRunStep
Attribute cExecStep33.VB_VarHelpID = -1
Private WithEvents cExecStep34 As cRunStep
Attribute cExecStep34.VB_VarHelpID = -1
Private WithEvents cExecStep35 As cRunStep
Attribute cExecStep35.VB_VarHelpID = -1
Private WithEvents cExecStep36 As cRunStep
Attribute cExecStep36.VB_VarHelpID = -1
Private WithEvents cExecStep37 As cRunStep
Attribute cExecStep37.VB_VarHelpID = -1
Private WithEvents cExecStep38 As cRunStep
Attribute cExecStep38.VB_VarHelpID = -1
Private WithEvents cExecStep39 As cRunStep
Attribute cExecStep39.VB_VarHelpID = -1

Private WithEvents cExecStep40 As cRunStep
Attribute cExecStep40.VB_VarHelpID = -1
Private WithEvents cExecStep41 As cRunStep
Attribute cExecStep41.VB_VarHelpID = -1
Private WithEvents cExecStep42 As cRunStep
Attribute cExecStep42.VB_VarHelpID = -1
Private WithEvents cExecStep43 As cRunStep
Attribute cExecStep43.VB_VarHelpID = -1
Private WithEvents cExecStep44 As cRunStep
Attribute cExecStep44.VB_VarHelpID = -1
Private WithEvents cExecStep45 As cRunStep
Attribute cExecStep45.VB_VarHelpID = -1
Private WithEvents cExecStep46 As cRunStep
Attribute cExecStep46.VB_VarHelpID = -1
Private WithEvents cExecStep47 As cRunStep
Attribute cExecStep47.VB_VarHelpID = -1
Private WithEvents cExecStep48 As cRunStep
Attribute cExecStep48.VB_VarHelpID = -1
Private WithEvents cExecStep49 As cRunStep
Attribute cExecStep49.VB_VarHelpID = -1
```

```
Private WithEvents cExecStep50 As cRunStep
Attribute cExecStep50.VB_VarHelpID = -1
Private WithEvents cExecStep51 As cRunStep
Attribute cExecStep51.VB_VarHelpID = -1
Private WithEvents cExecStep52 As cRunStep
Attribute cExecStep52.VB_VarHelpID = -1
Private WithEvents cExecStep53 As cRunStep
Attribute cExecStep53.VB_VarHelpID = -1
Private WithEvents cExecStep54 As cRunStep
Attribute cExecStep54.VB_VarHelpID = -1
Private WithEvents cExecStep55 As cRunStep
Attribute cExecStep55.VB_VarHelpID = -1
Private WithEvents cExecStep56 As cRunStep
Attribute cExecStep56.VB_VarHelpID = -1
Private WithEvents cExecStep57 As cRunStep
Attribute cExecStep57.VB_VarHelpID = -1
Private WithEvents cExecStep58 As cRunStep
Attribute cExecStep58.VB_VarHelpID = -1
Private WithEvents cExecStep59 As cRunStep
Attribute cExecStep59.VB_VarHelpID = -1

Private WithEvents cExecStep60 As cRunStep
Attribute cExecStep60.VB_VarHelpID = -1
Private WithEvents cExecStep61 As cRunStep
Attribute cExecStep61.VB_VarHelpID = -1
Private WithEvents cExecStep62 As cRunStep
Attribute cExecStep62.VB_VarHelpID = -1
Private WithEvents cExecStep63 As cRunStep
Attribute cExecStep63.VB_VarHelpID = -1
Private WithEvents cExecStep64 As cRunStep
Attribute cExecStep64.VB_VarHelpID = -1
Private WithEvents cExecStep65 As cRunStep
Attribute cExecStep65.VB_VarHelpID = -1
Private WithEvents cExecStep66 As cRunStep
Attribute cExecStep66.VB_VarHelpID = -1
Private WithEvents cExecStep67 As cRunStep
Attribute cExecStep67.VB_VarHelpID = -1
Private WithEvents cExecStep68 As cRunStep
Attribute cExecStep68.VB_VarHelpID = -1
Private WithEvents cExecStep69 As cRunStep
Attribute cExecStep69.VB_VarHelpID = -1

Private WithEvents cExecStep70 As cRunStep
Attribute cExecStep70.VB_VarHelpID = -1
Private WithEvents cExecStep71 As cRunStep
Attribute cExecStep71.VB_VarHelpID = -1
Private WithEvents cExecStep72 As cRunStep
Attribute cExecStep72.VB_VarHelpID = -1
Private WithEvents cExecStep73 As cRunStep
Attribute cExecStep73.VB_VarHelpID = -1
Private WithEvents cExecStep74 As cRunStep
Attribute cExecStep74.VB_VarHelpID = -1
Private WithEvents cExecStep75 As cRunStep
Attribute cExecStep75.VB_VarHelpID = -1
```

```
Private WithEvents cExecStep76 As cRunStep
Attribute cExecStep76.VB_VarHelpID = -1
Private WithEvents cExecStep77 As cRunStep
Attribute cExecStep77.VB_VarHelpID = -1
Private WithEvents cExecStep78 As cRunStep
Attribute cExecStep78.VB_VarHelpID = -1
Private WithEvents cExecStep79 As cRunStep
Attribute cExecStep79.VB_VarHelpID = -1

Private WithEvents cExecStep80 As cRunStep
Attribute cExecStep80.VB_VarHelpID = -1
Private WithEvents cExecStep81 As cRunStep
Attribute cExecStep81.VB_VarHelpID = -1
Private WithEvents cExecStep82 As cRunStep
Attribute cExecStep82.VB_VarHelpID = -1
Private WithEvents cExecStep83 As cRunStep
Attribute cExecStep83.VB_VarHelpID = -1
Private WithEvents cExecStep84 As cRunStep
Attribute cExecStep84.VB_VarHelpID = -1
Private WithEvents cExecStep85 As cRunStep
Attribute cExecStep85.VB_VarHelpID = -1
Private WithEvents cExecStep86 As cRunStep
Attribute cExecStep86.VB_VarHelpID = -1
Private WithEvents cExecStep87 As cRunStep
Attribute cExecStep87.VB_VarHelpID = -1
Private WithEvents cExecStep88 As cRunStep
Attribute cExecStep88.VB_VarHelpID = -1
Private WithEvents cExecStep89 As cRunStep
Attribute cExecStep89.VB_VarHelpID = -1

Private WithEvents cExecStep90 As cRunStep
Attribute cExecStep90.VB_VarHelpID = -1
Private WithEvents cExecStep91 As cRunStep
Attribute cExecStep91.VB_VarHelpID = -1
Private WithEvents cExecStep92 As cRunStep
Attribute cExecStep92.VB_VarHelpID = -1
Private WithEvents cExecStep93 As cRunStep
Attribute cExecStep93.VB_VarHelpID = -1
Private WithEvents cExecStep94 As cRunStep
Attribute cExecStep94.VB_VarHelpID = -1
Private WithEvents cExecStep95 As cRunStep
Attribute cExecStep95.VB_VarHelpID = -1
Private WithEvents cExecStep96 As cRunStep
Attribute cExecStep96.VB_VarHelpID = -1
Private WithEvents cExecStep97 As cRunStep
Attribute cExecStep97.VB_VarHelpID = -1
Private WithEvents cExecStep98 As cRunStep
Attribute cExecStep98.VB_VarHelpID = -1
Private WithEvents cExecStep99 As cRunStep
Attribute cExecStep99.VB_VarHelpID = -1

Private Const msIt As String = " Iterator: "
Private Const msItValue As String = " Value: "
Public Sub Abort()
```

```
  On Error GoTo AbortErr

  ' Make sure that we don't execute any more steps
  Call StopRun

  If cExecStep1 Is Nothing And cExecStep2 Is Nothing And cExecStep3 Is Nothing And cExecStep4 Is Nothing And
cExecStep5 Is Nothing And cExecStep6 Is Nothing And cExecStep7 Is Nothing And cExecStep8 Is Nothing And
cExecStep9 Is Nothing And _
    cExecStep10 Is Nothing And cExecStep11 Is Nothing And cExecStep12 Is Nothing And cExecStep13 Is Nothing
And cExecStep14 Is Nothing And cExecStep15 Is Nothing And cExecStep16 Is Nothing And cExecStep17 Is
Nothing And cExecStep18 Is Nothing And cExecStep19 Is Nothing And _
    cExecStep20 Is Nothing And cExecStep21 Is Nothing And cExecStep22 Is Nothing And cExecStep23 Is Nothing
And cExecStep24 Is Nothing And cExecStep25 Is Nothing And cExecStep26 Is Nothing And cExecStep27 Is
Nothing And cExecStep28 Is Nothing And cExecStep29 Is Nothing And _
    cExecStep30 Is Nothing And cExecStep31 Is Nothing And cExecStep32 Is Nothing And cExecStep33 Is Nothing
And cExecStep34 Is Nothing And cExecStep35 Is Nothing And cExecStep36 Is Nothing And cExecStep37 Is
Nothing And cExecStep38 Is Nothing And cExecStep39 Is Nothing And _
    cExecStep40 Is Nothing And cExecStep41 Is Nothing And cExecStep42 Is Nothing And cExecStep43 Is Nothing
And cExecStep44 Is Nothing And cExecStep45 Is Nothing And cExecStep46 Is Nothing And cExecStep47 Is
Nothing And cExecStep48 Is Nothing And cExecStep49 Is Nothing And _
    cExecStep50 Is Nothing And cExecStep51 Is Nothing And cExecStep52 Is Nothing And cExecStep53 Is Nothing
And cExecStep54 Is Nothing And cExecStep55 Is Nothing And cExecStep56 Is Nothing And cExecStep57 Is
Nothing And cExecStep58 Is Nothing And cExecStep59 Is Nothing And _
    cExecStep60 Is Nothing And cExecStep61 Is Nothing And cExecStep62 Is Nothing And cExecStep63 Is Nothing
And cExecStep64 Is Nothing And cExecStep65 Is Nothing And cExecStep66 Is Nothing And cExecStep67 Is
Nothing And cExecStep68 Is Nothing And cExecStep69 Is Nothing And _
    cExecStep70 Is Nothing And cExecStep71 Is Nothing And cExecStep72 Is Nothing And cExecStep73 Is Nothing
And cExecStep74 Is Nothing And cExecStep75 Is Nothing And cExecStep76 Is Nothing And cExecStep77 Is
Nothing And cExecStep78 Is Nothing And cExecStep79 Is Nothing And _
    cExecStep80 Is Nothing And cExecStep81 Is Nothing And cExecStep82 Is Nothing And cExecStep83 Is Nothing
And cExecStep84 Is Nothing And cExecStep85 Is Nothing And cExecStep86 Is Nothing And cExecStep87 Is
Nothing And cExecStep88 Is Nothing And cExecStep89 Is Nothing And _
    cExecStep90 Is Nothing And cExecStep91 Is Nothing And cExecStep92 Is Nothing And cExecStep93 Is Nothing
And cExecStep94 Is Nothing And cExecStep95 Is Nothing And cExecStep96 Is Nothing And cExecStep97 Is
Nothing And cExecStep98 Is Nothing And cExecStep99 Is Nothing Then
    ' Then...
    WriteToWspLog (mintRunComplete)
    RaiseEvent RunComplete(Determine64BitTime())
  Else
    ' Abort each of the steps that is currently executing.
    If Not cExecStep1 Is Nothing Then
      cExecStep1.Abort
    End If

    If Not cExecStep2 Is Nothing Then
      cExecStep2.Abort
    End If

    If Not cExecStep3 Is Nothing Then
      cExecStep3.Abort
    End If

    If Not cExecStep4 Is Nothing Then
```

```
    cExecStep4.Abort
End If

If Not cExecStep5 Is Nothing Then
    cExecStep5.Abort
End If

If Not cExecStep6 Is Nothing Then
    cExecStep6.Abort
End If

If Not cExecStep7 Is Nothing Then
    cExecStep7.Abort
End If

If Not cExecStep8 Is Nothing Then
    cExecStep8.Abort
End If

If Not cExecStep9 Is Nothing Then
    cExecStep9.Abort
End If

If Not cExecStep10 Is Nothing Then
    cExecStep10.Abort
End If

If Not cExecStep11 Is Nothing Then
    cExecStep11.Abort
End If

If Not cExecStep12 Is Nothing Then
    cExecStep12.Abort
End If

If Not cExecStep13 Is Nothing Then
    cExecStep13.Abort
End If

If Not cExecStep14 Is Nothing Then
    cExecStep14.Abort
End If

If Not cExecStep15 Is Nothing Then
    cExecStep15.Abort
End If

If Not cExecStep16 Is Nothing Then
    cExecStep16.Abort
End If

If Not cExecStep17 Is Nothing Then
    cExecStep17.Abort
End If
```

```
If Not cExecStep18 Is Nothing Then
   cExecStep18.Abort
End If

If Not cExecStep19 Is Nothing Then
   cExecStep19.Abort
End If

If Not cExecStep20 Is Nothing Then
   cExecStep20.Abort
End If

If Not cExecStep21 Is Nothing Then
   cExecStep21.Abort
End If

If Not cExecStep22 Is Nothing Then
   cExecStep22.Abort
End If

If Not cExecStep23 Is Nothing Then
   cExecStep23.Abort
End If

If Not cExecStep24 Is Nothing Then
   cExecStep24.Abort
End If

If Not cExecStep25 Is Nothing Then
   cExecStep25.Abort
End If

If Not cExecStep26 Is Nothing Then
   cExecStep26.Abort
End If

If Not cExecStep27 Is Nothing Then
   cExecStep27.Abort
End If

If Not cExecStep28 Is Nothing Then
   cExecStep28.Abort
End If

If Not cExecStep29 Is Nothing Then
   cExecStep29.Abort
End If

' ============== 30 - 39 ==============
If Not cExecStep30 Is Nothing Then
   cExecStep30.Abort
End If
```

```
If Not cExecStep31 Is Nothing Then
   cExecStep31.Abort
End If

If Not cExecStep32 Is Nothing Then
   cExecStep32.Abort
End If

If Not cExecStep33 Is Nothing Then
   cExecStep33.Abort
End If

If Not cExecStep34 Is Nothing Then
   cExecStep34.Abort
End If

If Not cExecStep35 Is Nothing Then
   cExecStep35.Abort
End If

If Not cExecStep36 Is Nothing Then
   cExecStep36.Abort
End If

If Not cExecStep37 Is Nothing Then
   cExecStep37.Abort
End If

If Not cExecStep38 Is Nothing Then
   cExecStep38.Abort
End If

If Not cExecStep39 Is Nothing Then
   cExecStep39.Abort
End If

' ============== 40 - 49 ==============
If Not cExecStep40 Is Nothing Then
   cExecStep40.Abort
End If

If Not cExecStep41 Is Nothing Then
   cExecStep41.Abort
End If

If Not cExecStep42 Is Nothing Then
   cExecStep42.Abort
End If

If Not cExecStep43 Is Nothing Then
   cExecStep43.Abort
End If

If Not cExecStep44 Is Nothing Then
```

```
    cExecStep44.Abort
End If

If Not cExecStep45 Is Nothing Then
    cExecStep45.Abort
End If

If Not cExecStep46 Is Nothing Then
    cExecStep46.Abort
End If

If Not cExecStep47 Is Nothing Then
    cExecStep47.Abort
End If

If Not cExecStep48 Is Nothing Then
    cExecStep48.Abort
End If

If Not cExecStep49 Is Nothing Then
    cExecStep49.Abort
End If

' ============== 50 - 59 ==============
If Not cExecStep50 Is Nothing Then
    cExecStep50.Abort
End If

If Not cExecStep51 Is Nothing Then
    cExecStep51.Abort
End If

If Not cExecStep52 Is Nothing Then
    cExecStep52.Abort
End If

If Not cExecStep53 Is Nothing Then
    cExecStep53.Abort
End If

If Not cExecStep54 Is Nothing Then
    cExecStep54.Abort
End If

If Not cExecStep55 Is Nothing Then
    cExecStep55.Abort
End If

If Not cExecStep56 Is Nothing Then
    cExecStep56.Abort
End If

If Not cExecStep57 Is Nothing Then
    cExecStep57.Abort
```

```
End If

If Not cExecStep58 Is Nothing Then
   cExecStep58.Abort
End If

If Not cExecStep59 Is Nothing Then
   cExecStep59.Abort
End If

' ============== 60 - 69 ==============
If Not cExecStep60 Is Nothing Then
   cExecStep60.Abort
End If

If Not cExecStep61 Is Nothing Then
   cExecStep61.Abort
End If

If Not cExecStep62 Is Nothing Then
   cExecStep62.Abort
End If

If Not cExecStep63 Is Nothing Then
   cExecStep63.Abort
End If

If Not cExecStep64 Is Nothing Then
   cExecStep64.Abort
End If

If Not cExecStep65 Is Nothing Then
   cExecStep65.Abort
End If

If Not cExecStep66 Is Nothing Then
   cExecStep66.Abort
End If

If Not cExecStep67 Is Nothing Then
   cExecStep67.Abort
End If

If Not cExecStep68 Is Nothing Then
   cExecStep68.Abort
End If

If Not cExecStep69 Is Nothing Then
   cExecStep69.Abort
End If

' ============== 70 - 79 ==============
If Not cExecStep70 Is Nothing Then
   cExecStep70.Abort
```

```
End If

If Not cExecStep71 Is Nothing Then
   cExecStep71.Abort
End If

If Not cExecStep72 Is Nothing Then
   cExecStep72.Abort
End If

If Not cExecStep73 Is Nothing Then
   cExecStep73.Abort
End If

If Not cExecStep74 Is Nothing Then
   cExecStep74.Abort
End If

If Not cExecStep75 Is Nothing Then
   cExecStep75.Abort
End If

If Not cExecStep76 Is Nothing Then
   cExecStep76.Abort
End If

If Not cExecStep77 Is Nothing Then
   cExecStep77.Abort
End If

If Not cExecStep78 Is Nothing Then
   cExecStep78.Abort
End If

If Not cExecStep79 Is Nothing Then
   cExecStep79.Abort
End If

' ============== 80 - 89 ==============
If Not cExecStep80 Is Nothing Then
   cExecStep80.Abort
End If

If Not cExecStep81 Is Nothing Then
   cExecStep81.Abort
End If

If Not cExecStep82 Is Nothing Then
   cExecStep82.Abort
End If

If Not cExecStep83 Is Nothing Then
   cExecStep83.Abort
End If
```

```
If Not cExecStep84 Is Nothing Then
   cExecStep84.Abort
End If

If Not cExecStep85 Is Nothing Then
   cExecStep85.Abort
End If

If Not cExecStep86 Is Nothing Then
   cExecStep86.Abort
End If

If Not cExecStep87 Is Nothing Then
   cExecStep87.Abort
End If

If Not cExecStep88 Is Nothing Then
   cExecStep88.Abort
End If

If Not cExecStep89 Is Nothing Then
   cExecStep89.Abort
End If

' ============== 90 - 99 ==============
If Not cExecStep90 Is Nothing Then
   cExecStep90.Abort
End If

If Not cExecStep91 Is Nothing Then
   cExecStep91.Abort
End If

If Not cExecStep92 Is Nothing Then
   cExecStep92.Abort
End If

If Not cExecStep93 Is Nothing Then
   cExecStep93.Abort
End If

If Not cExecStep94 Is Nothing Then
   cExecStep94.Abort
End If

If Not cExecStep95 Is Nothing Then
   cExecStep95.Abort
End If

If Not cExecStep96 Is Nothing Then
   cExecStep96.Abort
End If
```

```
      If Not cExecStep97 Is Nothing Then
         cExecStep97.Abort
      End If

      If Not cExecStep98 Is Nothing Then
         cExecStep98.Abort
      End If

      If Not cExecStep99 Is Nothing Then
         cExecStep99.Abort
      End If

   End If

   Exit Sub

AbortErr:
   Call LogErrors(Errors)
   On Error GoTo 0
   ShowError errAbortFailed
   ' Try to abort the remaining steps, if any
   Resume Next

End Sub
Public Sub AbortSiblings(cTermInstance As cInstance)

   On Error GoTo AbortSiblingsErr

   ' Abort each of the steps that is currently executing.
   If Not cExecStep1 Is Nothing Then
      If cExecStep1.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
         cExecStep1.Abort
      End If
   End If

   If Not cExecStep2 Is Nothing Then
      If cExecStep2.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
         cExecStep2.Abort
      End If
   End If

   If Not cExecStep3 Is Nothing Then
      If cExecStep3.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
         cExecStep3.Abort
      End If
   End If

   If Not cExecStep4 Is Nothing Then
      If cExecStep4.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
         cExecStep4.Abort
      End If
   End If

   If Not cExecStep5 Is Nothing Then
```

```
    If cExecStep5.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
      cExecStep5.Abort
    End If
  End If

  If Not cExecStep6 Is Nothing Then
    If cExecStep6.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
      cExecStep6.Abort
    End If
  End If

  If Not cExecStep7 Is Nothing Then
    If cExecStep7.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
      cExecStep7.Abort
    End If
  End If

  If Not cExecStep8 Is Nothing Then
    If cExecStep8.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
      cExecStep8.Abort
    End If
  End If

  If Not cExecStep9 Is Nothing Then
    If cExecStep9.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
      cExecStep9.Abort
    End If
  End If

  If Not cExecStep10 Is Nothing Then
    If cExecStep10.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
      cExecStep10.Abort
    End If
  End If

  If Not cExecStep11 Is Nothing Then
    If cExecStep11.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
      cExecStep11.Abort
    End If
  End If

  If Not cExecStep12 Is Nothing Then
    If cExecStep12.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
      cExecStep12.Abort
    End If
  End If

  If Not cExecStep13 Is Nothing Then
    If cExecStep13.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
      cExecStep13.Abort
    End If
  End If

  If Not cExecStep14 Is Nothing Then
```

```
    If cExecStep14.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
      cExecStep14.Abort
    End If
  End If

  If Not cExecStep15 Is Nothing Then
    If cExecStep15.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
      cExecStep15.Abort
    End If
  End If

  If Not cExecStep16 Is Nothing Then
    If cExecStep16.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
      cExecStep16.Abort
    End If
  End If

  If Not cExecStep17 Is Nothing Then
    If cExecStep17.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
      cExecStep17.Abort
    End If
  End If

  If Not cExecStep18 Is Nothing Then
    If cExecStep18.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
      cExecStep18.Abort
    End If
  End If

  If Not cExecStep19 Is Nothing Then
    If cExecStep19.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
      cExecStep19.Abort
    End If
  End If

  If Not cExecStep20 Is Nothing Then
    If cExecStep20.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
      cExecStep20.Abort
    End If
  End If

  If Not cExecStep21 Is Nothing Then
    If cExecStep21.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
      cExecStep21.Abort
    End If
  End If

  If Not cExecStep22 Is Nothing Then
    If cExecStep22.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
      cExecStep22.Abort
    End If
  End If

  If Not cExecStep23 Is Nothing Then
```

```
    If cExecStep23.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
      cExecStep23.Abort
    End If
  End If

  If Not cExecStep24 Is Nothing Then
    If cExecStep24.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
      cExecStep24.Abort
    End If
  End If

  If Not cExecStep25 Is Nothing Then
    If cExecStep25.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
      cExecStep25.Abort
    End If
  End If

  If Not cExecStep26 Is Nothing Then
    If cExecStep26.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
      cExecStep26.Abort
    End If
  End If

  If Not cExecStep27 Is Nothing Then
    If cExecStep27.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
      cExecStep27.Abort
    End If
  End If

  If Not cExecStep28 Is Nothing Then
    If cExecStep28.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
      cExecStep28.Abort
    End If
  End If

  If Not cExecStep29 Is Nothing Then
    If cExecStep29.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
      cExecStep29.Abort
    End If
  End If

  ' ============ 30 =================
  If Not cExecStep30 Is Nothing Then
    If cExecStep30.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
      cExecStep30.Abort
    End If
  End If

  If Not cExecStep31 Is Nothing Then
    If cExecStep31.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
      cExecStep31.Abort
    End If
  End If
```

```
  If Not cExecStep32 Is Nothing Then
     If cExecStep32.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
        cExecStep32.Abort
     End If
  End If

  If Not cExecStep33 Is Nothing Then
     If cExecStep33.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
        cExecStep33.Abort
     End If
  End If

  If Not cExecStep34 Is Nothing Then
     If cExecStep34.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
        cExecStep34.Abort
     End If
  End If

  If Not cExecStep35 Is Nothing Then
     If cExecStep35.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
        cExecStep35.Abort
     End If
  End If

  If Not cExecStep36 Is Nothing Then
     If cExecStep36.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
        cExecStep36.Abort
     End If
  End If

  If Not cExecStep37 Is Nothing Then
     If cExecStep37.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
        cExecStep37.Abort
     End If
  End If

  If Not cExecStep38 Is Nothing Then
     If cExecStep38.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
        cExecStep38.Abort
     End If
  End If

  If Not cExecStep39 Is Nothing Then
     If cExecStep39.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
        cExecStep39.Abort
     End If
  End If

  ' ============ 40 =================
  If Not cExecStep40 Is Nothing Then
     If cExecStep40.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
        cExecStep40.Abort
     End If
  End If
```

```
If Not cExecStep41 Is Nothing Then
   If cExecStep41.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
      cExecStep41.Abort
   End If
End If

If Not cExecStep42 Is Nothing Then
   If cExecStep42.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
      cExecStep42.Abort
   End If
End If

If Not cExecStep43 Is Nothing Then
   If cExecStep43.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
      cExecStep43.Abort
   End If
End If

If Not cExecStep44 Is Nothing Then
   If cExecStep44.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
      cExecStep44.Abort
   End If
End If

If Not cExecStep45 Is Nothing Then
   If cExecStep45.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
      cExecStep45.Abort
   End If
End If

If Not cExecStep46 Is Nothing Then
   If cExecStep46.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
      cExecStep46.Abort
   End If
End If

If Not cExecStep47 Is Nothing Then
   If cExecStep47.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
      cExecStep47.Abort
   End If
End If

If Not cExecStep48 Is Nothing Then
   If cExecStep48.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
      cExecStep48.Abort
   End If
End If

If Not cExecStep49 Is Nothing Then
   If cExecStep49.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
      cExecStep49.Abort
   End If
End If
```

```
' ============ 50 =================
If Not cExecStep50 Is Nothing Then
   If cExecStep50.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
      cExecStep50.Abort
   End If
End If

If Not cExecStep51 Is Nothing Then
   If cExecStep51.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
      cExecStep51.Abort
   End If
End If

If Not cExecStep52 Is Nothing Then
   If cExecStep52.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
      cExecStep52.Abort
   End If
End If

If Not cExecStep53 Is Nothing Then
   If cExecStep53.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
      cExecStep53.Abort
   End If
End If

If Not cExecStep54 Is Nothing Then
   If cExecStep54.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
      cExecStep54.Abort
   End If
End If

If Not cExecStep55 Is Nothing Then
   If cExecStep55.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
      cExecStep55.Abort
   End If
End If

If Not cExecStep56 Is Nothing Then
   If cExecStep56.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
      cExecStep56.Abort
   End If
End If

If Not cExecStep57 Is Nothing Then
   If cExecStep57.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
      cExecStep57.Abort
   End If
End If

If Not cExecStep58 Is Nothing Then
   If cExecStep58.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
      cExecStep58.Abort
   End If
```

```
End If

If Not cExecStep59 Is Nothing Then
   If cExecStep59.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
      cExecStep59.Abort
   End If
End If

' ============ 60 =================
If Not cExecStep60 Is Nothing Then
   If cExecStep60.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
      cExecStep60.Abort
   End If
End If

If Not cExecStep61 Is Nothing Then
   If cExecStep61.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
      cExecStep61.Abort
   End If
End If

If Not cExecStep62 Is Nothing Then
   If cExecStep62.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
      cExecStep62.Abort
   End If
End If

If Not cExecStep63 Is Nothing Then
   If cExecStep63.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
      cExecStep63.Abort
   End If
End If

If Not cExecStep64 Is Nothing Then
   If cExecStep64.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
      cExecStep64.Abort
   End If
End If

If Not cExecStep65 Is Nothing Then
   If cExecStep65.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
      cExecStep65.Abort
   End If
End If

If Not cExecStep66 Is Nothing Then
   If cExecStep66.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
      cExecStep66.Abort
   End If
End If

If Not cExecStep67 Is Nothing Then
   If cExecStep67.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
      cExecStep67.Abort
```

```
    End If
  End If

  If Not cExecStep68 Is Nothing Then
    If cExecStep68.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
      cExecStep68.Abort
    End If
  End If

  If Not cExecStep69 Is Nothing Then
    If cExecStep69.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
      cExecStep69.Abort
    End If
  End If

  ' ============ 70 =================
  If Not cExecStep70 Is Nothing Then
    If cExecStep70.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
      cExecStep70.Abort
    End If
  End If

  If Not cExecStep71 Is Nothing Then
    If cExecStep71.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
      cExecStep71.Abort
    End If
  End If

  If Not cExecStep72 Is Nothing Then
    If cExecStep72.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
      cExecStep72.Abort
    End If
  End If

  If Not cExecStep73 Is Nothing Then
    If cExecStep73.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
      cExecStep73.Abort
    End If
  End If

  If Not cExecStep74 Is Nothing Then
    If cExecStep74.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
      cExecStep74.Abort
    End If
  End If

  If Not cExecStep75 Is Nothing Then
    If cExecStep75.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
      cExecStep75.Abort
    End If
  End If

  If Not cExecStep76 Is Nothing Then
    If cExecStep76.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
```

```
        cExecStep76.Abort
    End If
End If

If Not cExecStep77 Is Nothing Then
    If cExecStep77.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
        cExecStep77.Abort
    End If
End If

If Not cExecStep78 Is Nothing Then
    If cExecStep78.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
        cExecStep78.Abort
    End If
End If

If Not cExecStep79 Is Nothing Then
    If cExecStep79.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
        cExecStep79.Abort
    End If
End If

' ============ 80 =================
If Not cExecStep80 Is Nothing Then
    If cExecStep80.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
        cExecStep80.Abort
    End If
End If

If Not cExecStep81 Is Nothing Then
    If cExecStep81.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
        cExecStep81.Abort
    End If
End If

If Not cExecStep82 Is Nothing Then
    If cExecStep82.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
        cExecStep82.Abort
    End If
End If

If Not cExecStep83 Is Nothing Then
    If cExecStep83.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
        cExecStep83.Abort
    End If
End If

If Not cExecStep84 Is Nothing Then
    If cExecStep84.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
        cExecStep84.Abort
    End If
End If

If Not cExecStep85 Is Nothing Then
```

```
    If cExecStep85.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
      cExecStep85.Abort
    End If
  End If

  If Not cExecStep86 Is Nothing Then
    If cExecStep86.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
      cExecStep86.Abort
    End If
  End If

  If Not cExecStep87 Is Nothing Then
    If cExecStep87.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
      cExecStep87.Abort
    End If
  End If

  If Not cExecStep88 Is Nothing Then
    If cExecStep88.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
      cExecStep88.Abort
    End If
  End If

  If Not cExecStep89 Is Nothing Then
    If cExecStep89.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
      cExecStep89.Abort
    End If
  End If

  ' ============ 90 =================
  If Not cExecStep90 Is Nothing Then
    If cExecStep90.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
      cExecStep90.Abort
    End If
  End If

  If Not cExecStep91 Is Nothing Then
    If cExecStep91.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
      cExecStep91.Abort
    End If
  End If

  If Not cExecStep92 Is Nothing Then
    If cExecStep92.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
      cExecStep92.Abort
    End If
  End If

  If Not cExecStep93 Is Nothing Then
    If cExecStep93.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
      cExecStep93.Abort
    End If
  End If
```

```
  If Not cExecStep94 Is Nothing Then
    If cExecStep94.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
      cExecStep94.Abort
    End If
  End If

  If Not cExecStep95 Is Nothing Then
    If cExecStep95.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
      cExecStep95.Abort
    End If
  End If

  If Not cExecStep96 Is Nothing Then
    If cExecStep96.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
      cExecStep96.Abort
    End If
  End If

  If Not cExecStep97 Is Nothing Then
    If cExecStep97.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
      cExecStep97.Abort
    End If
  End If

  If Not cExecStep98 Is Nothing Then
    If cExecStep98.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
      cExecStep98.Abort
    End If
  End If

  If Not cExecStep99 Is Nothing Then
    If cExecStep99.ExecuteStep.ParentStepId = cTermInstance.Step.ParentStepId Then
      cExecStep99.Abort
    End If
  End If

  Exit Sub

AbortSiblingsErr:
  Call LogErrors(Errors)
  On Error GoTo 0
  ShowError errAbortFailed
  ' Try to abort the remaining steps, if any
  Resume Next

End Sub
Private Sub ExecutionFailed(cTermStep As cRunStep)
  ' Called when execution of a step fails for any reason - ensure that execution
  ' continues

  On Error GoTo ExecutionFailedErr

  Call AddFreeProcess(cTermStep.Index)
```

```
  Call RunBranch(mstrCurBranchRoot)

  Exit Sub

ExecutionFailedErr:
  ' Log the error code raised by Visual Basic - do not raise an error here!
  Call LogErrors(Errors)

End Sub
Private Sub FreeExecStep(lngIndex As Long)
  ' Frees an instance of a cExecuteSM object depending on the index
  On Error GoTo FreeExecStepErr

  Select Case lngIndex + 1
    Case 1
      Set cExecStep1 = Nothing
    Case 2
      Set cExecStep2 = Nothing
    Case 3
      Set cExecStep3 = Nothing
    Case 4
      Set cExecStep4 = Nothing
    Case 5
      Set cExecStep5 = Nothing
    Case 6
      Set cExecStep6 = Nothing
    Case 7
      Set cExecStep7 = Nothing
    Case 8
      Set cExecStep8 = Nothing
    Case 9
      Set cExecStep9 = Nothing
    Case 10
      Set cExecStep10 = Nothing
    Case 11
      Set cExecStep11 = Nothing
    Case 12
      Set cExecStep12 = Nothing
    Case 13
      Set cExecStep13 = Nothing
    Case 14
      Set cExecStep14 = Nothing
    Case 15
      Set cExecStep15 = Nothing
    Case 16
      Set cExecStep16 = Nothing
    Case 17
      Set cExecStep17 = Nothing
    Case 18
      Set cExecStep18 = Nothing
    Case 19
      Set cExecStep19 = Nothing
    Case 20
      Set cExecStep20 = Nothing
```

```
Case 21
   Set cExecStep21 = Nothing
Case 22
   Set cExecStep22 = Nothing
Case 23
   Set cExecStep23 = Nothing
Case 24
   Set cExecStep24 = Nothing
Case 25
   Set cExecStep25 = Nothing
Case 26
   Set cExecStep26 = Nothing
Case 27
   Set cExecStep27 = Nothing
Case 28
   Set cExecStep28 = Nothing
Case 29
   Set cExecStep29 = Nothing
Case 30
   Set cExecStep30 = Nothing
Case 31
   Set cExecStep31 = Nothing
Case 32
   Set cExecStep32 = Nothing
Case 33
   Set cExecStep33 = Nothing
Case 34
   Set cExecStep34 = Nothing
Case 35
   Set cExecStep35 = Nothing
Case 36
   Set cExecStep36 = Nothing
Case 37
   Set cExecStep37 = Nothing
Case 38
   Set cExecStep38 = Nothing
Case 39
   Set cExecStep39 = Nothing
Case 40
   Set cExecStep40 = Nothing
Case 41
   Set cExecStep41 = Nothing
Case 42
   Set cExecStep42 = Nothing
Case 43
   Set cExecStep43 = Nothing
Case 44
   Set cExecStep44 = Nothing
Case 45
   Set cExecStep45 = Nothing
Case 46
   Set cExecStep46 = Nothing
Case 47
   Set cExecStep47 = Nothing
```

```
Case 48
   Set cExecStep48 = Nothing
Case 49
   Set cExecStep49 = Nothing
Case 50
   Set cExecStep50 = Nothing
Case 51
   Set cExecStep51 = Nothing
Case 52
   Set cExecStep52 = Nothing
Case 53
   Set cExecStep53 = Nothing
Case 54
   Set cExecStep54 = Nothing
Case 55
   Set cExecStep55 = Nothing
Case 56
   Set cExecStep56 = Nothing
Case 57
   Set cExecStep57 = Nothing
Case 58
   Set cExecStep58 = Nothing
Case 59
   Set cExecStep59 = Nothing
Case 60
   Set cExecStep60 = Nothing
Case 61
   Set cExecStep61 = Nothing
Case 62
   Set cExecStep62 = Nothing
Case 63
   Set cExecStep63 = Nothing
Case 64
   Set cExecStep64 = Nothing
Case 65
   Set cExecStep65 = Nothing
Case 66
   Set cExecStep66 = Nothing
Case 67
   Set cExecStep67 = Nothing
Case 68
   Set cExecStep68 = Nothing
Case 69
   Set cExecStep69 = Nothing
Case 70
   Set cExecStep70 = Nothing
Case 71
   Set cExecStep71 = Nothing
Case 72
   Set cExecStep72 = Nothing
Case 73
   Set cExecStep73 = Nothing
Case 74
   Set cExecStep74 = Nothing
```

```
    Case 75
        Set cExecStep75 = Nothing
    Case 76
        Set cExecStep76 = Nothing
    Case 77
        Set cExecStep77 = Nothing
    Case 78
        Set cExecStep78 = Nothing
    Case 79
        Set cExecStep79 = Nothing
    Case 80
        Set cExecStep80 = Nothing
    Case 81
        Set cExecStep81 = Nothing
    Case 82
        Set cExecStep82 = Nothing
    Case 83
        Set cExecStep83 = Nothing
    Case 84
        Set cExecStep84 = Nothing
    Case 85
        Set cExecStep85 = Nothing
    Case 86
        Set cExecStep86 = Nothing
    Case 87
        Set cExecStep87 = Nothing
    Case 88
        Set cExecStep88 = Nothing
    Case 89
        Set cExecStep89 = Nothing
    Case 90
        Set cExecStep90 = Nothing
    Case 91
        Set cExecStep91 = Nothing
    Case 92
        Set cExecStep92 = Nothing
    Case 93
        Set cExecStep93 = Nothing
    Case 94
        Set cExecStep94 = Nothing
    Case 95
        Set cExecStep95 = Nothing
    Case 96
        Set cExecStep96 = Nothing
    Case 97
        Set cExecStep97 = Nothing
    Case 98
        Set cExecStep98 = Nothing
    Case 99
        Set cExecStep99 = Nothing
    Case Else
        BugAssert False, "FreeExecStep: Invalid index value!"
End Select
```

```
  Exit Sub

FreeExecStepErr:
  ' Log the error code raised by Visual Basic
  Call LogErrors(Errors)

End Sub
Private Sub ProcessAskFailures()
  ' This procedure is called when a step with a continuation criteria = Ask has failed.
  ' Wait for all running processes to complete before displaying an Abort/Retry/Fail
  ' message to the user. We process every Ask step that has failed and use a simple
  ' algorithm to determine what to do next.
  ' 1. An abort response to any failure results in an immediate abort of the run
  ' 2. A continue means the run continues - this failure is popped off the failure list.
  ' 3. A retry means that the execution details for the instance are cleared and the
  '    step is re-executed.
  Dim lIndex As Long
  Dim cStepRec As cStep
  Dim cNextInst As cInstance
  Dim cFailureRec As cFailedStep

  On Error GoTo ProcessAskFailuresErr

  ' Display a popup message for all steps that have failed with a continuation
  ' criteria of Ask
  For lIndex = mcFailures.Count - 1 To 0 Step -1

    Set cFailureRec = mcFailures(lIndex)

    If cFailureRec.ContCriteria = gintOnFailureAsk Then
      Set cStepRec = mcRunSteps.QueryStep(cFailureRec.StepId)
      ' Ask the user whether to abort/retry/continue
      #If RUN_ONLY Then
        cFailureRec.AskResponse = ShowMessageBox(0, _
            "Step '" & GetStepNodeText(cStepRec) & "' failed. " & _
            "Select Abort to abort run and Ignore to continue. " & _
            "Select Retry to re-execute the failed step.", _
            "Step Failure", _
            MB_ABORTRETRYIGNORE + MB_APPLMODAL + MB_ICONEXCLAMATION)
      #Else
        cFailureRec.AskResponse = ShowMessageBox(frmRunning.hWnd, _
            "Step '" & GetStepNodeText(cStepRec) & "' failed. " & _
            "Select Abort to abort run and Ignore to continue. " & _
            "Select Retry to re-execute the failed step.", _
            "Step Failure", _
            MB_ABORTRETRYIGNORE + MB_APPLMODAL + MB_ICONEXCLAMATION)
      #End If

      ' Process an abort response immediately
      If cFailureRec.AskResponse = IDABORT Then
        mblnAbort = True
        Set cNextInst = mcInstances.QueryInstance(cFailureRec.InstanceId)
        Call RunPendingSiblings(cNextInst, cFailureRec.EndTime)
        Exit For
```

```
        End If
      End If

  Next lIndex

  ' Process all failed steps for which we have Ignore and Retry responses.
  If Not mblnAbort Then
     ' Navigate in reverse order since we'll be deleting items from the collection
     For lIndex = mcFailures.Count - 1 To 0 Step -1
        If mcFailures(lIndex).ContCriteria = gintOnFailureAsk Then
           mblnAsk = False
           Set cFailureRec = mcFailures.Delete(lIndex)

           Select Case cFailureRec.AskResponse
              Case IDABORT
                 BugAssert True

              Case IDRETRY
                 ' Delete all instances for the failed step and re-try
                 ' Returns a parent instance reference
                 Set cNextInst = ProcessRetryStep(cFailureRec)
                 Call RunPendingStepInBranch(mstrCurBranchRoot, cNextInst)

              Case IDIGNORE
                 Set cNextInst = mcInstances.QueryInstance(cFailureRec.InstanceId)
                 Call RunPendingSiblings(cNextInst, cFailureRec.EndTime)

           End Select
        End If
     Next lIndex
  End If

  Exit Sub

ProcessAskFailuresErr:
  ' Log the error code raised by Visual Basic
  Call LogErrors(Errors)
  Err.Raise vbObjectError + errExecuteBranchFailed, mstrModuleName, _
        LoadResString(errExecuteBranchFailed)

End Sub
Private Function ProcessRetryStep(cFailureRec As cFailedStep) As cInstance
  ' This procedure is called when a step with a continuation criteria = Ask has failed
  ' and the user wants to re-execute the step.
  ' We delete all existing instances for the step and reset the iterator, if
  ' any on the parent instance - this way we ensure that the step will be executed
  ' in the next pass.
  Dim lIndex As Long
  Dim cParentInstance As cInstance
  Dim cSubStepRec As cSubStep
  Dim cStepRec As cStep

  On Error GoTo ProcessRetryStepErr
```

```
  ' Navigate in reverse order since we'll be deleting items from the collection
  For lIndex = mcInstances.Count - 1 To 0 Step -1

    If mcInstances(lIndex).Step.StepId = cFailureRec.StepId Then
      Set cParentInstance = mcInstances.QueryInstance(mcInstances(lIndex).ParentInstanceId)
      Set cSubStepRec = cParentInstance.QuerySubStep(cFailureRec.StepId)
      Set cStepRec = mcRunSteps.QueryStep(cFailureRec.StepId)

      ' Decrement the child count on the parent instance and reset the
      ' step iterators on the sub-step record, if any -
      ' all the iterations of the step will be re-executed.
      cParentInstance.ChildDeleted cFailureRec.StepId
      cParentInstance.AllComplete = False
      cParentInstance.AllStarted = False

      cSubStepRec.InitializeIt cStepRec, mcParameters

      ' Now delete the current instance
      Set ProcessRetryStep = mcInstances.Delete(lIndex)
    End If
  Next lIndex

  Exit Function

ProcessRetryStepErr:
  ' Log the error code raised by Visual Basic
  Call LogErrors(Errors)
  Err.Raise vbObjectError + errExecuteBranchFailed, mstrModuleName, _
      LoadResString(errExecuteBranchFailed)

End Function


Private Sub RunNextStep(ByVal dtmCompleteTime As Currency, ByVal lngIndex As Long, _
    ByVal InstanceId As Long, ByVal ExecutionStatus As InstanceStatus)
  ' Checks if there are any steps remaining to be
  ' executed in the current branch. If so, it executes
  ' the step.
  Dim cTermInstance As cInstance
  Dim cFailure As cFailedStep

  On Error GoTo RunNextStepErr

  BugMessage "RunNextStep: cExecStep" & CStr(lngIndex + 1) & " has completed."

  Call mcTermSteps.Delete
  Call FreeExecStep(lngIndex)

  ' Call a procedure to add the freed up object to the list
  Call AddFreeProcess(lngIndex)

  Set cTermInstance = mcInstances.QueryInstance(InstanceId)
  cTermInstance.Status = ExecutionStatus
```

```
  If ExecutionStatus = gintFailed Then
     If cTermInstance.Step.ContinuationCriteria = gintOnFailureAbortSiblings Then
        Call AbortSiblings(cTermInstance)
     End If

     If Not mcFailures.StepFailed(cTermInstance.Step.StepId) Then
        Set cFailure = New cFailedStep
        cFailure.InstanceId = cTermInstance.InstanceId
        cFailure.StepId = cTermInstance.Step.StepId
        cFailure.ParentStepId = cTermInstance.Step.ParentStepId
        cFailure.ContCriteria = cTermInstance.Step.ContinuationCriteria
        cFailure.EndTime = dtmCompleteTime
        mcFailures.Add cFailure
        Set cFailure = Nothing
     End If
  End If

  If ExecutionStatus = gintFailed And cTermInstance.Step.ContinuationCriteria = gintOnFailureAbort Then
     If StringEmpty(msAbortDtls) Then
        ' Initialize the abort message
        msAbortDtls = "Step '" & GetStepNodeText(cTermInstance.Step) & "' failed. " & _
              "Aborting execution. Please check the error file for details."
     End If
     Call Abort
  ElseIf ExecutionStatus = gintFailed And cTermInstance.Step.ContinuationCriteria = gintOnFailureAsk Then
     mblnAsk = True

     ' If the step failed due to a Cancel operation (Abort), abort the run
     If mblnAbort Then
        Call RunPendingSiblings(cTermInstance, dtmCompleteTime)
     End If
  Else
     Call RunPendingSiblings(cTermInstance, dtmCompleteTime)
  End If

  If mblnAbort Then
     If Not AnyStepRunning(mcFreeSteps, mbarrFree) And Not StringEmpty(msAbortDtls) Then
        ' Display an error only if the abort is due to a failure
        ' We had to abort since a step failed - since no other steps are currently
        ' running, we can display a message to the user saying that we had to abort
        #If RUN_ONLY Then
           Call ShowMessageBox(0, msAbortDtls, "Run Aborted", _
                 MB_APPLMODAL + MB_OK + MB_ICONEXCLAMATION)
        #Else
           Call ShowMessageBox(frmRunning.hWnd, msAbortDtls, "Run Aborted", _
                 MB_APPLMODAL + MB_OK + MB_ICONEXCLAMATION)
        #End If
'         MsgBox msAbortDtls, vbOKOnly, "Run Aborted"
     End If
  ElseIf mblnAsk Then
     If Not AnyStepRunning(mcFreeSteps, mbarrFree) Then
        ' Ask the user whether to abort/retry/ignore failed steps
        Call ProcessAskFailures
     End If
```

```
  End If

  Exit Sub

RunNextStepErr:
  ' Log the error code raised by Visual Basic
  Call LogErrors(Errors)
  WriteError errExecuteBranchFailed, mstrSource
  Call ResetForm(lngIndex)

End Sub
Public Sub StopRun()

  ' Setting the Abort flag to True will ensure that we
  ' don't execute any more steps
  mblnAbort = True

End Sub

Private Sub CreateDummyInstance(strRootKey As String)

  Dim cNewInstance As cInstance
  Dim cSubStepDtls  As cStep
  Dim lngSubStepId As Long

  On Error GoTo CreateDummyInstanceErr

  ' Create a new instance of the step
  ' initialize substeps for the step
  Set cNewInstance = New cInstance

  ' There can be multiple iterations of the top level nodes
  ' running at the same time, but only one branch at any
  ' time - so enforce a degree of parallelism of 1 on this
  ' node!
  Set cNewInstance.Step = New cStep
  cNewInstance.DegreeParallelism = 1
  cNewInstance.Key = mstrDummyRootKey

  cNewInstance.InstanceId = NewInstanceId
  cNewInstance.ParentInstanceId = 0

  lngSubStepId = MakeIdentifierValid(strRootKey)

  Set cSubStepDtls = mcRunSteps.QueryStep(lngSubStepId)
  If cSubStepDtls.EnabledFlag Then
     ' Create a child node for the step corresponding to
     ' the root node of the branch being currently executed,
     ' only if it has been enabled
     Call cNewInstance.CreateSubStep(cSubStepDtls, mcParameters)
  End If

  mcInstances.Add cNewInstance
  Set cNewInstance.Iterators = DetermineIterators(cNewInstance)
```

```
  ' Set a reference to the newly created dummy instance
  Set mcDummyRootInstance = cNewInstance

  Set cNewInstance = Nothing

  Exit Sub

CreateDummyInstanceErr:
  ' Log the error code raised by Visual Basic
  Call LogErrors(Errors)
  On Error GoTo 0
  mstrSource = mstrModuleName & "CreateDummyInstance"
  Err.Raise vbObjectError + errCreateInstanceFailed, _
        mstrSource, LoadResString(errCreateInstanceFailed)

End Sub
Private Function CreateInstance(cExecStep As cStep, _
      cParentInstance As cInstance) As cInstance
  ' Creates a new instance of the passed in step. Returns
  ' a reference to the newly created instance object.

  Dim cNewInstance As cInstance
  Dim nodChild As cStep
  Dim lngSubStepId As Long

  On Error GoTo CreateInstanceErr

  ' Create a new instance of the step
  ' initialize substeps for the step
  Set cNewInstance = New cInstance
  Set cNewInstance.Step = cExecStep
  cNewInstance.Key = MakeKeyValid(cExecStep.StepId, cExecStep.StepType)
  cNewInstance.ParentInstanceId = cParentInstance.InstanceId
  cNewInstance.InstanceId = NewInstanceId
  ' Validate the degree of parallelism field before assigning it to the instance -
  ' (the parameter value might have been set to an invalid value at runtime)
  Call ValidateParallelism(cExecStep.DegreeParallelism, _
        cExecStep.WorkspaceId, ParamsInWsp:=mcParameters)
  cNewInstance.DegreeParallelism = SubstituteParameters(cExecStep.DegreeParallelism, _
        cExecStep.WorkspaceId, WspParameters:=mcParameters)

  If mcNavSteps.HasChild(StepKey:=cNewInstance.Key) Then
     Set nodChild = mcNavSteps.ChildStep(StepKey:=cNewInstance.Key)
     Do
        If nodChild.EnabledFlag Then
           ' Create nodes for all it's substeps only
           ' if the substeps have been enabled
           Call cNewInstance.CreateSubStep(nodChild, mcParameters)
        End If

        Set nodChild = mcNavSteps.NextStep(StepId:=nodChild.StepId)
     Loop While (Not nodChild Is Nothing)
  End If
```

```
   mcInstances.Add cNewInstance
   Set cNewInstance.Iterators = DetermineIterators(cNewInstance)

   ' Increment the number of executing steps on the parent
   cParentInstance.ChildExecuted (cExecStep.StepId)

   Set CreateInstance = cNewInstance

   Exit Function

CreateInstanceErr:
   ' Log the error code raised by Visual Basic
   Call LogErrors(Errors)
   On Error GoTo 0
   mstrSource = mstrModuleName & "CreateInstance"
   Err.Raise vbObjectError + errCreateInstanceFailed, _
         mstrSource, LoadResString(errCreateInstanceFailed)

End Function
Private Function DetermineIterators(cInstanceRec As cInstance) As cRunColIt
   ' Returns a collection of all the iterator values for this
   ' instance - since an iterator that is defined at a
   ' particular level can be used in all it's substeps, we
   ' need to navigate the step tree all the way to the root

   Dim cRunIts As cRunColIt
   Dim cRunIt As cRunItNode
   Dim cStepIt As cIterator
   Dim cParentInst As cInstance
   Dim cSubStepRec As cSubStep
   Dim cSubStepDtls As cStep
   Dim lngSubStepId As Long
   Dim lngIndex As Long

   On Error GoTo DetermineIteratorsErr

   Set cRunIts = New cRunColIt

   If cInstanceRec.ParentInstanceId > 0 Then
      ' The last iterator for an instance of a step is stored
      ' on it's parent! So navigate up before beginning the
      ' search for iterator values.
      Set cParentInst = mcInstances.QueryInstance(cInstanceRec.ParentInstanceId)

      ' Get the sub-step record for the current step
      ' on it's parent's instance!
      lngSubStepId = cInstanceRec.Step.StepId
      Set cSubStepRec = cParentInst.QuerySubStep(lngSubStepId)
      Set cSubStepDtls = mcRunSteps.QueryStep(lngSubStepId)

      ' And determine the next iteration value for the
      ' substep in this instance
      Set cStepIt = cSubStepRec.NewIteration(cSubStepDtls)
```

```
      If Not cStepIt Is Nothing Then
         ' Add the iterator details to the collection since
         ' an iterator has been defined for the step
         Set cRunIt = New cRunItNode
         cRunIt.IteratorName = cSubStepDtls.IteratorName
         cRunIt.Value = SubstituteParameters(cStepIt.Value, cSubStepDtls.WorkspaceId,
WspParameters:=mcParameters)
         cRunIt.StepId = cSubStepRec.StepId
         cRunIts.Push cRunIt
      End If

      ' Since the parent instance has all the iterators upto
      ' that level, read them and push them on to the stack for
      ' this instance
      For lngIndex = 0 To cParentInst.Iterators.Count - 1
         Set cRunIt = cParentInst.Iterators(lngIndex)
         cRunIts.Push cRunIt
      Next lngIndex
   End If

   Set DetermineIterators = cRunIts

   Exit Function

DetermineIteratorsErr:
   ' Log the error code raised by Visual Basic
   Call LogErrors(Errors)
   On Error GoTo 0
   mstrSource = mstrModuleName & "DetermineIterators"
   Err.Raise vbObjectError + errExecInstanceFailed, _
         mstrSource, LoadResString(errExecInstanceFailed)

End Function
Private Function DetermineConstraints(cInstanceRec As cInstance, _
      intConsType As ConstraintType) As Variant
   ' Returns a collection of all the constraints for this
   ' instance of the passed in type - all the constraints defined
   ' for the manager are executed first, followed by those defined
   ' for the step. If a step has an iterator defined for it, each
   ' constraint is executed only once.

   Dim cParentInst As cInstance
   Dim cTempInst As cInstance
   Dim vntConstraints As Variant
   Dim vntTempCons As Variant
   Dim cColConstraints() As Variant
   Dim lngConsCount As Long

   On Error GoTo DetermineConstraintsErr

   Set cTempInst = cInstanceRec
   lngConsCount = 0
```

```
  ' Go all the way to the root
  Do
     If cTempInst.ParentInstanceId > 0 Then
        Set cParentInst = mcInstances.QueryInstance(cTempInst.ParentInstanceId)
     Else
        Set cParentInst = Nothing
     End If

     ' Check if the step has an iterator defined for it
     If cTempInst.ValidForIteration(cParentInst, intConsType) Then
        vntTempCons = mcRunConstraints.ConstraintsForStep( _
              cTempInst.Step.StepId, cTempInst.Step.VersionNo, _
              intConsType, blnSort:=True, _
              blnGlobal:=False, blnGlobalConstraintsOnly:=False)

        If Not IsEmpty(vntTempCons) Then
           ReDim Preserve cColConstraints(lngConsCount)
           cColConstraints(lngConsCount) = vntTempCons
           lngConsCount = lngConsCount + 1
        End If
     End If

     Set cTempInst = cParentInst

  Loop While Not cTempInst Is Nothing

  If lngConsCount > 0 Then
     vntTempCons = OrderConstraints(cColConstraints, intConsType)
  End If

  DetermineConstraints = vntTempCons

  Exit Function

DetermineConstraintsErr:
  ' Log the error code raised by Visual Basic
  Call LogErrors(Errors)
  On Error GoTo 0
  mstrSource = mstrModuleName & "DetermineConstraints"
  Err.Raise vbObjectError + errExecInstanceFailed, _
        mstrSource, LoadResString(errExecInstanceFailed)

End Function
Private Function GetInstanceToExecute(cParentNode As cInstance, _
     cSubStepRec As cSubStep, _
     cSubStepDtls As cStep) As cInstance

  Dim cSubStepInst As cInstance

  On Error GoTo GetInstanceToExecuteErr

  BugAssert Not (cParentNode Is Nothing Or _
        cSubStepRec Is Nothing Or _
        cSubStepDtls Is Nothing), _
```

```
        "GetInstanceToExecute: Input invalid"

  ' Check if it has iterators
  If cSubStepDtls.IteratorCount = 0 Then
     ' Check if the step has been executed
     If cSubStepRec.TasksRunning = 0 And cSubStepRec.TasksComplete = 0 And _
           Not mcInstances.CompletedInstanceExists(cParentNode.InstanceId, cSubStepDtls) Then
        ' The sub-step hasn't been executed yet.
        ' Create an instance for it and exit
        Set cSubStepInst = CreateInstance(cSubStepDtls, cParentNode)
     Else
        Set cSubStepInst = Nothing
     End If
  Else
     ' Check if there are pending iterations for the sub-step
     If Not cSubStepRec.NextIteration(cSubStepDtls) Is Nothing Then
        ' Pending iterations exist - create an instance for the sub-step and exit
        Set cSubStepInst = CreateInstance(cSubStepDtls, cParentNode)
     Else
        ' No more iterations - continue with the next substep
        Set cSubStepInst = Nothing
     End If
  End If

  Set GetInstanceToExecute = cSubStepInst
  Exit Function

GetInstanceToExecuteErr:
  ' Log the error code raised by Visual Basic
  Call LogErrors(Errors)
  On Error GoTo 0
  mstrSource = mstrModuleName & "GetInstanceToExecute"
  Err.Raise vbObjectError + errNavInstancesFailed, _
        mstrSource, LoadResString(errNavInstancesFailed)

End Function

Public Function InstancesForStep(lngStepId As Long, ByRef StepStatus As InstanceStatus) As cInstances
  ' Returns an array of all the instances for a step
  Dim lngIndex As Long
  Dim cTempInst As cInstance
  Dim cStepInstances As cInstances
  Dim cStepRec As cStep

  On Error GoTo InstancesForStepErr

  Set cStepInstances = New cInstances

  For lngIndex = 0 To mcInstances.Count - 1
     Set cTempInst = mcInstances(lngIndex)

     If cTempInst.Step.StepId = lngStepId Then
        cStepInstances.Add cTempInst
     End If
```

```
  Next lngIndex

  If cStepInstances.Count = 0 Then
     Set cStepRec = mcRunSteps.QueryStep(lngStepId)
     If Not mcFailures.ExecuteSubStep(cStepRec.ParentStepId) Then
        StepStatus = gintAborted
     End If
     Set cStepRec = Nothing
  End If

  ' Set the return value of the function to the array of
  ' constraints that has been built above
  Set InstancesForStep = cStepInstances

  Set cStepInstances = Nothing
  Exit Function

InstancesForStepErr:
  ' Log the error code raised by Visual Basic
  Call LogErrors(Errors)
  On Error GoTo 0
  mstrSource = mstrModuleName & "InstancesForStep"
  Err.Raise vbObjectError + errNavInstancesFailed, mstrSource, _
        LoadResString(errNavInstancesFailed)

End Function
Private Sub RemoveFreeProcess(lngRunningProcess As Long)
  ' Removes the passed in element from the collection of
  ' free objects

  ' Confirm that the last element in the array is the one
  ' we need to delete
  If mcFreeSteps(mcFreeSteps.Count - 1) = lngRunningProcess Then
     mcFreeSteps.Delete Position:=mcFreeSteps.Count - 1
  Else
     ' Ask the class to find the element and delete it
     mcFreeSteps.Delete Item:=lngRunningProcess
  End If

End Sub
Private Sub AddFreeProcess(lngTerminatedProcess As Long)
  ' Adds the passed in element to the collection of
  ' free objects

  mcFreeSteps.Add lngTerminatedProcess

End Sub

Private Sub ResetForm(Optional ByVal lngIndex As Long)

  Dim lngTemp As Long

  On Error GoTo ResetFormErr
```

```
  ' Check if there are any running instances to wait for
  If mcFreeSteps.Count <> glngNumConcurrentProcesses Then

     For lngTemp = 0 To mcFreeSteps.Count - 1
        If mcFreeSteps(lngTemp) = lngIndex Then
           Exit For
        End If
     Next lngTemp

     If lngTemp <= mcFreeSteps.Count - 1 Then
        ' This process that just completed did not exist in the list of
        ' free processes
        Call AddFreeProcess(lngIndex)
     End If

     If Not AnyStepRunning(mcFreeSteps, mbarrFree) Then
        WriteToWspLog (mintRunComplete)
        ' All steps are complete
        RaiseEvent RunComplete(Determine64BitTime())
     End If
  Else
     WriteToWspLog (mintRunComplete)
     RaiseEvent RunComplete(Determine64BitTime())
  End If

  Exit Sub

ResetFormErr:

End Sub
Private Function NewInstanceId() As Long
  ' Will return new instance id's - uses a static counter
  ' that it increments each time
  Static lngInstance As Long

  lngInstance = lngInstance + 1
  NewInstanceId = lngInstance

End Function

Private Function RunPendingStepInBranch(strCurBranchRoot As String, _
     Optional cExecInstance As cInstance = Nothing) As cInstance
  ' Runs a worker step in the branch being executed, if
  ' there are any pending execution
  ' This function is also called when a step has just completed
  ' execution - in which case the terminated instance is
  ' passed in as the optional parameter. When that happens,
  ' we first try to execute the siblings of the terminated
  ' step if any are pending execution.
  ' If the terminated instance has not been passed in, we
  ' start with the dummy root instance and navigate down,
  ' trying to find a pending worker step.

  Dim cExecSubStep As cStep
```

```
Dim cParentInstance As cInstance
Dim cNextInst As cInstance

On Error GoTo RunPendingStepInBranchErr

If Not cExecInstance Is Nothing Then
   ' Called when an instance has terminated
   ' When a worker step terminates, then we need to
   ' decremement the number of running steps on it's
   ' manager
   Set cParentInstance = _
         mcInstances.QueryInstance(cExecInstance.ParentInstanceId)

Else
   If StringEmpty(strCurBranchRoot) Or mcDummyRootInstance Is Nothing Then
      ' Run complete - event raised by Run method
      Set RunPendingStepInBranch = Nothing
      Exit Function
   End If

   ' If there are no pending steps on the root instance,
   ' then there are no steps within the branch that need
   ' to be executed
   If mcDummyRootInstance.AllComplete Or mcDummyRootInstance.AllStarted Then
      Set RunPendingStepInBranch = Nothing
      Exit Function
   End If

   Set cParentInstance = mcDummyRootInstance
End If

Do
   Set cNextInst = GetSubStepToExecute(cParentInstance)
   If cNextInst Is Nothing Then
      ' There are no steps within the branch that can
      ' be executed - If we are at the dummy instance,
      ' this branch has completed executing
      If cParentInstance.Key = mstrDummyRootKey Then
         Set cNextInst = Nothing
         Exit Do
      Else
         ' Go to the parent instance and try to find
         ' some other sibling is pending execution
         Set cNextInst = mcInstances.QueryInstance(cParentInstance.ParentInstanceId)

         If cParentInstance.SubSteps.Count = 0 Then
            cNextInst.ChildTerminated cParentInstance.Step.StepId
         End If
      End If
   End If

   BugAssert Not cNextInst Is Nothing
   Set cParentInstance = cNextInst
```

```
  Loop While cNextInst.Step.StepType <> gintWorkerStep

  If Not cNextInst Is Nothing Then
    Call ExecuteStep(cNextInst)
  End If

  Set RunPendingStepInBranch = cNextInst

  Exit Function

RunPendingStepInBranchErr:
  ' Log the error code raised by Visual Basic
  Call LogErrors(Errors)
  On Error GoTo 0
  Err.Raise vbObjectError + errNavInstancesFailed, _
        mstrModuleName & "RunPendingStepInBranch", LoadResString(errNavInstancesFailed)

End Function
Private Function RunPendingSibling(cTermInstance As cInstance, _
    dtmCompleteTime As Currency) As cInstance
  ' This process is called when a step terminates. Tries to
  ' run a sibling of the terminated step, if one is pending
  ' execution.

  Dim cParentInstance As cInstance
  Dim cNextInst As cInstance

  On Error GoTo RunPendingSiblingErr

  If StringEmpty(mstrCurBranchRoot) Or mcDummyRootInstance Is Nothing Then
    ' Run complete - event raised by Run method
    Set RunPendingSibling = Nothing
    Exit Function
  End If

  BugAssert cTermInstance.ParentInstanceId > 0, "Orphaned instance in array!"

  ' When a worker step terminates, then we need to
  ' decremement the number of running steps on it's
  ' manager
  Set cParentInstance = mcInstances.QueryInstance(cTermInstance.ParentInstanceId)

  ' Decrement the number of running processes on the
  ' parent by 1
  Call cParentInstance.ChildTerminated(cTermInstance.Step.StepId)

  ' The first step that terminates has to be a worker
  ' If it is complete, update the completed steps on the
  ' parent by 1.
  Call cParentInstance.ChildCompleted(cTermInstance.Step.StepId)
  cParentInstance.AllStarted = False

  Do
    Set cNextInst = GetSubStepToExecute(cParentInstance, dtmCompleteTime)
```

```
      If cNextInst Is Nothing Then
         If cParentInstance.Key = mstrDummyRootKey Then
            Set cNextInst = Nothing
            Exit Do
         Else
            ' Go to the parent instance and try to find
            ' some other sibling is pending execution
            Set cNextInst = mcInstances.QueryInstance(cParentInstance.ParentInstanceId)
            If cParentInstance.IsRunning Then
               cNextInst.AllStarted = True
            Else
               ' No more sub-steps to execute
               Call cNextInst.ChildCompleted(cParentInstance.Step.StepId)
               Call cNextInst.ChildTerminated(cParentInstance.Step.StepId)
               cNextInst.AllStarted = False
            End If
         End If
      End If

      BugAssert Not cNextInst Is Nothing
      Set cParentInstance = cNextInst

   Loop While cNextInst.Step.StepType <> gintWorkerStep

   If Not cNextInst Is Nothing Then
      Call ExecuteStep(cNextInst)
   End If

   Set RunPendingSibling = cNextInst

   Exit Function

RunPendingSiblingErr:
   ' Log the error code raised by Visual Basic
   Call LogErrors(Errors)
   On Error GoTo 0
   mstrSource = mstrModuleName & "RunPendingSibling"
   Err.Raise vbObjectError + errNavInstancesFailed, mstrSource, _
      LoadResString(errNavInstancesFailed)

End Function
Private Sub RunPendingSiblings(cTermInstance As cInstance, _
      dtmCompleteTime As Currency)
   ' This process is called when a step terminates. Tries to
   ' run siblings of the terminated step, if they are pending
   ' execution.

   Dim cExecInst As cInstance

   On Error GoTo RunPendingSiblingsErr
   BugMessage "In RunPendingSiblings"

   ' Call a procedure to run the sibling of the terminated
```

```
  ' step, if any. This procedure will also update the
  ' number of complete/running tasks on the manager steps.
  Set cExecInst = RunPendingSibling(cTermInstance, dtmCompleteTime)

  If Not cExecInst Is Nothing Then
     Do
        ' Execute any other pending steps in the branch.
        ' The step that has just terminated might be
        ' the last one that was executing in a sub-branch.
        ' That would mean that we can execute another
        ' sub-branch that might involve more than 1 step.
        ' Pass the just executed step as a parameter.
        Set cExecInst = RunPendingStepInBranch(mstrCurBranchRoot, cExecInst)
     Loop While Not cExecInst Is Nothing
  Else
     If Not mcDummyRootInstance.IsRunning Then
        ' All steps have been executed in the branch - run
        ' a new branch
        Call RunNewBranch
     Else
        ' There are no more steps to execute in the current
        ' branch but we have running processes.
     End If
  End If

  Exit Sub

RunPendingSiblingsErr:
  ' Log the error code raised by Visual Basic
  Call LogErrors(Errors)
  On Error GoTo 0
  mstrSource = mstrModuleName & "RunPendingSiblings"
  Err.Raise vbObjectError + errNavInstancesFailed, _
        mstrSource, LoadResString(errNavInstancesFailed)

End Sub

Private Sub NoSubStepsToExecute(cMgrInstance As cInstance, Optional dtmCompleteTime As Currency =
gdtmEmpty)
  ' Called when we cannot find any more substeps to run for
  ' manager step - set the allcomplete or allstarted
  ' properties to true

  If cMgrInstance.IsRunning() Then
     cMgrInstance.AllStarted = True
  Else
     cMgrInstance.AllComplete = True
     If dtmCompleteTime <> gdtmEmpty Then
        ' Update the end time on the manager step
        Call TimeCompleteUpdateForStep(cMgrInstance, dtmCompleteTime)
     End If
  End If

End Sub
```

```
Private Function GetSubStepToExecute(cParentNode As cInstance, _
      Optional dtmCompleteTime As Currency = 0) As cInstance
   ' Returns the child of the passed in node that is to be
   ' executed next. Checks if we are in the middle of an instance
   ' being executed in which case it returns the pending
   ' instance. Creates a new instance if there are pending
   ' instances for a sub-step.

   Dim lngIndex As Long
   Dim cSubStepRec As cSubStep
   Dim cSubStepDtls As cStep
   Dim cSubStepInst As cInstance

   On Error GoTo GetSubStepToExecuteErr

   ' There are a number of cases that need to be accounted
   ' for here.
   ' 1. While traversing through all enabled nodes for the
   ' first time - instance records may not exist for the
   ' substeps.
   ' 2. Instance records exist, and there are processes
   ' that need to be executed for a sub-step
   ' 3. There are no more processes that need to be currently
   ' executed (till a process completes)
   ' 4. There are no more processes that need to be executed
   ' (All substeps have completed execution)

   ' This is the only point where we check the Abort flag -
   ' since this is the heart of the navigation routine that
   ' selects processes to execute. Also, when a step terminates
   ' selection of the next process goes through here.
   If mblnAbort Then
      Set GetSubStepToExecute = Nothing
      cParentNode.Status = gintAborted
      Exit Function
   End If

   If mblnAsk Then
      Set GetSubStepToExecute = Nothing
      Exit Function
   End If

   If Not mcFailures.ExecuteSubStep(cParentNode.Step.StepId) Then
      Set GetSubStepToExecute = Nothing
      cParentNode.Status = gintAborted
      Exit Function
   End If

   ' First check if there are pending steps for the parent!
   If cParentNode.IsPending Then
      ' Loop through all the sub-steps for the parent node
      For lngIndex = 0 To cParentNode.SubSteps.Count - 1
         Set cSubStepRec = cParentNode.SubSteps(lngIndex)
```

```
        Set cSubStepDtls = mcRunSteps.QueryStep(cSubStepRec.StepId)
        If Not mcInstances.InstanceAborted(cSubStepRec) Then
           ' Check if the sub-step is a worker
           If cSubStepDtls.StepType = gintWorkerStep Then
              ' Find/create an instance to execute
              Set cSubStepInst = GetInstanceToExecute( _
                    cParentNode, cSubStepRec, cSubStepDtls)
              If Not cSubStepInst Is Nothing Then
                 Exit For
              Else
                 ' Continue w/ the next sub-step
              End If
           Else
              ' The sub-step is a manager step
              ' Check if there are any pending instances for
              ' the manager
              Set cSubStepInst = mcInstances.QueryPendingInstance( _
                    cParentNode.InstanceId, cSubStepRec.StepId)
              If cSubStepInst Is Nothing Then
                 ' Find/create an instance to execute
                 Set cSubStepInst = GetInstanceToExecute( _
                       cParentNode, cSubStepRec, cSubStepDtls)
                 If Not cSubStepInst Is Nothing Then
                    Exit For
                 Else
                    ' Continue w/ the next sub-step
                 End If
              Else
                 ' We have found a pending instance for the
                 ' sub-step (manager) - exit the loop
                 Exit For
              End If
           End If
        End If
     Next lngIndex

     If lngIndex > cParentNode.SubSteps.Count - 1 Or cParentNode.SubSteps.Count = 0 Then
        ' If we could not find any sub-steps to execute,
        ' mark the parent node as complete/all started
        Call NoSubStepsToExecute(cParentNode, dtmCompleteTime)
        Set cSubStepInst = Nothing
     End If
  End If

  Set GetSubStepToExecute = cSubStepInst
  Exit Function

GetSubStepToExecuteErr:
  ' Log the error code raised by Visual Basic
  Call LogErrors(Errors)
  On Error GoTo 0
  mstrSource = mstrModuleName & "GetSubStepToExecute"
  Err.Raise vbObjectError + errNavInstancesFailed, mstrSource, _
     LoadResString(errNavInstancesFailed)
```

```
End Function

Private Sub TimeCompleteUpdateForStep(cMgrInstance As cInstance, ByVal EndTime As Currency)

  ' Called when there are no more sub-steps to execute for
  ' the manager step. It updates the end time and status on
  ' the manager.
  Dim lElapsed As Long

  On Error GoTo TimeCompleteUpdateForStepErr

  If cMgrInstance.Key <> mstrDummyRootKey Then
     cMgrInstance.EndTime = EndTime
     cMgrInstance.Status = gintComplete
     lElapsed = (EndTime - cMgrInstance.StartTime) * 10000
     cMgrInstance.ElapsedTime = lElapsed
     RaiseEvent StepComplete(cMgrInstance.Step, EndTime, cMgrInstance.InstanceId, lElapsed)
  End If

  Exit Sub

TimeCompleteUpdateForStepErr:
  ' Log the error code raised by Visual Basic
  Call LogErrors(Errors)
  WriteError errUpdateDisplayFailed, mstrModuleName & "TimeCompleteUpdateForStep"

End Sub

Private Function GetFreeObject() As Long

  ' Check the array of free objects and retrieve the first one
  If mcFreeSteps.Count > 0 Then
     GetFreeObject = mcFreeSteps(mcFreeSteps.Count - 1)
  Else
     mstrSource = mstrModuleName & "GetFreeObject"
     ShowError errMaxProcessesExceeded
     On Error GoTo 0
     Err.Raise vbObjectError + errMaxProcessesExceeded, _
           mstrSource, _
           LoadResString(errMaxProcessesExceeded)
  End If

End Function
Private Function StepTerminated(cCompleteStep As cStep, ByVal dtmCompleteTime As Currency, _
     ByVal lngIndex As Long, ByVal InstanceId As Long, ByVal ExecutionStatus As InstanceStatus) As cStep
  ' This procedure is called whenever a step terminates.
  Dim cTermRec As cTermStep
  Dim cInstRec As cInstance
  Dim cStartInst As cInstance
  Dim lElapsed As Long
  Dim sLogLabel As String
  Dim LogLabels As New cVectorStr
  Dim iItIndex As Long
```

```
  On Error GoTo StepTerminatedErr

  Set cInstRec = mcInstances.QueryInstance(InstanceId)
  If dtmCompleteTime <> 0 And cInstRec.StartTime <> 0 Then
     ' Convert to milliseconds since that is the default precision
     lElapsed = (dtmCompleteTime - cInstRec.StartTime) * 10000
  Else
     lElapsed = 0
  End If

  Set cStartInst = cInstRec
  iItIndex = 0
  Do While cInstRec.Key <> mstrDummyRootKey
     sLogLabel = gstrSQ & cInstRec.Step.StepLabel & gstrSQ

     If iItIndex < cInstRec.Iterators.Count Then
        If cStartInst.Iterators(iItIndex).StepId = cInstRec.Step.StepId Then
           sLogLabel = sLogLabel & msIt & gstrSQ & cStartInst.Iterators(iItIndex).IteratorName & gstrSQ & _
                 msItValue & gstrSQ & cStartInst.Iterators(iItIndex).Value & gstrSQ
           iItIndex = iItIndex + 1
        End If
     End If

     If cInstRec.Key = cStartInst.Key Then
        ' Append the execution status
        sLogLabel = sLogLabel & " Status: " & gstrSQ & gsExecutionStatus(ExecutionStatus) & gstrSQ
        If ExecutionStatus = gintFailed Then
           ' Append the continuation criteria for the step since it failed
           sLogLabel = sLogLabel & " Continuation Criteria: " & gstrSQ &
gsContCriteria(cInstRec.Step.ContinuationCriteria) & gstrSQ
        End If
     End If
     LogLabels.Add sLogLabel

     Set cInstRec = mcInstances.QueryInstance(cInstRec.ParentInstanceId)
  Loop

  Call WriteToWspLog(mintStepComplete, LogLabels, dtmCompleteTime)
  Set LogLabels = Nothing

  ' Adds the terminated step details to a queue.
  Set cTermRec = New cTermStep
  cTermRec.ExecutionStatus = ExecutionStatus
  cTermRec.Index = lngIndex
  cTermRec.InstanceId = InstanceId
  cTermRec.TimeComplete = dtmCompleteTime
  Call mcTermSteps.Add(cTermRec)
  Set cTermRec = Nothing

  RaiseEvent StepComplete(cCompleteStep, dtmCompleteTime, InstanceId, lElapsed)

  Exit Function
```

```
StepTerminatedErr:
  ' Log the error code raised by Visual Basic
  Call LogErrors(Errors)
  WriteError errExecuteBranchFailed, mstrSource
  Call ResetForm(lngIndex)

End Function
Public Property Let RootKey(ByVal vdata As String)

  mstrRootKey = vdata

End Property

Public Property Get RootKey() As String
  RootKey = mstrRootKey
End Property

Private Function InitExecStep() As cRunStep
  ' Since arrays of objects cannot be declared as WithEvents,
  ' we use a limited number of objects and set a maximum
  ' on the number of steps that can run in parallel
  ' This is a wrapper that will create an instance of
  ' a cExecuteSM object depending on the index
  Dim lngIndex As Long

  On Error GoTo InitExecStepErr

  lngIndex = GetFreeObject

  Select Case lngIndex + 1
    Case 1
      Set cExecStep1 = New cRunStep
      Set InitExecStep = cExecStep1
    Case 2
      Set cExecStep2 = New cRunStep
      Set InitExecStep = cExecStep2
    Case 3
      Set cExecStep3 = New cRunStep
      Set InitExecStep = cExecStep3
    Case 4
      Set cExecStep4 = New cRunStep
      Set InitExecStep = cExecStep4
    Case 5
      Set cExecStep5 = New cRunStep
      Set InitExecStep = cExecStep5
    Case 6
      Set cExecStep6 = New cRunStep
      Set InitExecStep = cExecStep6
    Case 7
      Set cExecStep7 = New cRunStep
      Set InitExecStep = cExecStep7
    Case 8
      Set cExecStep8 = New cRunStep
      Set InitExecStep = cExecStep8
```

```
Case 9
   Set cExecStep9 = New cRunStep
   Set InitExecStep = cExecStep9
Case 10
   Set cExecStep10 = New cRunStep
   Set InitExecStep = cExecStep10
Case 11
   Set cExecStep11 = New cRunStep
   Set InitExecStep = cExecStep11
Case 12
   Set cExecStep12 = New cRunStep
   Set InitExecStep = cExecStep12
Case 13
   Set cExecStep13 = New cRunStep
   Set InitExecStep = cExecStep13
Case 14
   Set cExecStep14 = New cRunStep
   Set InitExecStep = cExecStep14
Case 15
   Set cExecStep15 = New cRunStep
   Set InitExecStep = cExecStep15
Case 16
   Set cExecStep16 = New cRunStep
   Set InitExecStep = cExecStep16
Case 17
   Set cExecStep17 = New cRunStep
   Set InitExecStep = cExecStep17
Case 18
   Set cExecStep18 = New cRunStep
   Set InitExecStep = cExecStep18
Case 19
   Set cExecStep19 = New cRunStep
   Set InitExecStep = cExecStep19
Case 20
   Set cExecStep20 = New cRunStep
   Set InitExecStep = cExecStep20
Case 21
   Set cExecStep21 = New cRunStep
   Set InitExecStep = cExecStep21
Case 22
   Set cExecStep22 = New cRunStep
   Set InitExecStep = cExecStep22
Case 23
   Set cExecStep23 = New cRunStep
   Set InitExecStep = cExecStep23
Case 24
   Set cExecStep24 = New cRunStep
   Set InitExecStep = cExecStep24
Case 25
   Set cExecStep25 = New cRunStep
   Set InitExecStep = cExecStep25
Case 26
   Set cExecStep26 = New cRunStep
   Set InitExecStep = cExecStep26
```

```
Case 27
   Set cExecStep27 = New cRunStep
   Set InitExecStep = cExecStep27
Case 28
   Set cExecStep28 = New cRunStep
   Set InitExecStep = cExecStep28
Case 29
   Set cExecStep29 = New cRunStep
   Set InitExecStep = cExecStep29
Case 30
   Set cExecStep30 = New cRunStep
   Set InitExecStep = cExecStep30
Case 31
   Set cExecStep31 = New cRunStep
   Set InitExecStep = cExecStep31
Case 32
   Set cExecStep32 = New cRunStep
   Set InitExecStep = cExecStep32
Case 33
   Set cExecStep33 = New cRunStep
   Set InitExecStep = cExecStep33
Case 34
   Set cExecStep34 = New cRunStep
   Set InitExecStep = cExecStep34
Case 35
   Set cExecStep35 = New cRunStep
   Set InitExecStep = cExecStep35
Case 36
   Set cExecStep36 = New cRunStep
   Set InitExecStep = cExecStep36
Case 37
   Set cExecStep37 = New cRunStep
   Set InitExecStep = cExecStep37
Case 38
   Set cExecStep38 = New cRunStep
   Set InitExecStep = cExecStep38
Case 39
   Set cExecStep39 = New cRunStep
   Set InitExecStep = cExecStep39
Case 40
   Set cExecStep40 = New cRunStep
   Set InitExecStep = cExecStep40
Case 41
   Set cExecStep41 = New cRunStep
   Set InitExecStep = cExecStep41
Case 42
   Set cExecStep42 = New cRunStep
   Set InitExecStep = cExecStep42
Case 43
   Set cExecStep43 = New cRunStep
   Set InitExecStep = cExecStep43
Case 44
   Set cExecStep44 = New cRunStep
   Set InitExecStep = cExecStep44
```

```
Case 45
   Set cExecStep45 = New cRunStep
   Set InitExecStep = cExecStep45
Case 46
   Set cExecStep46 = New cRunStep
   Set InitExecStep = cExecStep46
Case 47
   Set cExecStep47 = New cRunStep
   Set InitExecStep = cExecStep47
Case 48
   Set cExecStep48 = New cRunStep
   Set InitExecStep = cExecStep48
Case 49
   Set cExecStep49 = New cRunStep
   Set InitExecStep = cExecStep49
Case 50
   Set cExecStep50 = New cRunStep
   Set InitExecStep = cExecStep50
Case 51
   Set cExecStep51 = New cRunStep
   Set InitExecStep = cExecStep51
Case 52
   Set cExecStep52 = New cRunStep
   Set InitExecStep = cExecStep52
Case 53
   Set cExecStep53 = New cRunStep
   Set InitExecStep = cExecStep53
Case 54
   Set cExecStep54 = New cRunStep
   Set InitExecStep = cExecStep54
Case 55
   Set cExecStep55 = New cRunStep
   Set InitExecStep = cExecStep55
Case 56
   Set cExecStep56 = New cRunStep
   Set InitExecStep = cExecStep56
Case 57
   Set cExecStep57 = New cRunStep
   Set InitExecStep = cExecStep57
Case 58
   Set cExecStep58 = New cRunStep
   Set InitExecStep = cExecStep58
Case 59
   Set cExecStep59 = New cRunStep
   Set InitExecStep = cExecStep59
Case 60
   Set cExecStep60 = New cRunStep
   Set InitExecStep = cExecStep60
Case 61
   Set cExecStep61 = New cRunStep
   Set InitExecStep = cExecStep61
Case 62
   Set cExecStep62 = New cRunStep
   Set InitExecStep = cExecStep62
```

```
Case 63
   Set cExecStep63 = New cRunStep
   Set InitExecStep = cExecStep63
Case 64
   Set cExecStep64 = New cRunStep
   Set InitExecStep = cExecStep64
Case 65
   Set cExecStep65 = New cRunStep
   Set InitExecStep = cExecStep65
Case 66
   Set cExecStep66 = New cRunStep
   Set InitExecStep = cExecStep66
Case 67
   Set cExecStep67 = New cRunStep
   Set InitExecStep = cExecStep67
Case 68
   Set cExecStep68 = New cRunStep
   Set InitExecStep = cExecStep68
Case 69
   Set cExecStep69 = New cRunStep
   Set InitExecStep = cExecStep69
Case 70
   Set cExecStep70 = New cRunStep
   Set InitExecStep = cExecStep70
Case 71
   Set cExecStep71 = New cRunStep
   Set InitExecStep = cExecStep71
Case 72
   Set cExecStep72 = New cRunStep
   Set InitExecStep = cExecStep72
Case 73
   Set cExecStep73 = New cRunStep
   Set InitExecStep = cExecStep73
Case 74
   Set cExecStep74 = New cRunStep
   Set InitExecStep = cExecStep74
Case 75
   Set cExecStep75 = New cRunStep
   Set InitExecStep = cExecStep75
Case 76
   Set cExecStep76 = New cRunStep
   Set InitExecStep = cExecStep76
Case 77
   Set cExecStep77 = New cRunStep
   Set InitExecStep = cExecStep77
Case 78
   Set cExecStep78 = New cRunStep
   Set InitExecStep = cExecStep78
Case 79
   Set cExecStep79 = New cRunStep
   Set InitExecStep = cExecStep79
Case 80
   Set cExecStep80 = New cRunStep
   Set InitExecStep = cExecStep80
```

```
Case 81
   Set cExecStep81 = New cRunStep
   Set InitExecStep = cExecStep81
Case 82
   Set cExecStep82 = New cRunStep
   Set InitExecStep = cExecStep82
Case 83
   Set cExecStep83 = New cRunStep
   Set InitExecStep = cExecStep83
Case 84
   Set cExecStep84 = New cRunStep
   Set InitExecStep = cExecStep84
Case 85
   Set cExecStep85 = New cRunStep
   Set InitExecStep = cExecStep85
Case 86
   Set cExecStep86 = New cRunStep
   Set InitExecStep = cExecStep86
Case 87
   Set cExecStep87 = New cRunStep
   Set InitExecStep = cExecStep87
Case 88
   Set cExecStep88 = New cRunStep
   Set InitExecStep = cExecStep88
Case 89
   Set cExecStep89 = New cRunStep
   Set InitExecStep = cExecStep89
Case 90
   Set cExecStep90 = New cRunStep
   Set InitExecStep = cExecStep90
Case 91
   Set cExecStep91 = New cRunStep
   Set InitExecStep = cExecStep91
Case 92
   Set cExecStep92 = New cRunStep
   Set InitExecStep = cExecStep92
Case 93
   Set cExecStep93 = New cRunStep
   Set InitExecStep = cExecStep93
Case 94
   Set cExecStep94 = New cRunStep
   Set InitExecStep = cExecStep94
Case 95
   Set cExecStep95 = New cRunStep
   Set InitExecStep = cExecStep95
Case 96
   Set cExecStep96 = New cRunStep
   Set InitExecStep = cExecStep96
Case 97
   Set cExecStep97 = New cRunStep
   Set InitExecStep = cExecStep97
Case 98
   Set cExecStep98 = New cRunStep
   Set InitExecStep = cExecStep98
```

```
      Case 99
         Set cExecStep99 = New cRunStep
         Set InitExecStep = cExecStep99
      Case Else
         Set InitExecStep = Nothing
   End Select

   BugMessage "Sending cExecStep" & (lngIndex + 1) & "!"

   If Not InitExecStep Is Nothing Then
      InitExecStep.Index = lngIndex

      ' Remove this element from the collection of free objects
      Call RemoveFreeProcess(lngIndex)
   End If

   Exit Function

InitExecStepErr:
   ' Log the error code raised by Visual Basic
   Call LogErrors(Errors)
   Set InitExecStep = Nothing

End Function
Public Sub Run()
   ' Calls procedures to build a list of all the steps that
   ' need to be executed and to execute them
   ' Determines whether the run has started/terminated and
   ' raises the Run Start and Complete events.
   Dim cTempStep As cStep

   On Error GoTo RunErr

   If StringEmpty(mstrRootKey) Then
      Call ShowError(errExecuteBranchFailed)
      On Error GoTo 0
      Err.Raise vbObjectError + errExecuteBranchFailed, mstrModuleName & "Run", _
            LoadResString(errExecuteBranchFailed)
   Else
      ' Execute the first branch
      WriteToWspLog (mintRunStart)
      RaiseEvent RunStart(Determine64BitTime(), mcWspLog.FileName)

      If mcNavSteps.HasChild(StepKey:=mstrRootKey) Then
         Set cTempStep = mcNavSteps.ChildStep(StepKey:=mstrRootKey)
         mstrCurBranchRoot = MakeKeyValid(cTempStep.StepId, cTempStep.StepType)

         Call CreateDummyInstance(mstrCurBranchRoot)

         ' Run all pending steps in the branch
         If Not RunBranch(mstrCurBranchRoot) Then
            ' Execute a new branch if there aren't any
            ' steps to run
            Call RunNewBranch
```

```
        End If
      Else
        WriteToWspLog (mintRunComplete)
        ' No children to execute - the run is complete
        RaiseEvent RunComplete(Determine64BitTime())
      End If
    End If

    Exit Sub

RunErr:
    ' Log the error code raised by Visual Basic
    Call LogErrors(Errors)
    Call ShowError(errExecuteBranchFailed, OptArgs:=mstrCurBranchRoot)
    Call ResetForm

End Sub
Private Sub RunNewBranch()
    ' We will build a tree of all instances that occur and
    ' the count of the sub-steps that are running will be
    ' stored at each node in the tree (maintained internally
    ' as an array). Since there can be multiple iterations
    ' of the top level nodes running at the same time, we
    ' create a dummy node at the root that keeps a record of
    ' the instances of the top level node.

    ' Determines whether the run has started/terminated and
    ' raises the Run Start and Complete events.
    Dim cNextStep As cStep
    Dim bRunComplete As Boolean

    On Error GoTo RunNewBranchErr

    bRunComplete = False

    Do
      If StringEmpty(mstrCurBranchRoot) Then
        Exit Do
'       On Error GoTo 0
'       Err.Raise vbObjectError + errExecuteBranchFailed, mstrSource, _
'           LoadResString(errExecuteBranchFailed)
      Else
        Set cNextStep = mcNavSteps.NextStep(StepKey:=mstrCurBranchRoot)
        If cNextStep Is Nothing Then
          mstrCurBranchRoot = gstrEmptyString
          bRunComplete = True
          Exit Do
        Else
          ' Starting execution of a new branch - initialize the
          ' module-level variable
          mstrCurBranchRoot = MakeKeyValid(cNextStep.StepId, cNextStep.StepType)
          Call CreateDummyInstance(mstrCurBranchRoot)
        End If
      End If
```

```
      Debug.Print "Running new branch: " & mstrCurBranchRoot

  ' Loop until we find a branch that has steps to execute
  Loop While Not RunBranch(mstrCurBranchRoot)

  If bRunComplete Then
     WriteToWspLog (mintRunComplete)
     ' Run is complete
     RaiseEvent RunComplete(Determine64BitTime())
  End If

  Exit Sub

RunNewBranchErr:
  ' Log the error code raised by Visual Basic
  Call LogErrors(Errors)
  Call ShowError(errExecuteBranchFailed, OptArgs:=mstrCurBranchRoot)
  On Error GoTo 0
  mstrSource = mstrModuleName & "RunNewBranch"
  Err.Raise vbObjectError + errExecuteBranchFailed, mstrSource, _
     LoadResString(errExecuteBranchFailed)

End Sub
Private Function RunBranch(strRootNode As String) As Boolean
  ' This procedure is called to run all the necessary steps
  ' in a branch. It can also be called when a step terminates,
  ' in which case the terminated step is passed in as the
  ' optional parameter. When a step terminates, we need to
  ' either wait for some other steps to terminate before
  ' we execute more steps or run as many steps as necessary
  ' Returns True if there are steps currently executing
  ' in the branch, else returns False
  Dim cRunning As cInstance

  On Error GoTo RunBranchErr

  If Not StringEmpty(strRootNode) Then
     ' Call a procedure to execute all the enabled steps
     ' in the branch - will return the step node that is
     ' being executed - nothing means 'No more steps to
     ' execute in the branch'.
     Do
        Set cRunning = RunPendingStepInBranch(strRootNode, cRunning)

     Loop While Not cRunning Is Nothing

     RunBranch = mcDummyRootInstance.IsRunning
  End If

  Exit Function

RunBranchErr:
  ' Log the error code raised by Visual Basic
  Call LogErrors(Errors)
```

```
  On Error GoTo 0
  mstrSource = mstrModuleName & "RunBranch"
  Err.Raise vbObjectError + errExecuteBranchFailed, _
        mstrSource, LoadResString(errExecuteBranchFailed)

End Function
Private Sub TimeUpdateForProcess(StepRecord As cStep, _
      ByVal InstanceId As Long, _
      Optional ByVal StartTime As Currency = 0, _
      Optional ByVal EndTime As Currency = 0, _
      Optional ByVal ElapsedTime As Long = 0, _
      Optional Command As String)
  ' We do not maintain start and end timestamps for the constraint
  ' of a step. Hence we check if the process that just started/
  ' terminated is the worker step that is being executed. If so,
  ' we update the start/end time and status on the instance record.

  Dim cInstanceRec As cInstance
  Dim sItVal As String

  On Error GoTo TimeUpdateForProcessErr

  Set cInstanceRec = mcInstances.QueryInstance(InstanceId)

  If StartTime = 0 Then
     RaiseEvent ProcessComplete(StepRecord, EndTime, InstanceId, ElapsedTime)
  Else
     sItVal = GetInstanceItValue(cInstanceRec)
     RaiseEvent ProcessStart(StepRecord, Command, StartTime, InstanceId, _
           cInstanceRec.ParentInstanceId, sItVal)
  End If

  Call cInstanceRec.UpdateStartTime(StepRecord.StepId, StartTime, EndTime, ElapsedTime)

  Exit Sub

TimeUpdateForProcessErr:
  ' Log the error code raised by Visual Basic
  Call LogErrors(Errors)
  WriteError errUpdateDisplayFailed, mstrModuleName & "TimeUpdateForProcess"

End Sub
Private Sub TimeStartUpdateForStep(StepRecord As cStep, _
      ByVal InstanceId As Long, _
      ByVal StartTime As Currency)

  ' Called when a step starts execution. Checks if this is the
  ' first enabled child of the manager step. If so, updates
  ' the start time and status on the manager.
  ' Also raises the Step Start event for the completed step.

  Dim cStartInst As cInstance
  Dim cInstanceRec As cInstance
  Dim LogLabels As New cVectorStr
```

```
  Dim iItIndex As Long
  Dim sLogLabel As String
  Dim sPath As String
  Dim sIt As String
  Dim sItVal As String

  On Error GoTo TimeStartUpdateForStepErr

  Set cStartInst = mcInstances.QueryInstance(InstanceId)

  ' Determine the step path and iterator values for the step and raise a step start event
  Set cInstanceRec = cStartInst
  Do While cInstanceRec.Key <> mstrDummyRootKey
     If Not StringEmpty(sPath) Then
        sPath = sPath & gstrFileSeparator
     End If
     sPath = sPath & gstrSQ & cInstanceRec.Step.StepLabel & gstrSQ
     Set cInstanceRec = mcInstances.QueryInstance(cInstanceRec.ParentInstanceId)
  Loop

  For iItIndex = cStartInst.Iterators.Count - 1 To 0 Step -1
     If Not StringEmpty(sIt) Then
        sIt = sIt & gstrFileSeparator
     End If
     sIt = sIt & gstrSQ & cStartInst.Iterators(iItIndex).Value & gstrSQ
  Next iItIndex

  sItVal = GetInstanceItValue(cStartInst)
  RaiseEvent StepStart(StepRecord, StartTime, InstanceId, cStartInst.ParentInstanceId, _
        sPath, sIt, sItVal)

  iItIndex = 0
  Set cInstanceRec = cStartInst
  ' Raise a StepStart event for the manager step, if this is it's first sub-step being executed
  Do While cInstanceRec.Key <> mstrDummyRootKey

     sLogLabel = gstrSQ & cInstanceRec.Step.StepLabel & gstrSQ
     If iItIndex < cStartInst.Iterators.Count Then
        If cStartInst.Iterators(iItIndex).StepId = cInstanceRec.Step.StepId Then
           sLogLabel = sLogLabel & msIt & gstrSQ & cStartInst.Iterators(iItIndex).IteratorName & gstrSQ & _
                 msItValue & gstrSQ & cStartInst.Iterators(iItIndex).Value & gstrSQ
           iItIndex = iItIndex + 1
        End If
     End If
     LogLabels.Add sLogLabel

     If cInstanceRec.Key <> cStartInst.Key And cInstanceRec.StartTime = 0 Then
        cInstanceRec.StartTime = StartTime
        cInstanceRec.Status = gintRunning
        sItVal = GetInstanceItValue(cInstanceRec)
        ' The step path and iterator values are not needed for manager steps, since
        ' they are primarily used by the run status form
        RaiseEvent StepStart(cInstanceRec.Step, StartTime, cInstanceRec.InstanceId, _
              cInstanceRec.ParentInstanceId, gstrEmptyString, gstrEmptyString, _
```

```
            sItVal)
      End If

      Set cInstanceRec = mcInstances.QueryInstance(cInstanceRec.ParentInstanceId)
   Loop

   Call WriteToWspLog(mintStepStart, LogLabels, StartTime)
   Set LogLabels = Nothing

   Exit Sub

TimeStartUpdateForStepErr:
   ' Log the error code raised by Visual Basic
   Call LogErrors(Errors)
   WriteError errUpdateDisplayFailed, mstrModuleName & "TimeStartUpdateForStep"

End Sub
Private Sub WriteToWspLog(iLogEvent As WspLogEvents, Optional StepDtls As cVectorStr, _
      Optional dtStamp As Currency = gdtmEmpty)

   ' Writes to the workspace log that is generated for the run. The last three
   ' parameters are valid only for Step Start and Step Complete events.
   Static bError As Boolean
   Dim sLabel As String
   Dim lIndex As Long
   Dim bHdr As Boolean
   Dim cTempConn As cConnection

   On Error GoTo WriteToWspLogErr

   Select Case iLogEvent
      Case mintRunStart
         Set mcWspLog = New cFileSM
         mcWspLog.FileName = GetDefaultDir(WspId, mcParameters) & gstrFileSeparator & _
               Trim(Str(RunId)) & gstrFileSeparator & "SMLog-" & Format(Now, FMT_WSP_LOG_FILE) &
gstrLogFileSuffix
         mcWspLog.WriteLine (JulianDateToString(Determine64BitTime()) & " Start Run: " & vbTab & gstrSQ &
GetWorkspaceDetails(WorkspaceId:=WspId)) & gstrSQ

         ' Write all current parameter values to the log
         bHdr = False
         For lIndex = 0 To mcParameters.ParameterCount - 1
            If mcParameters(lIndex).ParameterType <> gintParameterApplication Then
               If Not bHdr Then
                  mcWspLog.WriteField JulianDateToString(Determine64BitTime()) & " Parameters: "
                  bHdr = True
               Else
                  mcWspLog.WriteField vbTab & vbTab & vbTab
               End If
               mcWspLog.WriteLine vbTab & gstrSQ & mcParameters(lIndex).ParameterName & gstrSQ & vbTab &
vbTab & gstrSQ & mcParameters(lIndex).ParameterValue & gstrSQ
            End If
         Next lIndex
```

```
        ' Write all connection properties to the log
        For lIndex = 0 To RunConnections.Count - 1
           Set cTempConn = RunConnections(lIndex)
           If lIndex = 0 Then
              mcWspLog.WriteField JulianDateToString(Determine64BitTime()) & " Connections: "
           Else
              mcWspLog.WriteField vbTab & vbTab & vbTab
           End If
           mcWspLog.WriteLine vbTab & gstrSQ & cTempConn.ConnectionName & gstrSQ & _
                 vbTab & vbTab & gstrSQ & cTempConn.ConnectionValue & gstrSQ & _
                 vbTab & "No Count: " & gstrSQ & cTempConn.NoCountDisplay & gstrSQ & gstrBlank & _
                 "No Execute: " & gstrSQ & cTempConn.NoExecute & gstrSQ & gstrBlank & _
                 "Parse Query Only: " & gstrSQ & cTempConn.ParseQueryOnly & gstrSQ & gstrBlank & _
                 "Quoted Identifiers: " & gstrSQ & cTempConn.QuotedIdentifiers & gstrSQ & gstrBlank & _
                 "ANSI Nulls: " & gstrSQ & cTempConn.AnsiNulls & gstrSQ & gstrBlank & _
                 "Show Query Plan: " & gstrSQ & cTempConn.ShowQueryPlan & gstrSQ & gstrBlank & _
                 "Show Stats Time: " & gstrSQ & cTempConn.ShowStatsTime & gstrSQ & gstrBlank & _
                 "Show Stats IO: " & gstrSQ & cTempConn.ShowStatsIO & gstrSQ & gstrBlank & _
                 "Row Count" & gstrSQ & cTempConn.RowCount & gstrSQ & gstrBlank & _
                 "Query Timeout" & gstrSQ & cTempConn.QueryTimeOut & gstrSQ
        Next lIndex

     Case mintRunComplete
        BugAssert Not mcWspLog Is Nothing
        mcWspLog.WriteLine (JulianDateToString(Determine64BitTime()) & " Comp. Run: " & vbTab & gstrSQ &
GetWorkspaceDetails(WorkspaceId:=WspId)) & gstrSQ
        Set mcWspLog = Nothing

     Case mintStepStart
        For lIndex = StepDtls.Count - 1 To 0 Step -1
           sLabel = StepDtls(lIndex)
           If lIndex = StepDtls.Count - 1 Then
              mcWspLog.WriteLine JulianDateToString(dtStamp) & " Start Step: " & vbTab & sLabel
           Else
              mcWspLog.WriteLine vbTab & vbTab & vbTab & vbTab & sLabel
           End If
        Next lIndex

     Case mintStepComplete
        For lIndex = StepDtls.Count - 1 To 0 Step -1
           sLabel = StepDtls(lIndex)
           If lIndex = StepDtls.Count - 1 Then
              mcWspLog.WriteLine JulianDateToString(dtStamp) & " Comp. Step: " & vbTab & sLabel
           Else
              mcWspLog.WriteLine vbTab & vbTab & vbTab & vbTab & sLabel
           End If
        Next lIndex

  End Select

  Exit Sub

WriteToWspLogErr:
  If Not bError Then
```

```
      bError = True
   End If

End Sub
'Private Sub WriteToWspLog(iLogEvent As WspLogEvents, Optional StepDtls As cVectorStr, _
'       Optional dtStamp As Date = gdtmEmpty)
'
'   This function uses the LogWriter dll - memory corruption problems since the vb exe
'   and the vc Execute Dll both use the same dll to write.
'    ' Writes to the workspace log that is generated for the run. The last three
'    ' parameters are valid only for StepStart and StepComplete events.
'    Static bError As Boolean
'    Static sFile As String
'    Dim sLabel As String
'    Dim lIndex As Long
'    Dim bHdr As Boolean
'
'    On Error GoTo WriteToWspLogErr
'
'    Select Case iLogEvent
'        Case mintRunStart
'            Set mcWspLog = New LOGWRITERLib.SMLog
'            sFile = App.Path & "\" & "SMLog-" & Format(Now, FMT_WSP_LOG_FILE) & gstrLogFileSuffix
'            mcWspLog.FileName = sFile
'            mcWspLog.Init
'            mcWspLog.WriteLine (Format(Now, FMT_WSP_LOG_DATE) & " Start Run: " & vbTab & gstrSQ &
GetWorkspaceDetails(WorkspaceId:=WspId)) & gstrSQ
'
'            ' Write all current parameter values to the log
'            bHdr = False
'            For lIndex = 0 To mcParameters.ParameterCount - 1
'                If mcParameters(lIndex).ParameterType <> gintParameterApplication Then
'                    If Not bHdr Then
'                        'mcWspLog.WriteLine Format(Now, FMT_WSP_LOG_DATE) & " Parameters: " & vbTab &
gstrSQ & mcParameters(lIndex).ParameterName & gstrSQ & vbTab & vbTab & gstrSQ &
mcParameters(lIndex).ParameterValue & gstrSQ
'                        bHdr = True
'                    Else
'                        'mcWspLog.WriteLine vbTab & vbTab & vbTab & vbTab & gstrSQ &
mcParameters(lIndex).ParameterName & gstrSQ & vbTab & vbTab & gstrSQ &
mcParameters(lIndex).ParameterValue & gstrSQ
'                    End If
'                End If
'            Next lIndex
'
'        Case mintRunComplete
'            BugAssert Not mcWspLog Is Nothing
'            mcWspLog.WriteLine (Format(Now, FMT_WSP_LOG_DATE) & " Comp. Run: " & vbTab & gstrSQ &
GetWorkspaceDetails(WorkspaceId:=WspId)) & gstrSQ
'            Set mcWspLog = Nothing
'
'        Case mintStepStart
'            For lIndex = StepDtls.Count - 1 To 0 Step -1
'                sLabel = StepDtls(lIndex)
```

```
'               If lIndex = StepDtls.Count - 1 Then
'                  mcWspLog.WriteLine Format(dtStamp, FMT_WSP_LOG_DATE) & " Start Step: " & vbTab & sLabel
'               Else
'                  mcWspLog.WriteLine vbTab & vbTab & vbTab & vbTab & sLabel
'               End If
'            Next lIndex
'
'        Case mintStepComplete
'            For lIndex = StepDtls.Count - 1 To 0 Step -1
'               sLabel = StepDtls(lIndex)
'               If lIndex = StepDtls.Count - 1 Then
'                  mcWspLog.WriteLine Format(dtStamp, FMT_WSP_LOG_DATE) & " Comp. Step: " & vbTab &
sLabel
'               Else
'                  mcWspLog.WriteLine vbTab & vbTab & vbTab & vbTab & sLabel
'               End If
'            Next lIndex
'
'    End Select
'
'    Exit Sub
'
'WriteToWspLogErr:
'    If Not bError Then
'        bError = True
'    End If
'
'End Sub
'
Public Property Get WspPreExecution() As Variant
   WspPreExecution = mcvntWspPreCons
End Property
Public Property Let WspPreExecution(ByVal vdata As Variant)
   mcvntWspPreCons = vdata
End Property

Public Property Get WspPostExecution() As Variant
   WspPostExecution = mcvntWspPostCons
End Property
Public Property Let WspPostExecution(ByVal vdata As Variant)
   mcvntWspPostCons = vdata
End Property

Private Sub ExecuteStep(cCurStep As cInstance)
   ' Initializes a cRunStep object with all the properties
   ' corresponding to the step to be executed and calls it's
   ' execute method to execute the step

   Dim cExecStep As cRunStep

   On Error GoTo ExecuteStepErr
   mstrSource = mstrModuleName & "ExecuteStep"

   ' Confirm that the step is a worker
```

```
  If cCurStep.Step.StepType <> gintWorkerStep Then
     On Error GoTo 0
     Err.Raise vbObjectError + errExecInstanceFailed, mstrSource, _
           LoadResString(errExecInstanceFailed)
  End If

  Set cExecStep = InitExecStep()
  ' Exceeded the number of processes that we can run simultaneously
  If cExecStep Is Nothing Then
     ' Raise an error
     On Error GoTo 0
     Err.Raise vbObjectError + errProgramError, mstrSource, _
        LoadResString(errProgramError)
  End If
  ' Initialize the instance id - not needed for step execution
  ' but necessary to identify later which instance completed
  cExecStep.InstanceId = cCurStep.InstanceId

  Set cExecStep.ExecuteStep = cCurStep.Step
  Set cExecStep.Iterators = cCurStep.Iterators
  Set cExecStep.Globals = mcRunSteps
  Set cExecStep.WspParameters = mcParameters
  Set cExecStep.WspConnections = RunConnections
  Set cExecStep.WspConnDtls = RunConnDtls

  ' Initialize all the pre and post-execution constraints that
  ' have been defined globally for the workspace
  cExecStep.WspPreCons = mcvntWspPreCons
  cExecStep.WspPostCons = mcvntWspPostCons

  ' Initialize all the pre and post-execution constraints for
  ' the step being executed
  cExecStep.PreCons = DetermineConstraints(cCurStep, gintPreStep)
  cExecStep.PostCons = DetermineConstraints(cCurStep, gintPostStep)

  cExecStep.RunId = RunId
  cExecStep.CreateInputFiles = CreateInputFiles

  ' Call the execute method to execute the step
  cExecStep.Execute

  Set cExecStep = Nothing

  Exit Sub

ExecuteStepErr:
  ' Log the error code raised by Visual Basic
  Call LogErrors(Errors)
  On Error GoTo 0
  Call ExecutionFailed(cExecStep)

End Sub

Public Property Set Steps(cRunSteps As cArrSteps)
```

```
  Set mcRunSteps = cRunSteps
  Set mcNavSteps.StepRecords = cRunSteps

End Property
Public Property Set Parameters(cParameters As cArrParameters)
  ' A reference to the parameter array - we use it to
  ' substitute parameter values in the step text

  Set mcParameters = cParameters

End Property
Public Property Get Steps() As cArrSteps

  Set Steps = mcRunSteps

End Property
Public Property Get Constraints() As cArrConstraints

  Set Constraints = mcRunConstraints

End Property
Public Property Set Constraints(vdata As cArrConstraints)

  Set mcRunConstraints = vdata

End Property


Private Sub cExecStep1_ProcessComplete(cStepRecord As cStep, _
      dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub


Private Sub cExecStep1_ProcessStart(cStepRecord As cStep, _
      strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub


Private Sub cExecStep1_StepComplete(cStepRecord As cStep, _
      dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep1.Index, InstanceId, Status)

End Sub

Private Sub cExecStep1_StepStart(cStepRecord As cStep, _
      dtmStartTime As Currency, InstanceId As Long)
```

```
  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep9_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub


Private Sub cExecStep9_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub


Private Sub cExecStep9_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep9.Index, InstanceId, Status)

End Sub

Private Sub cExecStep9_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep10_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub


Private Sub cExecStep10_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub


Private Sub cExecStep10_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)
```

```
  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep10.Index, InstanceId, Status)

End Sub

Private Sub cExecStep10_StepStart(cStepRecord As cStep, _
      dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep11_ProcessComplete(cStepRecord As cStep, _
      dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub


Private Sub cExecStep11_ProcessStart(cStepRecord As cStep, _
      strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub


Private Sub cExecStep11_StepComplete(cStepRecord As cStep, _
      dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep11.Index, InstanceId, Status)

End Sub

Private Sub cExecStep11_StepStart(cStepRecord As cStep, _
      dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub
Private Sub cExecStep12_ProcessComplete(cStepRecord As cStep, _
      dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub


Private Sub cExecStep12_ProcessStart(cStepRecord As cStep, _
      strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub
```

```
Private Sub cExecStep12_StepComplete(cStepRecord As cStep, _
      dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

   Call StepTerminated(cStepRecord, dtmEndTime, cExecStep12.Index, InstanceId, Status)

End Sub

Private Sub cExecStep12_StepStart(cStepRecord As cStep, _
      dtmStartTime As Currency, InstanceId As Long)

   Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub
Private Sub cExecStep13_ProcessComplete(cStepRecord As cStep, _
      dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

   Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub


Private Sub cExecStep13_ProcessStart(cStepRecord As cStep, _
      strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

   Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub


Private Sub cExecStep13_StepComplete(cStepRecord As cStep, _
      dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

   Call StepTerminated(cStepRecord, dtmEndTime, cExecStep13.Index, InstanceId, Status)

End Sub

Private Sub cExecStep13_StepStart(cStepRecord As cStep, _
      dtmStartTime As Currency, InstanceId As Long)

   Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub
Private Sub cExecStep14_ProcessComplete(cStepRecord As cStep, _
      dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

   Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub


Private Sub cExecStep14_ProcessStart(cStepRecord As cStep, _
      strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)
```

```
  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub


Private Sub cExecStep14_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep14.Index, InstanceId, Status)

End Sub

Private Sub cExecStep14_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub
Private Sub cExecStep15_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub


Private Sub cExecStep15_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub


Private Sub cExecStep15_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep15.Index, InstanceId, Status)

End Sub

Private Sub cExecStep15_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub
Private Sub cExecStep16_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub
```

```
Private Sub cExecStep16_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub


Private Sub cExecStep16_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep16.Index, InstanceId, Status)

End Sub

Private Sub cExecStep16_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub
Private Sub cExecStep17_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub


Private Sub cExecStep17_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub


Private Sub cExecStep17_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep17.Index, InstanceId, Status)

End Sub

Private Sub cExecStep17_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep18_ProcessComplete(cStepRecord As cStep, _
```

```
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub


Private Sub cExecStep18_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub


Private Sub cExecStep18_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep18.Index, InstanceId, Status)

End Sub

Private Sub cExecStep18_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep19_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub


Private Sub cExecStep19_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub


Private Sub cExecStep19_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep19.Index, InstanceId, Status)

End Sub

Private Sub cExecStep19_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)
```

```
  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep20_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub cExecStep20_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub cExecStep20_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep20.Index, InstanceId, Status)

End Sub

Private Sub cExecStep20_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep21_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub cExecStep21_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub cExecStep21_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep21.Index, InstanceId, Status)

End Sub
```

```
Private Sub cExecStep21_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep22_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub cExecStep22_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub cExecStep22_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep22.Index, InstanceId, Status)

End Sub

Private Sub cExecStep22_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep23_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub cExecStep23_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub cExecStep23_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep23.Index, InstanceId, Status)
```

```
End Sub

Private Sub cExecStep23_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep24_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub cExecStep24_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub cExecStep24_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep24.Index, InstanceId, Status)

End Sub

Private Sub cExecStep24_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep25_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub cExecStep25_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub cExecStep25_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)
```

```
  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep25.Index, InstanceId, Status)

End Sub

Private Sub cExecStep25_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep26_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub cExecStep26_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub cExecStep26_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep26.Index, InstanceId, Status)

End Sub

Private Sub cExecStep26_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep27_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub cExecStep27_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub cExecStep27_StepComplete(cStepRecord As cStep, _
```

```
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep27.Index, InstanceId, Status)

End Sub

Private Sub cExecStep27_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep28_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub cExecStep28_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub cExecStep28_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep28.Index, InstanceId, Status)

End Sub

Private Sub cExecStep28_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep29_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub cExecStep29_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub
```

```
Private Sub cExecStep29_StepComplete(cStepRecord As cStep, _
      dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep29.Index, InstanceId, Status)

End Sub

Private Sub cExecStep29_StepStart(cStepRecord As cStep, _
      dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep30_ProcessComplete(cStepRecord As cStep, _
      dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub cExecStep30_ProcessStart(cStepRecord As cStep, _
      strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub cExecStep30_StepComplete(cStepRecord As cStep, _
      dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep30.Index, InstanceId, Status)

End Sub

Private Sub cExecStep30_StepStart(cStepRecord As cStep, _
      dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep31_ProcessComplete(cStepRecord As cStep, _
      dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub cExecStep31_ProcessStart(cStepRecord As cStep, _
      strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)
```

```
End Sub

Private Sub cExecStep31_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep31.Index, InstanceId, Status)

End Sub

Private Sub cExecStep31_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep32_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub cExecStep32_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub cExecStep32_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep32.Index, InstanceId, Status)

End Sub

Private Sub cExecStep32_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep33_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub cExecStep33_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)
```

```
  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub cExecStep33_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep33.Index, InstanceId, Status)

End Sub

Private Sub cExecStep33_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep34_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub cExecStep34_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub cExecStep34_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep34.Index, InstanceId, Status)

End Sub

Private Sub cExecStep34_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep35_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub
```

```
Private Sub cExecStep35_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub cExecStep35_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep35.Index, InstanceId, Status)

End Sub

Private Sub cExecStep35_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep36_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub cExecStep36_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub cExecStep36_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep36.Index, InstanceId, Status)

End Sub

Private Sub cExecStep36_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep37_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)
```

```
End Sub

Private Sub cExecStep37_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub cExecStep37_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep37.Index, InstanceId, Status)

End Sub

Private Sub cExecStep37_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep38_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub cExecStep38_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub cExecStep38_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep38.Index, InstanceId, Status)

End Sub

Private Sub cExecStep38_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep39_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)
```

```
  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub cExecStep39_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub cExecStep39_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep39.Index, InstanceId, Status)

End Sub

Private Sub cExecStep39_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep40_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub cExecStep40_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub cExecStep40_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep40.Index, InstanceId, Status)

End Sub

Private Sub cExecStep40_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep41_ProcessComplete(cStepRecord As cStep, _
```

```
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub cExecStep41_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub cExecStep41_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep41.Index, InstanceId, Status)

End Sub

Private Sub cExecStep41_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep42_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub cExecStep42_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub cExecStep42_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep42.Index, InstanceId, Status)

End Sub

Private Sub cExecStep42_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub
```

```
Private Sub cExecStep43_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub cExecStep43_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub cExecStep43_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep43.Index, InstanceId, Status)

End Sub

Private Sub cExecStep43_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep44_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub cExecStep44_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub cExecStep44_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep44.Index, InstanceId, Status)

End Sub

Private Sub cExecStep44_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)
```

```
End Sub

Private Sub cExecStep45_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub cExecStep45_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub cExecStep45_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep45.Index, InstanceId, Status)

End Sub

Private Sub cExecStep45_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep46_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub cExecStep46_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub cExecStep46_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep46.Index, InstanceId, Status)

End Sub

Private Sub cExecStep46_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)
```

```
  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep47_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub cExecStep47_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub cExecStep47_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep47.Index, InstanceId, Status)

End Sub

Private Sub cExecStep47_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep48_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub cExecStep48_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub cExecStep48_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep48.Index, InstanceId, Status)

End Sub
```

```
Private Sub cExecStep48_StepStart(cStepRecord As cStep, _
      dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep49_ProcessComplete(cStepRecord As cStep, _
      dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub cExecStep49_ProcessStart(cStepRecord As cStep, _
      strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub cExecStep49_StepComplete(cStepRecord As cStep, _
      dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep49.Index, InstanceId, Status)

End Sub

Private Sub cExecStep49_StepStart(cStepRecord As cStep, _
      dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep50_ProcessComplete(cStepRecord As cStep, _
      dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub cExecStep50_ProcessStart(cStepRecord As cStep, _
      strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub cExecStep50_StepComplete(cStepRecord As cStep, _
      dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep50.Index, InstanceId, Status)
```

```
End Sub

Private Sub cExecStep50_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep51_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub cExecStep51_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub cExecStep51_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep51.Index, InstanceId, Status)

End Sub

Private Sub cExecStep51_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep52_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub cExecStep52_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub cExecStep52_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)
```

```
  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep52.Index, InstanceId, Status)

End Sub

Private Sub cExecStep52_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep53_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub cExecStep53_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub cExecStep53_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep53.Index, InstanceId, Status)

End Sub

Private Sub cExecStep53_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep54_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub cExecStep54_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub cExecStep54_StepComplete(cStepRecord As cStep, _
```

```
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep54.Index, InstanceId, Status)

End Sub

Private Sub cExecStep54_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep55_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub cExecStep55_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub cExecStep55_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep55.Index, InstanceId, Status)

End Sub

Private Sub cExecStep55_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep56_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub cExecStep56_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub
```

```
Private Sub cExecStep56_StepComplete(cStepRecord As cStep, _
      dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

   Call StepTerminated(cStepRecord, dtmEndTime, cExecStep56.Index, InstanceId, Status)

End Sub

Private Sub cExecStep56_StepStart(cStepRecord As cStep, _
      dtmStartTime As Currency, InstanceId As Long)

   Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep57_ProcessComplete(cStepRecord As cStep, _
      dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

   Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub cExecStep57_ProcessStart(cStepRecord As cStep, _
      strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

   Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub cExecStep57_StepComplete(cStepRecord As cStep, _
      dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

   Call StepTerminated(cStepRecord, dtmEndTime, cExecStep57.Index, InstanceId, Status)

End Sub

Private Sub cExecStep57_StepStart(cStepRecord As cStep, _
      dtmStartTime As Currency, InstanceId As Long)

   Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep58_ProcessComplete(cStepRecord As cStep, _
      dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

   Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub cExecStep58_ProcessStart(cStepRecord As cStep, _
      strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

   Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)
```

```
End Sub

Private Sub cExecStep58_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep58.Index, InstanceId, Status)

End Sub

Private Sub cExecStep58_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep59_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub cExecStep59_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub cExecStep59_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep59.Index, InstanceId, Status)

End Sub

Private Sub cExecStep59_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep60_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub cExecStep60_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)
```

```
  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub cExecStep60_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep60.Index, InstanceId, Status)

End Sub

Private Sub cExecStep60_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep61_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub cExecStep61_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub cExecStep61_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep61.Index, InstanceId, Status)

End Sub

Private Sub cExecStep61_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep62_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub
```

```
Private Sub cExecStep62_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub cExecStep62_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep62.Index, InstanceId, Status)

End Sub

Private Sub cExecStep62_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep63_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub cExecStep63_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub cExecStep63_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep63.Index, InstanceId, Status)

End Sub

Private Sub cExecStep63_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep64_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)
```

```
End Sub

Private Sub cExecStep64_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub cExecStep64_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep64.Index, InstanceId, Status)

End Sub

Private Sub cExecStep64_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep65_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub cExecStep65_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub cExecStep65_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep65.Index, InstanceId, Status)

End Sub

Private Sub cExecStep65_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep66_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)
```

```
  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub cExecStep66_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub cExecStep66_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep66.Index, InstanceId, Status)

End Sub

Private Sub cExecStep66_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep67_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub cExecStep67_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub cExecStep67_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep67.Index, InstanceId, Status)

End Sub

Private Sub cExecStep67_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep68_ProcessComplete(cStepRecord As cStep, _
```

```
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub cExecStep68_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub cExecStep68_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep68.Index, InstanceId, Status)

End Sub

Private Sub cExecStep68_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep69_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub cExecStep69_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub cExecStep69_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep69.Index, InstanceId, Status)

End Sub

Private Sub cExecStep69_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub
```

```
Private Sub cExecStep70_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub cExecStep70_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub cExecStep70_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep70.Index, InstanceId, Status)

End Sub

Private Sub cExecStep70_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep71_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub cExecStep71_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub cExecStep71_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep71.Index, InstanceId, Status)

End Sub

Private Sub cExecStep71_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)
```

```
End Sub

Private Sub cExecStep72_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub cExecStep72_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub cExecStep72_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep72.Index, InstanceId, Status)

End Sub

Private Sub cExecStep72_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep73_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub cExecStep73_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub cExecStep73_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep73.Index, InstanceId, Status)

End Sub

Private Sub cExecStep73_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)
```

```
  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep74_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub cExecStep74_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub cExecStep74_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep74.Index, InstanceId, Status)

End Sub

Private Sub cExecStep74_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep75_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub cExecStep75_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub cExecStep75_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep75.Index, InstanceId, Status)

End Sub
```

```
Private Sub cExecStep75_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep76_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub cExecStep76_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub cExecStep76_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep76.Index, InstanceId, Status)

End Sub

Private Sub cExecStep76_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep77_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub cExecStep77_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub cExecStep77_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep77.Index, InstanceId, Status)
```

```
End Sub

Private Sub cExecStep77_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep78_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub cExecStep78_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub cExecStep78_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep78.Index, InstanceId, Status)

End Sub

Private Sub cExecStep78_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep79_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub cExecStep79_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub cExecStep79_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)
```

```
  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep79.Index, InstanceId, Status)

End Sub

Private Sub cExecStep79_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep80_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub cExecStep80_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub cExecStep80_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep80.Index, InstanceId, Status)

End Sub

Private Sub cExecStep80_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep81_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub cExecStep81_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub cExecStep81_StepComplete(cStepRecord As cStep, _
```

```
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep81.Index, InstanceId, Status)

End Sub

Private Sub cExecStep81_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep82_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub cExecStep82_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub cExecStep82_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep82.Index, InstanceId, Status)

End Sub

Private Sub cExecStep82_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep83_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub cExecStep83_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub
```

```
Private Sub cExecStep83_StepComplete(cStepRecord As cStep, _
      dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

   Call StepTerminated(cStepRecord, dtmEndTime, cExecStep83.Index, InstanceId, Status)

End Sub

Private Sub cExecStep83_StepStart(cStepRecord As cStep, _
      dtmStartTime As Currency, InstanceId As Long)

   Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep84_ProcessComplete(cStepRecord As cStep, _
      dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

   Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub cExecStep84_ProcessStart(cStepRecord As cStep, _
      strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

   Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub cExecStep84_StepComplete(cStepRecord As cStep, _
      dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

   Call StepTerminated(cStepRecord, dtmEndTime, cExecStep84.Index, InstanceId, Status)

End Sub

Private Sub cExecStep84_StepStart(cStepRecord As cStep, _
      dtmStartTime As Currency, InstanceId As Long)

   Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep85_ProcessComplete(cStepRecord As cStep, _
      dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

   Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub cExecStep85_ProcessStart(cStepRecord As cStep, _
      strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

   Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)
```

```
End Sub

Private Sub cExecStep85_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep85.Index, InstanceId, Status)

End Sub

Private Sub cExecStep85_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep86_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub cExecStep86_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub cExecStep86_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep86.Index, InstanceId, Status)

End Sub

Private Sub cExecStep86_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep87_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub cExecStep87_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)
```

```
  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub cExecStep87_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep87.Index, InstanceId, Status)

End Sub

Private Sub cExecStep87_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep88_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub cExecStep88_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub cExecStep88_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep88.Index, InstanceId, Status)

End Sub

Private Sub cExecStep88_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep89_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub
```

```
Private Sub cExecStep89_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub cExecStep89_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep89.Index, InstanceId, Status)

End Sub

Private Sub cExecStep89_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep90_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub cExecStep90_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub cExecStep90_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep90.Index, InstanceId, Status)

End Sub

Private Sub cExecStep90_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep91_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)
```

```
End Sub

Private Sub cExecStep91_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub cExecStep91_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep91.Index, InstanceId, Status)

End Sub

Private Sub cExecStep91_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep92_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub cExecStep92_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub cExecStep92_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep92.Index, InstanceId, Status)

End Sub

Private Sub cExecStep92_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep93_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)
```

```
  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub cExecStep93_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub cExecStep93_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep93.Index, InstanceId, Status)

End Sub

Private Sub cExecStep93_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep94_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub cExecStep94_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub cExecStep94_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep94.Index, InstanceId, Status)

End Sub

Private Sub cExecStep94_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep95_ProcessComplete(cStepRecord As cStep, _
```

```
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub cExecStep95_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub cExecStep95_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep95.Index, InstanceId, Status)

End Sub

Private Sub cExecStep95_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep96_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub cExecStep96_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub cExecStep96_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep96.Index, InstanceId, Status)

End Sub

Private Sub cExecStep96_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub
```

```
Private Sub cExecStep97_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub cExecStep97_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub cExecStep97_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep97.Index, InstanceId, Status)

End Sub

Private Sub cExecStep97_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep98_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub cExecStep98_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub cExecStep98_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep98.Index, InstanceId, Status)

End Sub

Private Sub cExecStep98_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)
```

```
End Sub

Private Sub cExecStep99_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub cExecStep99_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub cExecStep99_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep99.Index, InstanceId, Status)

End Sub

Private Sub cExecStep99_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep2_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub cExecStep2_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub


Private Sub cExecStep2_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep2.Index, _
      InstanceId, Status)

End Sub
```

```
Private Sub cExecStep2_StepStart(cStepRecord As cStep, _
      dtmStartTime As Currency, InstanceId As Long)

   Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub


Private Sub cExecStep3_ProcessComplete(cStepRecord As cStep, _
      dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

   Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub cExecStep3_ProcessStart(cStepRecord As cStep, _
      strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

   Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub


Private Sub cExecStep3_StepComplete(cStepRecord As cStep, _
      dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

   Call StepTerminated(cStepRecord, dtmEndTime, cExecStep3.Index, _
         InstanceId, Status)

End Sub

Private Sub cExecStep3_StepStart(cStepRecord As cStep, _
      dtmStartTime As Currency, InstanceId As Long)

   Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub


Private Sub cExecStep4_ProcessComplete(cStepRecord As cStep, _
      dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

   Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub cExecStep4_ProcessStart(cStepRecord As cStep, _
      strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

   Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub cExecStep4_StepComplete(cStepRecord As cStep, _
```

```
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep4.Index, _
       InstanceId, Status)

End Sub


Private Sub cExecStep4_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep5_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub cExecStep5_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub cExecStep5_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep5.Index, _
       InstanceId, Status)

End Sub

Private Sub cExecStep5_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep6_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub cExecStep6_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)
```

```
  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub cExecStep6_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep6.Index, _
      InstanceId, Status)

End Sub

Private Sub cExecStep6_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep7_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub cExecStep7_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub cExecStep7_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep7.Index, _
      InstanceId, Status)

End Sub

Private Sub cExecStep7_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub cExecStep8_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub
```

```
Private Sub cExecStep8_ProcessStart(cStepRecord As cStep, _
      strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

  Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub cExecStep8_StepComplete(cStepRecord As cStep, _
      dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

  Call StepTerminated(cStepRecord, dtmEndTime, cExecStep8.Index, _
        InstanceId, Status)

End Sub

Private Sub cExecStep8_StepStart(cStepRecord As cStep, _
      dtmStartTime As Currency, InstanceId As Long)

  Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub Class_Initialize()

  Dim lngCount As Long
  Dim lngTemp As Long

  On Error GoTo InitializeErr

  Set mcFreeSteps = New cVectorLng
  ' Initialize the array of free objects with all elements
  ' for now
  For lngCount = 0 To glngNumConcurrentProcesses - 1 Step 1
     mcFreeSteps.Add lngCount
  Next lngCount

  ' Initialize a byte array with the number of free processes. It will
  ' be used later to determine if any step is running
  ' Each element in the array can represent 8 steps, 1 for each bit
  ReDim mbarrFree(glngNumConcurrentProcesses \ gintBitsPerByte)

  ' Initialize each element in the byte array w/ all 1's
  ' (upto glngNumConcurrentProcesses)
  For lngCount = LBound(mbarrFree) To UBound(mbarrFree) Step 1
     lngTemp = IIf( _
           glngNumConcurrentProcesses - (gintBitsPerByte * lngCount) > gintBitsPerByte, _
           gintBitsPerByte, _
           glngNumConcurrentProcesses - (gintBitsPerByte * lngCount))

     mbarrFree(lngCount) = (2 ^ lngTemp) - 1
  Next lngCount

  Set mcInstances = New cInstances
```

```
  Set mcFailures = New cFailedSteps
  Set mcNavSteps = New cStepTree
  Set mcTermSteps = New cTermSteps

  ' Initialize the Abort flag to False
  mblnAbort = False
  mblnAsk = False

  Exit Sub

InitializeErr:
  ' Log the error code raised by Visual Basic
  Call LogErrors(Errors)
  On Error GoTo 0
  Err.Raise vbObjectError + errInitializeFailed, mstrModuleName & "Initialize", _
        LoadResString(errInitializeFailed)

End Sub
Private Sub Class_Terminate()

  On Error GoTo Class_TerminateErr

  mcFreeSteps.Clear
  Set mcFreeSteps = Nothing
  ReDim mbarrFree(0)

  mcInstances.Clear
  Set mcInstances = Nothing

  Set mcFailures = Nothing
  Set mcNavSteps = Nothing
  Set mcTermSteps = Nothing

  Exit Sub

Class_TerminateErr:
  Call LogErrors(Errors)

End Sub

Private Sub mcTermSteps_TermStepExists(cStepDetails As cTermStep)

  Call RunNextStep(cStepDetails.TimeComplete, cStepDetails.Index, _
        cStepDetails.InstanceId, cStepDetails.ExecutionStatus)

End Sub

VERSION 1.0 CLASS
BEGIN
 MultiUse = -1  'True
 Persistable = 0  'NotPersistable
 DataBindingBehavior = 0  'vbNone
 DataSourceBehavior  = 0  'vbNone
 MTSTransactionMode  = 0  'NotAnMTSObject
```

```
END
Attribute VB_Name = "cRunItDetails"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
'  FILE:       cRunItDetails.cls
'              Microsoft TPC-H Kit Ver. 2.7.0-1005
'              Copyright Microsoft, 2008
'              All Rights Reserved
'
'
'  PURPOSE:    This module encapsulates the properties of iterator values
'              that are used by the step being executed at runtime.
'  Contact:    Reshma Tharamal (reshmat@microsoft.com)
'

Option Explicit

' Used to indicate the source module name when errors
' are raised by this class
Private Const mstrModuleName As String = "cRunItDetails."
Private mstrSource As String

Private mstrIteratorName As String
Private mintType As ValueType
Private mlngSequence As Long
Private mlngFrom As Long
Private mlngTo As Long
Private mlngStep As Long
Private mstrValue As String

Public Property Get RangeTo() As Long

   RangeTo = mlngTo

End Property
Public Property Let RangeTo(ByVal vdata As Long)

   mlngTo = vdata

End Property

Public Property Get RangeFrom() As Long

   RangeFrom = mlngFrom

End Property
Public Property Get Sequence() As Long

   Sequence = mlngSequence

End Property
```

```
Public Property Get RangeStep() As Long

  RangeStep = mlngStep

End Property
Public Property Let RangeStep(vdata As Long)

  mlngStep = vdata

End Property

Public Property Let RangeFrom(ByVal vdata As Long)

  mlngFrom = vdata

End Property
Public Property Let Sequence(ByVal vdata As Long)

  mlngSequence = vdata

End Property

Public Property Get IteratorType() As ValueType

  IteratorType = mintType

End Property
Public Property Let IteratorType(ByVal vdata As ValueType)

  On Error GoTo TypeErr
  mstrSource = mstrModuleName & "Type"

  ' These constants have been defined in the enumeration,
  ' Type, which is exposed
  Select Case vdata
     Case gintFrom, gintTo, gintStep, gintValue
        mintType = vdata

     Case Else
        On Error GoTo 0
        Err.Raise vbObjectError + errTypeInvalid, _
           mstrSource, LoadResString(errTypeInvalid)
  End Select

  Exit Property

TypeErr:
  LogErrors Errors
  mstrSource = mstrModuleName & "Type"
  On Error GoTo 0
  Err.Raise vbObjectError + errTypeInvalid, _
     mstrSource, LoadResString(errTypeInvalid)

End Property
```

```
Private Sub IsList()

  If mintType <> gintValue Then
     On Error GoTo 0
     Err.Raise vbObjectError + errInvalidProperty, mstrSource, _
           LoadResString(errInvalidProperty)
  End If

End Sub
Private Sub IsRange()

  If mintType = gintValue Then
     On Error GoTo 0
     Err.Raise vbObjectError + errInvalidProperty, mstrSource, _
           LoadResString(errInvalidProperty)
  End If

End Sub

Public Property Get Value() As String

  Value = mstrValue

End Property
Public Property Let Value(vdata As String)

  mstrValue = vdata

End Property


Public Property Get IteratorName() As String

  IteratorName = mstrIteratorName

End Property
Public Property Let IteratorName(ByVal vdata As String)

  mstrIteratorName = vdata

End Property

VERSION 1.0 CLASS
BEGIN
 MultiUse = -1  'True
END
Attribute VB_Name = "cRunItNode"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
' An iterator class containing the properties that are used
' by the stpe being executed.
' These iterators might actually come from steps that are at
```

```
' a higher level than the step actually being executed (viz.
' direct ascendants of the step at any level).

Option Explicit

Public IteratorName As String
Public Value As String
Public StepId As Long

VERSION 1.0 CLASS
BEGIN
 MultiUse = -1  'True
END
Attribute VB_Name = "cRunOnly"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
Option Explicit

Public Event Done()
Private WithEvents mcRunWsp As cRunWorkspace
Attribute mcRunWsp.VB_VarHelpID = -1

Public WspName As String
Public WorkspaceId As Long
Public WspLog As String

Public Sub RunWsp()

  On Error GoTo RunWspErr

  Set mcRunWsp = New cRunWorkspace
  Set mcRunWsp.LoadDb = dbsAttTool
  mcRunWsp.WorkspaceId = WorkspaceId
  mcRunWsp.CreateInputFiles = True
  mcRunWsp.RunWorkspace

  Exit Sub

RunWspErr:
  ' Log the VB error code
  LogErrors Errors

End Sub

Private Sub mcRunWsp_RunComplete(dtmEndTime As Currency)

  MsgBox "Completed executing workspace: " & gstrSQ & WspName & gstrSQ & " at " & _
       JulianDateToString(dtmEndTime) & "." & vbCrLf & vbCrLf & _
       "The log file for the run is: " & gstrSQ & WspLog & gstrSQ & "."
  RaiseEvent Done

End Sub
```

```
Private Sub mcRunWsp_RunStart(dtmStartTime As Currency, strWspLog As String, lRunId As Long)
   WspLog = strWspLog
End Sub


VERSION 1.0 CLASS
BEGIN
 MultiUse = -1  'True
 Persistable = 0  'NotPersistable
 DataBindingBehavior = 0  'vbNone
 DataSourceBehavior  = 0  'vbNone
 MTSTransactionMode  = 0  'NotAnMTSObject
END
Attribute VB_Name = "cRunStep"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
'  FILE:       cRunStep.cls
'              Microsoft TPC-H Kit Ver. 2.7.0-1005
'              Copyright Microsoft, 2008
'              All Rights Reserved
'
'
'  PURPOSE:    This class executes the step that is assigned to the
'              ExecuteStep property. It executes the pre-execution constraints
'              in sequence and then the step itself. At the end it executes
'              the post-execution constraints. Since these steps should always
'              be executed in sequence, each step is only fired on the
'              completion of the previous step.
'  Contact:    Reshma Tharamal (reshmat@microsoft.com)
'
Option Explicit

' Used to indicate the source module name when errors
' are raised by this class
Private Const mstrModuleName As String = "cRunStep."
Private mstrSource As String

' Local variable(s) to hold property value(s)
Private mcStep As cStep
Private mcGlobals As cArrSteps
Private mcvntWspPreCons As Variant
Private mcvntWspPostCons As Variant
Private mcvntPreCons As Variant
Private mcvntPostCons As Variant
Private mcIterators As cRunColIt
Private mlngInstanceId As Long ' Identifier for the current instance
Private mlngIndex As Long ' Index value for the current instance
Private mstrCommand As String ' The command string
Private msRunStepDtl As String ' Step text/file name that will go into the run_step_details table
Private mblnAbort As Boolean   ' Set to True when the user aborts the run
Private msOutputFile As String
```

```
Private msErrorFile As String
Private miStatus As InstanceStatus
Private mcVBErr As cVBErrorsSM
Public WspParameters As cArrParameters
Public WspConnections As cConnections
Public WspConnDtls As cConnDtls

Private WithEvents mcTermProcess As cTermProcess
Attribute mcTermProcess.VB_VarHelpID = -1
Public RunId As Long
Public CreateInputFiles As Boolean
Private msOutputDir As String

' Object that will execute the step
Private WithEvents mcExecObj As EXECUTEDLLLib.Execute
Attribute mcExecObj.VB_VarHelpID = -1

' Holds the step that is currently being executed (constraint or
' worker step)
Private mcExecStep As cStep

Private Const msCompareExe As String = "\diff.exe"

Private Enum NextNodeType
  mintWspPreConstraint = 1
  mintPreConstraint
  mintStep
  mintWspPostConstraint
  mintPostConstraint
End Enum

' Public events to notify the calling function of the
' start and end time for each step
Public Event StepStart(cStepRecord As cStep, _
      dtmStartTime As Currency, InstanceId As Long)
Public Event StepComplete(cStepRecord As cStep, _
      dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)
Public Event ProcessStart(cStepRecord As cStep, _
      strCommand As String, dtmStartTime As Currency, _
      InstanceId As Long)
Public Event ProcessComplete(cStepRecord As cStep, _
      dtmStartTime As Currency, InstanceId As Long, lElapsed As Long)

Private Function AppendDiffErrors(sDiffFile As String)
  ' The file containing the errors generated by the diff utility is passed in
  ' These errors are appended to the error file for the step

  Dim sTemp As String
  Dim InputFile As Integer

  If Not StringEmpty(sDiffFile) Then

     InputFile = FreeFile
     Open sDiffFile For Input Access Read As InputFile
```

```
    Do While Not EOF(InputFile)         ' Loop until end of file.
       Line Input #InputFile, sTemp    ' Read line into variable.
       mcVBErr.LogMessage sTemp
    Loop

    Close InputFile
  End If

End Function

Private Sub CreateStepTextFile()
  ' Creates a file containing the step text being executed
  On Error GoTo CreateStepTextFileErr

  Dim sInputFile As String

  If mcExecStep.ExecutionMechanism = gintExecuteShell Then
     sInputFile = GetOutputFile(gsCmdFileSuffix)
  Else
     sInputFile = GetOutputFile(gsSqlFileSuffix)
  End If

  ' Generate a file containing the step text being executed
  If Not StringEmpty(mcExecStep.StepTextFile) Or mcExecStep.ExecutionMechanism = gintExecuteShell Then
     FileCopy mstrCommand, sInputFile
  Else
     Call WriteCommandToFile(mstrCommand, sInputFile)
  End If

  Exit Sub

CreateStepTextFileErr:

  mcVBErr.LogVBErrors

End Sub
Private Function GetOutputFile(strFileExt As String) As String
  ' This function generates the output file name for the step currently being executed
  ' The value of the built-in parameter 'DefaultDir' is appended with the run identifier
  ' for the file location
  ' The step label is used for the file name and a combination of all iterator values
  ' for the step is used to make the output files unique for each instance
  Dim sFile As String
  Dim sIt As String
  Dim lIt As Long

  On Error GoTo GetOutputFileErr

  sFile = SubstituteParametersIfPossible(mcExecStep.StepLabel)

  sFile = TranslateStepLabel(sFile)

  If mcExecStep Is mcStep Then
```

```
      ' Use iterators that have been defined for the worker or any of it's managers
      ' to make the error/log file unique for this instance
      For lIt = mcIterators.Count - 1 To 0 Step -1
         sIt = sIt & gsExtSeparator & mcIterators(lIt).Value
      Next lIt
   End If
   sIt = sIt & strFileExt

   ' Ensure that the length of the complete path does not exceed 255 characters
   If Len(msOutputDir) + Len(sFile) + Len(sIt) > MAX_PATH Then
      sFile = Mid(sFile, 1, MAX_PATH - Len(sIt) - Len(msOutputDir))
   End If
   GetOutputFile = msOutputDir & sFile & sIt
   Exit Function

GetOutputFileErr:

   ' Does not make sense to log error to the error file yet. Write to the project
   ' log and return the step label as default
   GetOutputFile = mcExecStep.StepLabel & gsExtSeparator & strFileExt

End Function


Private Sub HandleExecutionError()

   On Error GoTo HandleExecutionError

   ' Log the error code raised by Visual Basic
   miStatus = gintFailed
   mcVBErr.LogVBErrors
   Call mcVBErr.WriteError(errExecuteStepFailed, _
         OptArgs:="Continuation criteria for the step is: " & gsContCriteria(mcStep.ContinuationCriteria))

HandleExecutionError:

   ' Logging failed - return

End Sub

Public Property Get Index() As Long

   Index = mlngIndex

End Property
Public Property Let Index(ByVal vdata As Long)

   mlngIndex = vdata

End Property
Private Function InitializeExecStatus() As InstanceStatus
   Dim sCompareFile As String

   On Error GoTo InitializeExecStatusErr
```

```
  InitializeExecStatus = mcExecObj.StepStatus

  If InitializeExecStatus = gintComplete Then
     If Not StringEmpty(mcExecStep.FailureDetails) Then
        ' Compare output to determine whether the step failed
        sCompareFile = GetShortName(SubstituteParameters( _
              mcExecStep.FailureDetails, mcExecStep.WorkspaceId, mcIterators, _
              WspParameters))
        InitializeExecStatus = IIf(CompareOutput(sCompareFile, msOutputFile), gintComplete, gintFailed)
     End If
  End If

  Exit Function

InitializeExecStatusErr:
  mcVBErr.LogVBErrors
'   Call LogErrors(Errors)
  InitializeExecStatus = mcExecObj.StepStatus

End Function
Private Function CompareOutput(sCompareFile As String, sOutputFile As String) As Boolean

  Dim sCmpOutput As String
  Dim sDiffOutput As String

  On Error GoTo CompareOutputErr

  ' Create temporary files to store the file compare output and
  ' the errors generated by the compare function
  sCmpOutput = CreateTempFile()
  sDiffOutput = CreateTempFile()

  ' Run the compare utility and redirect it's output and errors
  SyncShell ("cmd /c " & _
        GetShortName(App.Path & msCompareExe) & gstrBlank & _
        sCompareFile & gstrBlank & sOutputFile & _
        " > " & sCmpOutput & " 2> " & sDiffOutput)

  If FileLen(sDiffOutput) > 0 Then
     ' The compare generated errors - append error msgs to the error file
     Call AppendDiffErrors(sDiffOutput)
     CompareOutput = False
  Else
     CompareOutput = (FileLen(sCmpOutput) = 0)
  End If

  If Not CompareOutput Then
     mcVBErr.WriteError errDiffFailed
  End If

  ' Delete the temporary files used to store the output of the compare and
  ' the errors generated by the compare
  Kill sDiffOutput
```

```
  Kill sCmpOutput

  Exit Function

CompareOutputErr:
  mcVBErr.LogVBErrors
  CompareOutput = False

End Function
Public Property Get InstanceId() As Long

  InstanceId = mlngInstanceId

End Property
Public Property Let InstanceId(ByVal vdata As Long)

  mlngInstanceId = vdata

End Property

Private Function ExecuteConstraint(vntConstraints As Variant, _
    ByRef intLoopIndex As Integer) As Boolean

  ' Returns True if there is a constraint in the passed in
  ' array that remains to be executed

  If IsArray(vntConstraints) And Not IsEmpty(vntConstraints) Then
    ExecuteConstraint = (LBound(vntConstraints) <= intLoopIndex) And (intLoopIndex <=
UBound(vntConstraints))
  Else
    ExecuteConstraint = False
  End If

End Function
Private Function NextStep() As cStep

  ' Determines which is the next step to be executed - it could
  ' be either a pre-execution step, the worker step itself
  ' or a post-execution step

  Dim cConsRec As cConstraint
  Dim cNextStepRec As cStep
  Dim vntStepConstraints As Variant

  ' Static variable to remember exactly where we are in the
  ' processing
  Static intIndex As Integer
  Static intNextStepType As NextNodeType

  On Error GoTo NextStepErr

  If mblnAbort = True Then
    ' The user has aborted the run - do not run any more
    ' processes for the step
```

```
    Set NextStep = Nothing
    Exit Function
  End If

  If intNextStepType = 0 Then
    ' First time through this function - set the Index and
    ' node type to initial values
    intNextStepType = mintWspPreConstraint
    intIndex = 0
    RaiseEvent StepStart(mcStep, Determine64BitTime(), mlngInstanceId)
  End If

  Do
    Select Case intNextStepType
      Case mintWspPreConstraint
        vntStepConstraints = mcvntWspPreCons

      Case mintPreConstraint
        vntStepConstraints = mcvntPreCons

      Case mintStep
        ' CONS:
        If mcStep.StepType = gintWorkerStep Then
          Set cNextStepRec = mcStep
        End If

      Case mintWspPostConstraint
        vntStepConstraints = mcvntWspPostCons

      Case mintPostConstraint
        vntStepConstraints = mcvntPostCons

    End Select

    If intNextStepType <> mintStep Then
      ' Check if there is a constraint to be executed
      If ExecuteConstraint(vntStepConstraints, intIndex) Then
        ' Get the corresponding step record to be executed
        ' Query the global step record for the current
        ' constraint
        Set cConsRec = vntStepConstraints(intIndex)

        Set cNextStepRec = mcGlobals.QueryStep(cConsRec.GlobalStepId)
        intIndex = intIndex + 1
      Else
        If intNextStepType = mintPostConstraint Then
          ' No more stuff to be executed for the step
          ' Raise a Done event
          Set cNextStepRec = Nothing

          ' Set the next step type to an invalid value
          intNextStepType = -1
        Else
          Call NextType(intNextStepType, intIndex)
```

```
            End If
         End If
      Else
         ' Increment the step type so we look at the post-
         ' execution steps the next time through
         Call NextType(intNextStepType, intIndex)
      End If

   Loop Until (Not cNextStepRec Is Nothing) Or _
         intNextStepType = -1

   Set NextStep = cNextStepRec

   Exit Function

NextStepErr:
   ' Log the error code raised by Visual Basic
   Call LogErrors(Errors)
   On Error GoTo 0
   mstrSource = mstrModuleName & "NextStep"
   Err.Raise vbObjectError + errNextStepFailed, mstrSource, _
      LoadResString(errNextStepFailed)

End Function
Public Sub Execute()
   ' This procedure is the method that executes the step that
   ' is assigned to the ExecuteStep property. It call a procedure
   ' to determine the next step to be executed.
   ' Then it initializes all the properties of the cExecuteSM object
   ' and calls it's run method to execute it.
   Dim cConn As cConnection
   Dim cRunConnDtl As cConnDtl

   On Error GoTo ExecuteErr

   ' If this procedure is called after a step has completed,
   ' we would have to check if we created any temporary files
   ' while executing that step
   If Not mcExecStep Is Nothing Then
      If Not StringEmpty(mcExecStep.StepTextFile) Or mcExecStep.ExecutionMechanism = gintExecuteShell Then
         ' Remove the temporary file that we created while
         ' running this command
         Kill mstrCommand
      End If

      Call StepCompleted

      ' The VB errors class stores a reference to the Execute class since it uses
      ' a method of the class to write errors to the error log. Hence,
      ' release all references to the Execute object before destroying it.
      Set mcVBErr.ErrorFile = Nothing
      Set mcExecObj = Nothing

      ' Delete empty output and error files (generated by shell commands)
```

```
    ' (Can be done only after cleaning up cExecObj)
    Call DeleteEmptyOutputFiles
  Else
    ' First time through - initialize the location of output files
    msOutputDir = GetDefaultDir(mcStep.WorkspaceId, WspParameters)
    msOutputDir = msOutputDir & gstrFileSeparator & Trim(Str(RunId)) & gstrFileSeparator
    ' Dummy file since the function expects a file name
    MakePathValid (msOutputDir & "a.txt")
  End If

  ' Call a procedure to determine the next step to be executed
  ' - could be a constraint or the step itself
  ' Initialize a module-level variable to the step being
  ' executed
  Set mcExecStep = NextStep
  If mcExecStep Is Nothing Then
    RaiseEvent StepComplete(mcStep, Determine64BitTime(), mlngInstanceId, miStatus)
    ' No more stuff to execute
    Exit Sub
  End If

  Dim sStartDir As String

  Set mcExecObj = New EXECUTEDLLLib.Execute

  ' The VB errors class uses the WriteError method of the Execute class to write
  ' all VB errors to the error file for the step (this prevents a clash when the
  ' VB errors and Execution errors have to be written to the same log). Hence, store
  ' a reference to the Execute object in mcVBErr
  msErrorFile = GetOutputFile(gsErrorFileSuffix)
  mcExecObj.ErrorFile = msErrorFile
  Call DeleteFile(msErrorFile, bCheckIfEmpty:=False)
  Set mcVBErr.ErrorFile = mcExecObj

  If mcExecStep.ExecutionMechanism = gintExecuteShell Then
    sStartDir = Trim$(GetShortName(SubstituteParameters( _
          mcExecStep.StartDir, mcExecStep.WorkspaceId, mcIterators, WspParameters:=WspParameters)))
    ' Dummy connection object
    Set cConn = New cConnection
    Set cRunConnDtl = New cConnDtl
  Else
    ' Find the connection string value and substitute parameter values in it
    Set cRunConnDtl = WspConnDtls.GetConnectionDtl(mcExecStep.WorkspaceId, mcExecStep.StartDir)
    Set cConn = WspConnections.GetConnection(mcExecStep.WorkspaceId, cRunConnDtl.ConnectionString)
    sStartDir = Trim$(SubstituteParameters(cConn.ConnectionValue, _
        mcExecStep.WorkspaceId, mcIterators, WspParameters:=WspParameters))
  End If

  msOutputFile = GetOutputFile(gsOutputFileSuffix)
  Call DeleteFile(msOutputFile, bCheckIfEmpty:=False)
  mcExecObj.OutputFile = msOutputFile
'   mcExecObj.LogFile = GetShortName(SubstituteParameters( _
'         mcExecStep.LogFile, mcExecStep.WorkspaceId, mcIterators, WspParameters:=WspParameters))
  If mcExecStep.ExecutionMechanism = gintExecuteODBC And _
```

```
        cRunConnDtl.ConnType = ConnTypeDynamic Then
      Call mcExecObj.DoExecute(BuildCommandString(), sStartDir, mcExecStep.ExecutionMechanism, _
            cConn.NoCountDisplay, cConn.NoExecute, cConn.ParseQueryOnly, cConn.QuotedIdentifiers, _
            cConn.AnsiNulls, cConn.ShowQueryPlan, cConn.ShowStatsTime, cConn.ShowStatsIO, _
            cConn.RowCount, cConn.QueryTimeOut, gstrEmptyString)
  Else
      Call mcExecObj.DoExecute(BuildCommandString(), sStartDir, mcExecStep.ExecutionMechanism, _
            cConn.NoCountDisplay, cConn.NoExecute, cConn.ParseQueryOnly, cConn.QuotedIdentifiers, _
            cConn.AnsiNulls, cConn.ShowQueryPlan, cConn.ShowStatsTime, cConn.ShowStatsIO, _
            cConn.RowCount, cConn.QueryTimeOut, mcExecStep.StartDir)
  End If

  Exit Sub

ExecuteErr:
  Call HandleExecutionError

  ' We can assume that if we are in this function, a StepStart event has been triggered already.
  RaiseEvent StepComplete(mcStep, Determine64BitTime(), mlngInstanceId, miStatus)

End Sub
Private Function BuildCommandString() As String
  ' Process text to be executed - either from the text
  ' field or read it from a file.
  ' This function will always return the command text for ODBC commands
  ' and a file name for Shell commands
  Dim sFile As String
  Dim sCommand As String
  Dim sTemp As String

  On Error GoTo BuildCommandStringErr

  If Not StringEmpty(mcExecStep.StepTextFile) Then
     ' Substitute parameter values and environment variables
     ' in the filename
     msRunStepDtl = SubstituteParameters(mcExecStep.StepTextFile, _
           mcExecStep.WorkspaceId, mcIterators, WspParameters:=WspParameters)

     sFile = GetShortName(msRunStepDtl)

     mstrCommand = SubstituteParametersInText(sFile, mcExecStep.WorkspaceId)

     If mcExecStep.ExecutionMechanism = gintExecuteODBC Then
        ' Read the contents of the file and pass it to ODBC
        BuildCommandString = ReadCommandFromFile(mstrCommand)
     Else
        BuildCommandString = mstrCommand
     End If
  Else
     ' Substitute parameter values and environment variables
     ' in the step text
     msRunStepDtl = SubstituteParameters(mcExecStep.StepText, _
           mcExecStep.WorkspaceId, mcIterators, WspParameters:=WspParameters)
     mstrCommand = msRunStepDtl
```

```
      If mcExecStep.ExecutionMechanism = gintExecuteShell Then
         ' Write the command to a temp file (enables us to execute multiple
         ' commands via the command interpreter)
         mstrCommand = WriteCommandToFile(msRunStepDtl)
         BuildCommandString = mstrCommand
      Else
         BuildCommandString = SQLFixup(msRunStepDtl)
      End If
   End If

   If CreateInputFiles Then
      Call CreateStepTextFile
   End If

   Exit Function

BuildCommandStringErr:
   ' Log the error code raised by the Execute procedure
'    Call LogErrors(Errors)
   mcVBErr.LogVBErrors

   On Error GoTo 0
   mstrSource = mstrModuleName & "Execute"
   Err.Raise vbObjectError + errExecuteStepFailed, mstrSource, _
      LoadResString(errExecuteStepFailed) & mstrCommand

End Function
Public Sub Abort()

   On Error GoTo AbortErr

   ' Setting the Abort flag to True will ensure that we
   ' don't execute any more processes for this step
   mblnAbort = True

   If Not mcExecObj Is Nothing Then
      mcExecObj.Abort
   Else
      ' We are not in the middle of execution yet
   End If

   Exit Sub

AbortErr:
   Call LogErrors(Errors)
   On Error GoTo 0
   Err.Raise vbObjectError + errProgramError, _
      mstrModuleName & "Abort", _
      LoadResString(errProgramError)

End Sub
Private Sub NextType(ByRef StepType As NextNodeType, _
      ByRef Position As Integer)
```

```
  StepType = StepType + 1
  Position = 0

End Sub
Private Sub StepCompleted()

  On Error GoTo StepCompletedErr

  If Not mcExecStep Is Nothing Then
    If mcExecStep Is mcStep Then
      miStatus = InitializeExecStatus
      If miStatus = gintFailed Then
        ' Create input files if the step failed execution and one hasn't been created already
        If Not CreateInputFiles Then CreateStepTextFile
        Call mcVBErr.WriteError(errExecuteStepFailed, _
            OptArgs:="Continuation criteria for the step is: " & gsContCriteria(mcStep.ContinuationCriteria))
      End If
    End If
  End If

  Exit Sub

StepCompletedErr:
  ' Log the error code raised by Visual Basic
  miStatus = gintFailed
  mcVBErr.LogVBErrors
  Call mcVBErr.WriteError(errExecuteStepFailed, _
      OptArgs:="Continuation criteria for the step is: " & gsContCriteria(mcStep.ContinuationCriteria))

End Sub
Private Sub DeleteEmptyOutputFiles()

  On Error GoTo DeleteEmptyOutputFilesErr

  ' Delete empty output and error files
  If Not mcExecStep Is Nothing Then
    Call DeleteFile(msErrorFile, bCheckIfEmpty:=True)
    Call DeleteFile(msOutputFile, bCheckIfEmpty:=True)
  End If

  Exit Sub

DeleteEmptyOutputFilesErr:
  ' Not a critical error - continue

End Sub
Private Function ReadCommandFromFile(strFileName As String) As String

  ' Returns the contents of the passed in file

  Dim sCommand As String
  Dim sTemp As String
  Dim InputFile As Integer
```

```
  On Error GoTo ReadCommandFromFileErr

  If Not StringEmpty(strFileName) Then

     InputFile = FreeFile
     Open strFileName For Input Access Read As InputFile

     Line Input #InputFile, sCommand ' Read line into variable.

     Do While Not EOF(InputFile) ' Loop until end of file.
        Line Input #InputFile, sTemp ' Read line into variable.
        sCommand = sCommand & vbCrLf & sTemp
     Loop

     Close InputFile
  End If

  ReadCommandFromFile = sCommand

  Exit Function

ReadCommandFromFileErr:

  ' Log the error code raised by Visual Basic
  Call LogErrors(Errors)
  mstrSource = mstrModuleName & "ReadCommandFromFile"
  On Error GoTo 0
  Err.Raise vbObjectError + errSubValuesFailed, _
        gstrSource, _
        LoadResString(errSubValuesFailed)

End Function
Private Function SubstituteParametersIfPossible(strLabel As String)

  On Error GoTo SubstituteParametersIfPossibleErr

  SubstituteParametersIfPossible = SubstituteParameters(strLabel, _
        mcExecStep.WorkspaceId, mcIterators, WspParameters:=WspParameters)
  Exit Function

SubstituteParametersIfPossibleErr:
  SubstituteParametersIfPossible = strLabel

End Function
Private Function SubstituteParametersInText(strFileName As String, _
     lngWorkspace As Long) As String

  ' Reads each line in the passed in file, substitutes parameter
  ' values in the line and writes out the modified line to a
  ' temporary file that we create. The temporary file will be
  ' removed once the step completes execution.
  ' Returns the name of the newly created temporary file.
```

```
  Dim strTempFile As String
  Dim strTemp As String
  Dim strOutput As String
  Dim InputFile As Integer
  Dim OutputFile As Integer

  On Error GoTo SubstituteParametersInTextErr

  strTempFile = CreateTempFile()

  If Not StringEmpty(strFileName) Then

     InputFile = FreeFile
     Open strFileName For Input Access Read As InputFile

     OutputFile = FreeFile
     Open strTempFile For Output Access Write As OutputFile

     Do While Not EOF(InputFile) ' Loop until end of file.
        Line Input #InputFile, strTemp ' Read line into variable.
        strOutput = SubstituteParameters(strTemp, lngWorkspace, mcIterators, WspParameters:=WspParameters)

        If mcExecStep.ExecutionMechanism = gintExecuteODBC Then strOutput = SQLFixup(strOutput)

        Print #OutputFile, strOutput
        BugMessage strOutput
     Loop

  End If

  Close InputFile
  Close OutputFile

  SubstituteParametersInText = strTempFile

  Exit Function

SubstituteParametersInTextErr:

  ' Log the error code raised by Visual Basic
'    Call LogErrors(Errors)
  mcVBErr.LogVBErrors
  mstrSource = mstrModuleName & "SubstituteParametersInText"
  On Error GoTo 0
  Err.Raise vbObjectError + errSubValuesFailed, _
        gstrSource, _
        LoadResString(errSubValuesFailed)

End Function

Private Function WriteCommandToFile(sCommand As String, Optional sFile As String = gstrEmptyString) As String

  ' Writes the command text to a temporary file
  ' Returns the name of the temporary file
```

```
  Dim OutputFile As Integer

  On Error GoTo WriteCommandToFileErr

  If StringEmpty(sFile) Then
     sFile = CreateTempFile()
  End If

  OutputFile = FreeFile
  Open sFile For Output Access Write As OutputFile

  Print #OutputFile, sCommand

  Close OutputFile

  WriteCommandToFile = sFile

  Exit Function

WriteCommandToFileErr:

  ' Log the error code raised by Visual Basic
  Call LogErrors(Errors)
  mstrSource = mstrModuleName & "WriteCommandToFile"
  On Error GoTo 0
  Err.Raise vbObjectError + errSubValuesFailed, _
        gstrSource, _
        LoadResString(errSubValuesFailed)

End Function


Public Property Get WspPreCons() As Variant
  WspPreCons = mcvntWspPreCons
End Property
Public Property Let WspPreCons(ByVal vdata As Variant)
  mcvntWspPreCons = vdata
End Property

Public Property Get WspPostCons() As Variant
  WspPostCons = mcvntWspPostCons
End Property
Public Property Let WspPostCons(ByVal vdata As Variant)
  mcvntWspPostCons = vdata
End Property

Public Property Get PreCons() As Variant
  PreCons = mcvntPreCons
End Property
Public Property Let PreCons(ByVal vdata As Variant)
  mcvntPreCons = vdata
End Property
```

```
Public Property Get PostCons() As Variant
  PostCons = mcvntPostCons
End Property
Public Property Let PostCons(ByVal vdata As Variant)
  mcvntPostCons = vdata
End Property

Public Property Set Globals(cRunSteps As cArrSteps)

  Set mcGlobals = cRunSteps

End Property
Public Property Set ExecuteStep(cRunStep As cStep)

  Set mcStep = cRunStep

End Property
Public Property Get Globals() As cArrSteps

  Set Globals = mcGlobals

End Property
Public Property Get ExecuteStep() As cStep

  Set ExecuteStep = mcStep

End Property
Public Property Set Iterators(vdata As cRunColIt)

  Set mcIterators = vdata

End Property
Private Sub Class_Initialize()

  ' Initialize the Abort flag to False
  mblnAbort = False
  Set mcVBErr = New cVBErrorsSM
  Set mcTermProcess = New cTermProcess

End Sub

Private Sub Class_Terminate()

  On Error GoTo Class_TerminateErr

  Set mcExecObj = Nothing
  Set mcVBErr = Nothing
  Set mcTermProcess = Nothing

  Exit Sub

Class_TerminateErr:
  Call LogErrors(Errors)
```

```
End Sub

Private Sub mcExecObj_Start(ByVal StartTime As Currency)
  ' Raise an event indicating that the step has begun execution
  RaiseEvent ProcessStart(mcExecStep, msRunStepDtl, StartTime, mlngInstanceId)
End Sub

Private Sub mcExecObj_Complete(ByVal EndTime As Currency, ByVal Elapsed As Long)

  On Error GoTo mcExecObj_CompleteErr

  Debug.Print Elapsed
  RaiseEvent ProcessComplete(mcExecStep, EndTime, mlngInstanceId, Elapsed)
  mcTermProcess.ProcessTerminated

  Exit Sub

mcExecObj_CompleteErr:
  Call LogErrors(Errors)

End Sub

Private Sub mcTermProcess_TermProcessExists()

  On Error GoTo TermProcessExistsErr

  ' Call a procedure to execute the next step, if any
  Call Execute

  Exit Sub

TermProcessExistsErr:
  ' Log the error code raised by the Execute procedure
  Call LogErrors(Errors)

End Sub
VERSION 1.0 CLASS
BEGIN
 MultiUse = -1  'True
 Persistable = 0  'NotPersistable
 DataBindingBehavior = 0  'vbNone
 DataSourceBehavior  = 0  'vbNone
 MTSTransactionMode  = 0  'NotAnMTSObject
END
Attribute VB_Name = "cRunWorkspace"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
'  FILE:       cRunWorkspace.cls
'              Microsoft TPC-H Kit Ver. 2.7.0-1005
'              Copyright Microsoft, 2008
'              All Rights Reserved
'
```

```
'
'  PURPOSE:     This class loads all the information necessary to
'               execute a workspace and calls cRunInst to execute the workspace.
'               It also propagates Step start and complete and
'               Run start and complete events.
'  Contact:     Reshma Tharamal (reshmat@microsoft.com)
'
Option Explicit

' Used to indicate the source module name when errors
' are raised by this module
Private Const mstrModuleName As String = "cRunWorkspace."
Private mstrSource As String

Private mcRunSteps As cArrSteps
Private mcRunParams As cArrParameters
Private mcRunConstraints As cArrConstraints
Private mcRunConnections As cConnections
Private mcRunConnDtls As cConnDtls
Private mcvntWspPreCons As Variant
Private mcvntWspPostCons As Variant
Private mdbsLoadDb As Database
Private mlngRunId As Long
Private mlngWorkspaceId As Long
Private mField As cStringSM
Public CreateInputFiles As Boolean

Private WithEvents mcRun As cRunInst
Attribute mcRun.VB_VarHelpID = -1

Public Event RunStart(dtmStartTime As Currency, strWspLog As String, lRunId As Long)
Public Event RunComplete(dtmEndTime As Currency)
Public Event StepStart(cStepRecord As cStep, dtmStartTime As Currency, lngInstanceId As Long, _
      sPath As String, sIts As String)
Public Event StepComplete(cStepRecord As cStep, dtmEndTime As Currency, lngInstanceId As Long)
Public Event ProcessStart(cStepRecord As cStep, strCommand As String, _
      dtmStartTime As Currency, lngInstanceId As Long)
Public Event ProcessComplete(cStepRecord As cStep, dtmEndTime As Currency, lngInstanceId As Long)
Public Function InstancesForStep(lngStepId As Long, iStatus As InstanceStatus) As cInstances
  ' Returns an array of all the instances for a step

  If mcRun Is Nothing Then
     Set InstancesForStep = Nothing
  Else
     Set InstancesForStep = mcRun.InstancesForStep(lngStepId, iStatus)
  End If

End Function
Private Sub InsertRunDetail(cStepRecord As cStep, _
      strCommand As String, dtmStartTime As Currency, _
      lngInstanceId As Long, lParentInstanceId As Long, sItValue As String)
  ' Inserts a new run detail record into the database

  Dim strInsert As String
```

```
  Dim qy As QueryDef

  On Error GoTo InsertRunDetailErr
  mstrSource = mstrModuleName & "InsertRunDetail"

  strInsert = "insert into run_step_details " & _
        "( run_id, step_id, version_no, instance_id, parent_instance_id, " & _
        " command, start_time, iterator_value ) " & _
        " values ( "

#If USE_JET Then

  strInsert = strInsert & " [r_id], [s_id], [ver_no], [i_id], [p_i_id], " & _
        " [com], [s_date], [it_val] )"

  Set qy = mdbsLoadDb.CreateQueryDef( _
        gstrEmptyString, strInsert)

  ' Call a procedure to assign the Querydef parameters
  Call AssignParameters(qy, StartTime:=dtmStartTime, _
        StepId:=cStepRecord.StepId, _
        Version:=cStepRecord.VersionNo, _
        InstanceId:=lngInstanceId, _
        Command:=strCommand)

  qy.Execute dbFailOnError
  qy.Close

#Else

  strInsert = strInsert & Str(mlngRunId) _
     & ", " & Str(cStepRecord.StepId) _
     & ", " & mField.MakeStringFieldValid(cStepRecord.VersionNo) _
     & ", " & Str(lngInstanceId) _
     & ", " & Str(lParentInstanceId) _
     & ", " & mField.MakeStringFieldValid(strCommand) _
     & ", " & Str(dtmStartTime) _
     & ", " & mField.MakeStringFieldValid(sItValue)

  strInsert = strInsert & " ) "

  mdbsLoadDb.Execute strInsert, dbFailOnError

#End If

  Exit Sub

InsertRunDetailErr:
  LogErrors Errors
  mstrSource = mstrModuleName & "InsertRunDetail"
  On Error GoTo 0
  Err.Raise vbObjectError + errUpdateRunDataFailed, _
        mstrSource, _
        LoadResString(errUpdateRunDataFailed)
```

```
End Sub
Private Sub UpdateRunDetail(cStepRecord As cStep, _
      dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)
  ' Updates the run detail record in the database

  Dim strUpdate As String
  Dim qy As QueryDef

  On Error GoTo UpdateRunDetailErr

  strUpdate = "update run_step_details " & _
        " set end_time = [e_date], elapsed_time = [elapsed] " & _
        " where run_id = [r_id] " & _
        " and step_id = [s_id] " & _
        " and version_no = [ver_no] " & _
        " and instance_id = [i_id] "

  Set qy = mdbsLoadDb.CreateQueryDef( _
        gstrEmptyString, strUpdate)

  ' Call a procedure to assign the Querydef parameters
  Call AssignParameters(qy, EndTime:=dtmEndTime, _
        StepId:=cStepRecord.StepId, _
        Version:=cStepRecord.VersionNo, _
        InstanceId:=lngInstanceId, Elapsed:=lElapsed)

  qy.Execute dbFailOnError
  qy.Close

  Exit Sub

UpdateRunDetailErr:
  LogErrors Errors
  mstrSource = mstrModuleName & "UpdateRunDetail"
  On Error GoTo 0
  Err.Raise vbObjectError + errUpdateRunDataFailed, _
        mstrSource, _
        LoadResString(errUpdateRunDataFailed)

End Sub
Private Function InsertRunHeader(dtmStartTime As Currency) As Long
  ' Inserts a new run header record into the database
  ' and returns the id for the run

  Dim strInsert As String
  Dim qy As QueryDef

  On Error GoTo InsertRunHeaderErr

  strInsert = "insert into run_header " & _
     "( run_id, workspace_id, start_time ) " & _
     " values ( " & _
     " [r_id], [w_id], [s_date] )"
```

```
  Set qy = mdbsLoadDb.CreateQueryDef( _
        gstrEmptyString, strInsert)

  ' Call a procedure to execute the Querydef object
  Call AssignParameters(qy, StartTime:=dtmStartTime)

  qy.Execute dbFailOnError
  qy.Close

  InsertRunHeader = mlngRunId
  Exit Function

InsertRunHeaderErr:
  LogErrors Errors
  mstrSource = mstrModuleName & "InsertRunHeader"
  On Error GoTo 0
  Err.Raise vbObjectError + errUpdateRunDataFailed, _
        mstrSource, _
        LoadResString(errUpdateRunDataFailed)

End Function
Private Sub InsertRunParameters(dtmStartTime As Currency)
  ' Inserts a new run header record into the database
  ' and returns the id for the run

  Dim strInsert As String
  Dim qy As QueryDef
  Dim cParamRec As cParameter
  Dim lngIndex As Long

  On Error GoTo InsertRunParametersErr

  strInsert = "insert into run_parameters " & _
     "( run_id, parameter_name, parameter_value ) " & _
     " values ( " & _
     " [r_id], [p_name], [p_value] )"

  Set qy = mdbsLoadDb.CreateQueryDef( _
        gstrEmptyString, strInsert)
  qy.Parameters("r_id").Value = mlngRunId

  For lngIndex = 0 To mcRunParams.ParameterCount - 1
     Set cParamRec = mcRunParams(lngIndex)

     qy.Parameters("p_name").Value = cParamRec.ParameterName
     qy.Parameters("p_value").Value = cParamRec.ParameterValue
     qy.Execute dbFailOnError

  Next lngIndex

  qy.Close

  Exit Sub
```

```
InsertRunParametersErr:
  LogErrors Errors
  mstrSource = mstrModuleName & "InsertRunParameters"
  On Error GoTo 0
  Err.Raise vbObjectError + errUpdateRunDataFailed, _
        mstrSource, _
        LoadResString(errUpdateRunDataFailed)

End Sub
Private Sub AssignParameters(qyExec As DAO.QueryDef, _
      Optional StartTime As Currency = 0, _
      Optional EndTime As Currency = 0, _
      Optional StepId As Long = 0, _
      Optional Version As String = gstrEmptyString, _
      Optional InstanceId As Long = 0, _
      Optional ParentInstanceId As Long = 0, _
      Optional Command As String = gstrEmptyString, _
      Optional Elapsed As Long = 0, _
      Optional ItValue As String = gstrEmptyString)
  ' Assigns values to the parameters in the querydef object

  Dim prmParam As DAO.Parameter

  On Error GoTo AssignParametersErr
  mstrSource = mstrModuleName & "AssignParameters"

  For Each prmParam In qyExec.Parameters
    Select Case prmParam.Name
      Case "[w_id]"
        prmParam.Value = mlngWorkspaceId

      Case "[r_id]"
        prmParam.Value = mlngRunId

      Case "[s_id]"
        BugAssert StepId <> 0
        prmParam.Value = StepId

      Case "[ver_no]"
        BugAssert Not StringEmpty(Version)
        prmParam.Value = Version

      Case "[i_id]"
        BugAssert InstanceId <> 0
        prmParam.Value = InstanceId

      Case "[p_i_id]"
        prmParam.Value = ParentInstanceId

      Case "[com]"
        BugAssert Not StringEmpty(Command)
        prmParam.Value = Command
```

```
        Case "[s_date]"
            BugAssert StartTime <> 0
            prmParam.Value = StartTime

        Case "[e_date]"
            BugAssert EndTime <> 0
            prmParam.Value = EndTime

        Case "[elapsed]"
            prmParam.Value = Elapsed

        Case "[it_val]"
            prmParam.Value = ItValue

        Case Else
            ' Write the parameter name that is faulty
            WriteError errInvalidParameter, mstrSource, _
                prmParam.Name
            On Error GoTo 0
            Err.Raise errInvalidParameter, mstrSource, _
                LoadResString(errInvalidParameter)
    End Select
  Next prmParam

  Exit Sub

AssignParametersErr:

  mstrSource = mstrModuleName & "AssignParameters"
  Call LogErrors(Errors)
  On Error GoTo 0
  Err.Raise vbObjectError + errAssignParametersFailed, _
      mstrSource, LoadResString(errAssignParametersFailed)

End Sub
Private Sub RunStartProcessing(dtmStartTime As Currency)

  On Error GoTo RunStartProcessingErr

  ' Insert the run header into the database
  Call InsertRunHeader(dtmStartTime)

  ' Insert the run parameters into the database
  Call InsertRunParameters(dtmStartTime)

  Exit Sub

RunStartProcessingErr:
  ' Log the error code raised by Visual Basic
  Call LogErrors(Errors)
  mstrSource = mstrModuleName & "RunStartProcessing"
  ShowError errUpdateRunDataFailed
  WriteError errUpdateRunDataFailed, mstrSource
```

```
End Sub
Private Sub ProcessStartProcessing(cStepRecord As cStep, _
      strCommand As String, dtmStartTime As Currency, lngInstanceId As Long, _
      lParentInstanceId As Long, sItValue As String)

  On Error GoTo ProcessStartProcessingErr

  ' Insert the run detail into the database
  Call InsertRunDetail(cStepRecord, strCommand, dtmStartTime, lngInstanceId, _
        lParentInstanceId, sItValue)

  Exit Sub

ProcessStartProcessingErr:
  ' Log the error code raised by Visual Basic
  Call LogErrors(Errors)
  mstrSource = mstrModuleName & "ProcessStartProcessing"
  ShowError errUpdateRunDataFailed
  WriteError errUpdateRunDataFailed, mstrSource

End Sub
Private Sub StepStartProcessing(cStepRecord As cStep, dtmStartTime As Currency, _
      lngInstanceId As Long, lParentInstanceId As Long, sItValue As String)

  On Error GoTo StepStartProcessingErr

  ' Since ProcessStart events won't be triggered for manager steps
  If cStepRecord.StepType = gintManagerStep Then
     ' Insert the run detail into the database
     Call InsertRunDetail(cStepRecord, cStepRecord.StepLabel, _
           dtmStartTime, lngInstanceId, lParentInstanceId, sItValue)
  End If

  Exit Sub

StepStartProcessingErr:
  ' Log the error code raised by Visual Basic
  Call LogErrors(Errors)
  mstrSource = mstrModuleName & "StepStartProcessing"
  ShowError errUpdateRunDataFailed

End Sub
Private Sub ProcessCompleteProcessing(cStepRecord As cStep, _
      dtmStartTime As Currency, lngInstanceId As Long, lElapsed As Long)

  On Error GoTo ProcessCompleteProcessingErr

  ' Insert the run detail into the database
  Call UpdateRunDetail(cStepRecord, dtmStartTime, lngInstanceId, lElapsed)

  Exit Sub

ProcessCompleteProcessingErr:
  ' Log the error code raised by Visual Basic
```

```
  Call LogErrors(Errors)
  mstrSource = mstrModuleName & "ProcessCompleteProcessing"
  ShowError errUpdateRunDataFailed

End Sub
Private Sub StepCompleteProcessing(cStepRecord As cStep, _
      dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  On Error GoTo StepCompleteProcessingErr

  ' Since ProcessComplete events won't be triggered for manager steps
  If cStepRecord.StepType = gintManagerStep Then
     ' Update the run detail in the database
     Call UpdateRunDetail(cStepRecord, dtmEndTime, lngInstanceId, lElapsed)
  End If

  Exit Sub

StepCompleteProcessingErr:
  ' Log the error code raised by Visual Basic
  Call LogErrors(Errors)
  ShowError errUpdateRunDataFailed

End Sub
Private Sub RunCompleteProcessing(dtmEndTime As Currency)

  On Error GoTo RunCompleteProcessingErr

  ' Update the header record with the end time for the run
  Call UpdateRunHeader(dtmEndTime)

  Exit Sub

RunCompleteProcessingErr:
  ' Log the error code raised by Visual Basic
  Call LogErrors(Errors)
  ShowError errUpdateRunDataFailed

End Sub

Private Sub UpdateRunHeader(ByVal dtmEndTime As Currency)
  ' Updates the run header record with the end date

  Dim strUpdate As String
  Dim qy As QueryDef

  On Error GoTo UpdateRunHeaderErr

  strUpdate = "update run_header " & _
        " set end_time = [e_date] " & _
        " where run_id = [r_id] "

  Set qy = mdbsLoadDb.CreateQueryDef( _
        gstrEmptyString, strUpdate)
```

```
  ' Call a procedure to execute the Querydef object
  Call AssignParameters(qy, EndTime:=dtmEndTime)

  qy.Execute dbFailOnError
  qy.Close

  Exit Sub

UpdateRunHeaderErr:
  LogErrors Errors
  mstrSource = mstrModuleName & "UpdateRunHeader"
  On Error GoTo 0
  Err.Raise vbObjectError + errUpdateRunDataFailed, _
        mstrSource, _
        LoadResString(errUpdateRunDataFailed)

End Sub

Public Property Let WorkspaceId(ByVal vdata As Long)
  mlngWorkspaceId = vdata
End Property
Public Property Get WorkspaceId() As Long
  WorkspaceId = mlngWorkspaceId
End Property
Public Sub RunWorkspace()

  Dim cRunSeq As cSequence

  On Error GoTo RunWorkspaceErr

  ' Call a procedure to load the module-level structures
  ' with all the step and parameter data for the run
  If LoadRunData = False Then
     ' Error handled by the function already
     Exit Sub
  End If

  ' Retrieve the next run identifier using the sequence class
  Set cRunSeq = New cSequence
  Set cRunSeq.IdDatabase = dbsAttTool
  cRunSeq.IdentifierColumn = "run_id"
  mlngRunId = cRunSeq.Identifier
  Set cRunSeq = Nothing

  Call mcRunParams.InitBuiltInsForRun(mlngWorkspaceId, mlngRunId)

  Set mcRun.Constraints = mcRunConstraints
  mcRun.WspPreExecution = mcvntWspPreCons
  mcRun.WspPostExecution = mcvntWspPostCons

  Set mcRun.Steps = mcRunSteps
  Set mcRun.Parameters = mcRunParams
  Set mcRun.RunConnections = mcRunConnections
```

```
  Set mcRun.RunConnDtls = mcRunConnDtls

  mcRun.WspId = mlngWorkspaceId
  mcRun.RootKey = LabelStep(mlngWorkspaceId)
  mcRun.RunId = mlngRunId
  mcRun.CreateInputFiles = CreateInputFiles

  mcRun.Run

  Exit Sub

RunWorkspaceErr:
  ' Log the error code raised by Visual Basic
  Call LogErrors(Errors)

End Sub
Public Property Get LoadDb() As Database

  Set LoadDb = mdbsLoadDb

End Property
Public Property Set LoadDb(vdata As Database)

  Set mdbsLoadDb = vdata

End Property
Private Function LoadRunData() As Boolean

  ' Loads the step, parameter and constraint arrays
  ' with all the data for the workspace. Returns False
  ' if a failure occurs

  Dim strWorkspaceName As String
  Dim recWspSteps As Recordset
  Dim qySteps As DAO.QueryDef
  Dim recWspParams As Recordset
  Dim qyParams As DAO.QueryDef
  Dim recWspConns As Recordset
  Dim qyConns As DAO.QueryDef
  Dim recWspConnDtls As Recordset
  Dim qyConnDtls As DAO.QueryDef

  On Error GoTo LoadRunDataErr

  Set mcRunSteps.StepDB = mdbsLoadDb
  Set mcRunParams.ParamDatabase = mdbsLoadDb
  Set mcRunConstraints.ConstraintDB = mdbsLoadDb
  Set mcRunConnections.ConnDb = mdbsLoadDb
  Set mcRunConnDtls.ConnDb = mdbsLoadDb

  ' Read all the step and parameter data for the workspace
  Call ReadWorkspaceData(mlngWorkspaceId, mcRunSteps, _
       mcRunParams, mcRunConstraints, mcRunConnections, mcRunConnDtls, _
       recWspSteps, qySteps, recWspParams, qyParams, recWspConns, qyConns, _
```

```
        recWspConnDtls, qyConnDtls)

  ' Load all the pre- and post-execution constraints that
  ' have been defined for the workspace
  mcvntWspPreCons = mcRunConstraints.ConstraintsForWsp( _
     mlngWorkspaceId, _
     gintPreStep, _
     blnSort:=True, _
     blnGlobalConstraintsOnly:=True)
  mcvntWspPostCons = mcRunConstraints.ConstraintsForWsp( _
     mlngWorkspaceId, _
     gintPostStep, _
     blnSort:=True, _
     blnGlobalConstraintsOnly:=True)

  On Error Resume Next
  recWspSteps.Close
  qySteps.Close
  recWspParams.Close
  qyParams.Close
  recWspConns.Close
  qyConns.Close

  LoadRunData = True

  Exit Function

LoadRunDataErr:
  ' Log the error code raised by Visual Basic
  Call LogErrors(Errors)
  ShowError errLoadRunDataFailed
  LoadRunData = False

End Function
Public Sub StopRun()

  On Error GoTo StopRunErr

  If mcRun Is Nothing Then
     ' We haven't been the run yet, so do nothing
  Else
     mcRun.StopRun
  End If

  Exit Sub

StopRunErr:
  ' Log the error code raised by Visual Basic
  Call LogErrors(Errors)
  ' Errors would have been displayed by the called process

End Sub
Public Sub AbortRun()
```

```
  On Error GoTo AbortRunErr

  If mcRun Is Nothing Then
     ' We haven't been the run yet, so do nothing
  Else
     mcRun.Abort
  End If

  Exit Sub

AbortRunErr:
  ' Log the error code raised by Visual Basic
  Call LogErrors(Errors)
  ' Errors would have been displayed by the called process

End Sub

Private Sub Class_Initialize()

  ' Create instances of the step, parameter and constraint arrays
  Set mcRunSteps = New cArrSteps
  Set mcRunParams = New cArrParameters
  Set mcRunConstraints = New cArrConstraints
  Set mcRunConnections = New cConnections
  Set mcRunConnDtls = New cConnDtls
  Set mcRun = New cRunInst
  Set mField = New cStringSM

End Sub
Private Sub Class_Terminate()

  On Error GoTo UnLoadRunDataErr

  ' Clears the step, parameter and constraint arrays
  Set mcRunSteps = Nothing
  Set mcRunParams = Nothing
  Set mcRunConstraints = Nothing
  Set mcRunConnections = Nothing
  Set mcRunConnDtls = Nothing

  Set mcRun = Nothing
  Set mdbsLoadDb = Nothing
  Set mField = Nothing

  Exit Sub

UnLoadRunDataErr:
  ' Log the error code raised by Visual Basic
  Call LogErrors(Errors)
  ' Not a critical error - continue
  Resume Next

End Sub
```

```
Private Sub mcRun_ProcessComplete(cStepRecord As cStep, _
      dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  RaiseEvent ProcessComplete(cStepRecord, dtmEndTime, lngInstanceId)
  Call ProcessCompleteProcessing(cStepRecord, dtmEndTime, lngInstanceId, lElapsed)

End Sub

Private Sub mcRun_ProcessStart(cStepRecord As cStep, _
      strCommand As String, dtmStartTime As Currency, lngInstanceId As Long, _
      lParentInstanceId As Long, sItValue As String)

  RaiseEvent ProcessStart(cStepRecord, strCommand, dtmStartTime, lngInstanceId)
  Call ProcessStartProcessing(cStepRecord, strCommand, dtmStartTime, lngInstanceId, _
        lParentInstanceId, sItValue)

End Sub

Private Sub mcRun_RunComplete(dtmEndTime As Currency)

  Debug.Print "Run ended at: " & CStr(dtmEndTime)
  Call RunCompleteProcessing(dtmEndTime)

  RaiseEvent RunComplete(dtmEndTime)

End Sub
Private Sub mcRun_RunStart(dtmStartTime As Currency, strWspLog As String)

  RaiseEvent RunStart(dtmStartTime, strWspLog, mlngRunId)
  Debug.Print "Run started at: " & CStr(dtmStartTime)

  Call RunStartProcessing(dtmStartTime)

End Sub
Private Sub mcRun_StepComplete(cStepRecord As cStep, _
      dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

  RaiseEvent StepComplete(cStepRecord, dtmEndTime, lngInstanceId)
'   BugMessage "Step: " & cStepRecord.StepLabel & " has completed!"

  Call StepCompleteProcessing(cStepRecord, dtmEndTime, lngInstanceId, lElapsed)

End Sub
Private Sub mcRun_StepStart(cStepRecord As cStep, dtmStartTime As Currency, _
      lngInstanceId As Long, lParentInstanceId As Long, sPath As String, sIts As String, sItValue As String)

  RaiseEvent StepStart(cStepRecord, dtmStartTime, lngInstanceId, sPath, sIts)
  'bugmessage "Step: " & cStepRecord.StepLabel & " has started."

  Call StepStartProcessing(cStepRecord, dtmStartTime, lngInstanceId, lParentInstanceId, sItValue)

End Sub

VERSION 1.0 CLASS
```

```
BEGIN
 MultiUse = -1  'True
 Persistable = 0  'NotPersistable
 DataBindingBehavior = 0  'vbNone
 DataSourceBehavior  = 0  'vbNone
 MTSTransactionMode  = 0  'NotAnMTSObject
END
Attribute VB_Name = "cSequence"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
'  FILE:       cSequence.cls
'              Microsoft TPC-H Kit Ver. 2.7.0-1005
'              Copyright Microsoft, 2008
'              All Rights Reserved
'
'
'  PURPOSE:    This class uses the att_identifiers table to generate unique
'              identifiers.
'  Contact:    Reshma Tharamal (reshmat@microsoft.com)
'
Option Explicit

Private mlngIdentifier As Long
Private mstrIdentifierColumn As String
Private mrecIdentifiers As Recordset
Private mdbsDatabase As Database

Private Const mstrEmptyString = ""

' Used to indicate the source module name when errors
' are raised by this class
Private mstrSource As String
Private Const mstrModuleName As String = "cSequence."

Private Sub CreateIdRecord()
  ' Creates a record with all identifiers having an initial value of 1

  Dim sSql As String
  Dim pId As DAO.Parameter
  Dim qyId As DAO.QueryDef

  sSql = "insert into att_identifiers (" & _
        " workspace_id, parameter_id, step_id, " & _
        " constraint_id, run_id, connection_id " & _
        ", " & FLD_ID_CONN_NAME & _
        " ) values ( " & _
        "[w_id], [p_id], [s_id], [c_id], [r_id], [conn_id], [conn_dtl_id] )"
  Set qyId = mdbsDatabase.CreateQueryDef(gstrEmptyString, sSql)
  For Each pId In qyId.Parameters
     pId.Value = glMinId
  Next pId
  qyId.Execute dbFailOnError
```

```
  qyId.Close

End Sub
Private Sub CreateIdRecordset()

  Dim strSql As String

  ' Initialize the recordset with all identifiers
  strSql = "select * from att_identifiers"
  Set mrecIdentifiers = mdbsDatabase.OpenRecordset(strSql, dbOpenForwardOnly)

  If mrecIdentifiers.RecordCount = 0 Then
     CreateIdRecord
     Set mrecIdentifiers = mdbsDatabase.OpenRecordset(strSql, dbOpenForwardOnly)
  End If

  BugAssert mrecIdentifiers.RecordCount <> 0

End Sub

Public Property Set IdDatabase(vdata As Database)

  Set mdbsDatabase = vdata

End Property

Public Property Let IdentifierColumn(vdata As String)

  Dim intIndex As Integer

  On Error GoTo IdentifierColumnErr

  ' Initialize the return value to an empty string
  mstrIdentifierColumn = mstrEmptyString
  Call CreateIdRecordset

  For intIndex = 0 To mrecIdentifiers.Fields.Count - 1

     If LCase(Trim(mrecIdentifiers.Fields(intIndex).Name)) = _
           LCase(Trim(vdata)) Then

        ' Valid column name
        mstrIdentifierColumn = vdata
        Exit Property
     End If

  Next intIndex

  BugAssert True, "Invalid column name!"

  Exit Property

IdentifierColumnErr:
  LogErrors Errors
```

```
  mstrSource = mstrModuleName & "IdentifierColumn"
  On Error GoTo 0
  Err.Raise vbObjectError + errIdentifierColumnFailed, _
        mstrSource, _
        LoadResString(errIdentifierColumnFailed)

End Property
Public Property Get Identifier() As Long
  Dim strSql As String

  On Error GoTo GetIdentifierErr

  BugAssert mstrIdentifierColumn <> mstrEmptyString

  ' Increment the identifier column by 1
  strSql = "update att_identifiers " & _
     " set " & mstrIdentifierColumn & _
     " = " & mstrIdentifierColumn & " + 1"
  mdbsDatabase.Execute strSql, dbFailOnError

  ' Refresh the recordset with identifier values
  Call CreateIdRecordset

  mlngIdentifier = mrecIdentifiers.Fields(mstrIdentifierColumn).Value

  Identifier = mlngIdentifier

  Exit Property

GetIdentifierErr:
  LogErrors Errors
  mstrSource = mstrModuleName & "Identifier"
  On Error GoTo 0
  Err.Raise vbObjectError + errGetIdentifierFailed, _
        mstrSource, _
        LoadResString(errGetIdentifierFailed)

End Property
Private Sub Class_Terminate()

  mrecIdentifiers.Close

End Sub

VERSION 1.0 CLASS
BEGIN
 MultiUse = -1  'True
 Persistable = 0  'NotPersistable
 DataBindingBehavior = 0  'vbNone
 DataSourceBehavior  = 0  'vbNone
 MTSTransactionMode  = 0  'NotAnMTSObject
END
Attribute VB_Name = "cStack"
Attribute VB_GlobalNameSpace = False
```

```
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
'  FILE:       cStack.cls
'              Microsoft TPC-H Kit Ver. 2.7.0-1005
'              Copyright Microsoft, 2008
'              All Rights Reserved
'
'
'  PURPOSE:    This class implements a stack of objects.
'  Contact:    Reshma Tharamal (reshmat@microsoft.com)
'
Option Explicit

' Used to indicate the source module name when errors
' are raised by this class
Private Const mstrModuleName As String = "cStack."
Private mstrSource As String

Private mcVector As cVector
Private mlngCount As Long
Public Property Get Item(ByVal Position As Long) As Object
Attribute Item.VB_UserMemId = 0

  Set Item = mcVector(Position)

End Property

Public Sub Push(objToPush As Object)

  mcVector.Add objToPush

End Sub
Public Sub Clear()

  mcVector.Clear

End Sub

Public Function Pop() As Object

  If mcVector.Count > 0 Then
     Set Pop = mcVector.Delete(mcVector.Count - 1)
  Else
     Set Pop = Nothing
  End If

End Function
Public Function Count() As Long

  Count = mcVector.Count

End Function
```

```
Private Sub Class_Initialize()

   Set mcVector = New cVector

End Sub


Private Sub Class_Terminate()

   Set mcVector = Nothing

End Sub


VERSION 1.0 CLASS
BEGIN
 MultiUse = -1  'True
 Persistable = 0  'NotPersistable
 DataBindingBehavior = 0  'vbNone
 DataSourceBehavior  = 0  'vbNone
 MTSTransactionMode  = 0  'NotAnMTSObject
END
Attribute VB_Name = "cStep"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
Attribute VB_Ext_KEY = "SavedWithClassBuilder" ,"Yes"
Attribute VB_Ext_KEY = "Top_Level" ,"Yes"
'  FILE:       cStep.cls
'              Microsoft TPC-H Kit Ver. 2.7.0-1005
'              Copyright Microsoft, 2008
'              All Rights Reserved
'
'
'  PURPOSE:    Encapsulates the properties and methods of a step.
'              Contains functions to insert, update and delete
'              att_steps records from the database.
'  Contact:    Reshma Tharamal (reshmat@microsoft.com)
'
Option Explicit

' Local variable(s) to hold property value(s)
Private mlngStepId As Long
Private mstrVersionNo As String
Private mstrStepLabel As String
Private mstrStepTextFile As String
Private mstrStepText As String
Private mstrStartDir As String
Private mlngWorkspaceId As Integer
Private mlngParentStepId As Integer
Private mstrParentVersionNo As String
Private mintSequenceNo As Integer
```

```
Private mintStepLevel As Integer
Private mblnEnabledFlag As Boolean
Private mstrDegreeParallelism As String
Private mintExecutionMechanism As Integer
Private mstrFailureDetails As String
Private mintContinuationCriteria As Integer
Private mblnGlobalFlag As Boolean
Private mblnArchivedFlag As Boolean
Private mstrOutputFile As String
'Private mstrLogFile As String
Private mstrErrorFile As String
Private mdbsDatabase As Database
Private mintStepType As Integer
Private mintOperation As Operation
Private mlngPosition As Long
Private mstrIteratorName As String
Private mcIterators As cNodeCollections
Private mbIsNewVersion As Boolean
Private msOldVersion As String

' The following constants are used throughout the project to
' indicate the different options selected by the user
' The options are presented to the user as control arrays of
' option buttons. These constants have to be in sync with the
' indexes of the option buttons.
' All the control arrays have an lbound of 1. The value 0 is
' used to indicate that the property being represented by the
' control array is not valid for the step
' Public enums are used since we cannot expose public constants
' in class modules. gintNoOption is applicable to all enums,
' but declared in the Execution method enum, since we cannot
' declare it more than once.

' Is here as a comment
' Has been defined in public.bas with the other object types
'Public Enum gintStepType
'    gintGlobalStep = 3
'    gintManagerStep
'    gintWorkerStep
'End Enum

' Execution Method options
Public Enum ExecutionMethod
   gintNoOption = 0
   gintExecuteODBC
   gintExecuteShell
End Enum

' Failure criteria options
Public Enum FailureCriteria
   gintFailureODBC = 1
   gintFailureTextCompare
End Enum
```

```
' Continuation criteria options
' Note: Update the initialization of gsContCriteria in Initialize() if the
' continuation criteria are modified
Public Enum ContinuationCriteria
   gintOnFailureAbort = 1
   gintOnFailureContinue
   gintOnFailureCompleteSiblings
   gintOnFailureAbortSiblings
   gintOnFailureSkipSiblings
   gintOnFailureAsk
End Enum

' The initial version #
Private Const mstrMinVersion As String = "0.0"

' End of constants for option button control arrays
' Used to indicate the source module name when errors
' are raised by this class
Private mstrSource As String
Private Const mstrModuleName As String = "cStep."

' The cSequence class is used to generate unique step identifiers
Private mStepSeq As cSequence

' The StringSM class is used to carry out string operations
Private mFieldValue As cStringSM
Private Sub NewVersion()

mbIsNewVersion = True
msOldVersion = mstrVersionNo

End Sub
Public Function IsNewVersion() As Boolean
   IsNewVersion = mbIsNewVersion
End Function

Public Function OldVersionNo() As String
   OldVersionNo = msOldVersion
End Function

Public Sub SaveIterators()
   ' This procedure checks if any changes have been made
   ' to the iterators for the step. If so, it calls the
   ' methods of the iterator class to commit the changes
   Dim cItRec As cIterator
   Dim lngIndex As Long

   On Error GoTo SaveIteratorsErr

   For lngIndex = 0 To mcIterators.Count - 1
      Set cItRec = mcIterators(lngIndex)

      Select Case cItRec.IndOperation
         Case QueryOp
```

```
            ' No changes were made to the queried Step.
            ' Do nothing

        Case InsertOp
            cItRec.Add mlngStepId, mstrVersionNo
            cItRec.IndOperation = QueryOp

        Case UpdateOp
            cItRec.Update mlngStepId, mstrVersionNo
            cItRec.IndOperation = QueryOp

        Case DeleteOp
            cItRec.Delete mlngStepId, mstrVersionNo
            ' Remove the record from the collection
            mcIterators.Delete lngIndex

    End Select
  Next lngIndex

  Exit Sub

SaveIteratorsErr:
  LogErrors Errors
  mstrSource = mstrModuleName & "SaveIterators"
  On Error GoTo 0
  Err.Raise vbObjectError + errSaveFailed, _
        mstrSource, _
        LoadResString(errSaveFailed)

End Sub
Public Property Get IndOperation() As Operation

  IndOperation = mintOperation

End Property
Public Property Let IndOperation(ByVal vdata As Operation)

  BugAssert vdata = QueryOp Or vdata = InsertOp Or vdata = UpdateOp Or vdata = DeleteOp, "Invalid operation"
  mintOperation = vdata

End Property

Public Function Iterators() As Variant
  ' Returns a variant containing all the iterators that
  ' have been defined for the step

  Dim cStepIterators() As cIterator
  Dim cTempIt As cIterator
  Dim lngIndex As Long
  Dim lngItCount As Long

  On Error GoTo IteratorsErr

  lngItCount = 0
```

```
  For lngIndex = 0 To mcIterators.Count - 1
     ' Increase the array dimension and add the constraint
     ' to it
     Set cTempIt = mcIterators(lngIndex)

     If cTempIt.IndOperation <> DeleteOp Then
        ReDim Preserve cStepIterators(lngItCount)
        Set cStepIterators(lngItCount) = cTempIt
        lngItCount = lngItCount + 1
     End If

  Next lngIndex

  If lngItCount = 0 Then
     Iterators = Empty
  Else
     Iterators = cStepIterators()
  End If

  Call QuickSort(Iterators)

  Exit Function

IteratorsErr:
  LogErrors Errors
  On Error GoTo 0
  Err.Raise vbObjectError + errIteratorsFailed, _
        mstrModuleName & "Iterators", _
        LoadResString(errIteratorsFailed)

End Function
Public Function IteratorCount() As Long
  ' Returns a count of all the iterators for the step

  Dim lngItCount As Long
  Dim lngIndex As Long
  Dim cTempIt As cIterator

  On Error GoTo IteratorsErr

  lngItCount = 0
  For lngIndex = 0 To mcIterators.Count - 1

     If mcIterators(lngIndex).IndOperation <> DeleteOp Then
        lngItCount = lngItCount + 1
     End If

  Next lngIndex

  IteratorCount = lngItCount

  Exit Function

IteratorsErr:
```

```
  LogErrors Errors
  On Error GoTo 0
  Err.Raise vbObjectError + errIteratorsFailed, _
        mstrSource, _
        LoadResString(errIteratorsFailed)

End Function
Public Sub Validate()
  ' Each distinct object will have a Validate method which
  ' will check if the class properties are valid. This method
  ' will be used to check interdependant properties that
  ' cannot be validated by the let procedures.
  ' It should be called by the add and modify methods of the class

  ' Check if the step label has been specified
  If StringEmpty(mstrStepLabel) Then
     ShowError errStepLabelMandatory
     On Error GoTo 0
     Err.Raise vbObjectError + errValidateFailed, _
           "Validate", LoadResString(errValidateFailed)
  End If

  If Not IsStringEmpty(mstrStepText) And Not IsStringEmpty(mstrStepTextFile) Then
     ShowError errStepTextOrFile
     On Error GoTo 0
     Err.Raise vbObjectError + errStepTextOrFile, _
        "Validate", LoadResString(errStepTextOrFile)
  End If

End Sub

Public Function IncVersionY() As String
  ' The version number for a step is stored in the x.y
  ' format where x is the parent component and y is the
  ' child component of the step. This function will increment
  ' the y component of the step by 1

  On Error GoTo IncVersionYErr

  ' Store the old version number for the step
  Call NewVersion

  mstrVersionNo = Trim$(Str$(GetX(mstrVersionNo))) & gstrVerSeparator & _
        Trim$(Str(GetY(mstrVersionNo) + 1))
  IncVersionY = mstrVersionNo

  Exit Function

IncVersionYErr:
  ' Log the error code raised by Visual Basic
  Call LogErrors(Errors)
  gstrSource = mstrModuleName & "IncVersionY"
  On Error GoTo 0
  Err.Raise vbObjectError + errIncVersionYFailed, _
```

```
        gstrSource, _
        LoadResString(errIncVersionYFailed)

End Function
Public Function IncVersionX() As String
  ' The version number for a step is stored in the x.y
  ' format where x is the parent component and y is the
  ' child component of the step. This function will increment
  ' the y component of the step by 1 and reset the x component
  ' to 0

  On Error GoTo IncVersionXErr

  ' Store the old version number for the step
  Call NewVersion

  mstrVersionNo = Trim$(Str$(GetX(mstrVersionNo) + 1)) & gstrVerSeparator & "0"
  IncVersionX = mstrVersionNo

  Exit Function

IncVersionXErr:
  ' Log the error code raised by Visual Basic
  Call LogErrors(Errors)
  gstrSource = mstrModuleName & "IncVersionX"
  On Error GoTo 0
  Err.Raise vbObjectError + errIncVersionXFailed, _
        gstrSource, _
        LoadResString(errIncVersionXFailed)

End Function


Private Function GetY(strVersion As String) As Long
  ' The version number for a step is stored in the x.y
  ' format where x is the parent component and y is the
  ' child component of the step. Given an argument of type
  ' x.y, it returns y

  ' Truncate the fractional part to get the parent component
  ' of the version number (x.y)
  GetY = Val(Mid(strVersion, InStr(strVersion, gstrVerSeparator) + 1))

End Function
Private Function GetX(strVersion As String) As Long
  ' The version number for a step is stored in the x.y
  ' format where x is the parent component and y is the
  ' child component of the step. Given an argument of type
  ' x.y, it returns x

  ' Truncate the fractional part to get the parent component
  ' of the version number (x.y)
  GetX = Val(Left(strVersion, InStr(strVersion, gstrVerSeparator) - 1))
```

```
End Function

Public Function Clone(Optional cCloneStep As cStep) As cStep

  ' Creates a copy of a given step

  Dim lngIndex As Long
  Dim cItRec As cIterator
  Dim cItClone As cIterator

  On Error GoTo CloneErr

  If cCloneStep Is Nothing Then
     Set cCloneStep = New cStep
  End If

  ' Copy all the step properties to the newly created step
  ' Initialize the global flag first since subsequent
  ' validations might depend on it
  cCloneStep.GlobalFlag = mblnGlobalFlag
'   cCloneStep.GlobalRunMethod = mintGlobalRunMethod

  cCloneStep.StepType = mintStepType
  cCloneStep.StepId = mlngStepId
  cCloneStep.VersionNo = mstrVersionNo
  cCloneStep.StepLabel = mstrStepLabel
  cCloneStep.StepTextFile = mstrStepTextFile
  cCloneStep.StepText = mstrStepText
  cCloneStep.StartDir = mstrStartDir
  cCloneStep.WorkspaceId = mlngWorkspaceId
  cCloneStep.ParentStepId = mlngParentStepId
  cCloneStep.ParentVersionNo = mstrParentVersionNo
  cCloneStep.StepLevel = mintStepLevel
  cCloneStep.SequenceNo = mintSequenceNo
  cCloneStep.EnabledFlag = mblnEnabledFlag
  cCloneStep.DegreeParallelism = mstrDegreeParallelism
  cCloneStep.ExecutionMechanism = mintExecutionMechanism
  cCloneStep.FailureDetails = mstrFailureDetails
  cCloneStep.ContinuationCriteria = mintContinuationCriteria
  cCloneStep.ArchivedFlag = mblnArchivedFlag
  cCloneStep.OutputFile = mstrOutputFile
'   cCloneStep.LogFile = mstrLogFile
  cCloneStep.ErrorFile = mstrErrorFile
  cCloneStep.IteratorName = mstrIteratorName

  cCloneStep.IndOperation = mintOperation
  cCloneStep.Position = mlngPosition

  Set cCloneStep.NodeDB = mdbsDatabase

  ' Clone all the iterators for the step
  For lngIndex = 0 To mcIterators.Count - 1
     Set cItRec = mcIterators(lngIndex)
     Set cItClone = cItRec.Clone
```

```
      cCloneStep.LoadIterator cItClone
   Next lngIndex

   ' And set the return value to the newly created step
   Set Clone = cCloneStep

   Exit Function

CloneErr:
   LogErrors Errors
   mstrSource = mstrModuleName & "Clone"
   On Error GoTo 0
   Err.Raise vbObjectError + errCloneFailed, _
         mstrSource, LoadResString(errCloneFailed)

End Function
'End Sub
'
Public Property Let OutputFile(ByVal vdata As String)

   mstrOutputFile = vdata

End Property

Public Property Get OutputFile() As String

   OutputFile = mstrOutputFile

End Property

'Public Property Let LogFile(ByVal vdata As String)
'
'    mstrLogFile = vdata
'
'End Property
'
'Public Property Get LogFile() As String
'
'    LogFile = mstrLogFile
'
'End Property

Public Property Let ErrorFile(ByVal vdata As String)

   mstrErrorFile = vdata

End Property
Public Property Let IteratorName(ByVal vdata As String)

   mstrIteratorName = vdata

End Property

Public Property Get ErrorFile() As String
```

```
    ErrorFile = mstrErrorFile

End Property
Public Property Get IteratorName() As String

    IteratorName = mstrIteratorName

End Property

Public Property Set NodeDB(vdata As Database)

    Set mdbsDatabase = vdata
    Set mcIterators.NodeDB = vdata

End Property
Public Property Get NodeDB() As Database

    Set NodeDB = mdbsDatabase

End Property

Private Function IsStringEmpty(strToCheck As String) As Boolean

    IsStringEmpty = (strToCheck = gstrEmptyString)

End Function

Public Property Let EnabledFlag(ByVal vdata As Boolean)

    ' The enabled flag must be False for all global steps.
    ' This check must be made by the global step class. Only
    ' generic step validations will be carried out by this
    ' class
    mblnEnabledFlag = vdata

End Property

Public Property Let GlobalFlag(ByVal vdata As Boolean)

    mblnGlobalFlag = vdata

End Property
Public Property Get EnabledFlag() As Boolean

    EnabledFlag = mblnEnabledFlag

End Property

Public Property Let ArchivedFlag(ByVal vdata As Boolean)

    mblnArchivedFlag = vdata

End Property
```

```
Public Property Get ArchivedFlag() As Boolean

  ArchivedFlag = mblnArchivedFlag

End Property

Public Property Get GlobalFlag() As Boolean

  GlobalFlag = mblnGlobalFlag

End Property

Public Sub Add()
  ' Inserts a step record into the database - it initializes
  ' the necessary properties for the step and calls InsertStepRec
  ' to do the database work

  On Error GoTo AddErr

  ' A new record would have the deleted_flag turned off!
  mblnArchivedFlag = False

  Call InsertStepRec

  ' If a new version of a step has been created, reset the old version info, since
  ' it's already been saved to the db
  If IsNewVersion() Then
     mbIsNewVersion = False
     msOldVersion = gstrEmptyString
  End If

  Exit Sub

AddErr:
  LogErrors Errors
  On Error GoTo 0
  Err.Raise vbObjectError + errAddStepFailed, _
        mstrModuleName & "Add", LoadResString(errAddStepFailed)
End Sub
Private Sub InsertStepRec()
  ' Inserts a step record into the database
  ' It first generates the insert statement using the different
  ' step properties and then executes it

  Dim strInsert As String
  Dim qy As DAO.QueryDef

  On Error GoTo InsertStepRecErr

  ' First check if the database object is valid
  Call CheckDB

  ' Check if the step record is valid
```

```
   Call Validate

   If IsNewVersion() Then
      Call UpdOldVersionsArchFlg
   End If

   ' Create a temporary querydef object
   strInsert = "insert into att_steps " & _
      "( workspace_id, step_id, version_no, " & _
      " step_label, step_file_name, step_text, start_directory, " & _
      " parent_step_id, parent_version_no, sequence_no, " & _
      " enabled_flag, step_level, " & _
      " degree_parallelism, execution_mechanism, " & _
      " failure_details, " & _
      " continuation_criteria, global_flag, " & _
      " archived_flag, " & _
      " output_file_name, error_file_name, " & _
      " iterator_name ) values ( "

   ' log_file_name,

#If USE_JET Then

   strInsert = strInsert & " [w_id], [s_id], [ver_no], " & _
      " [s_label], [s_file_name], [s_text], [s_start_dir], " & _
      " [p_step_id], [p_version_no], [seq_no], " & _
      " [enabled], [s_level], [deg_parallelism], " & _
      " [exec_mechanism], [fail_dtls], " & _
      " [cont_criteria], [global], [archived], " & _
      " [output_file], [error_file], " & _
      " [it_name] ) "

   ' [log_file],

   Set qy = mdbsDatabase.CreateQueryDef(gstrEmptyString, strInsert)

   ' Call a procedure to execute the Querydef object
   Call AssignParameters(qy)

   qy.Execute dbFailOnError
   qy.Close
#Else

      strInsert = strInsert & Str(mlngWorkspaceId) & ", " & Str(mlngStepId) & _
      ", " & mFieldValue.MakeStringFieldValid(mstrVersionNo)

   ' For fields that may be null, call a function to determine
   ' the string to be appended to the insert statement
   strInsert = strInsert & ", " & mFieldValue.MakeStringFieldValid(mstrStepLabel)
   strInsert = strInsert & ", " & mFieldValue.MakeStringFieldValid(mstrStepTextFile)
   strInsert = strInsert & ", " & mFieldValue.MakeStringFieldValid(mstrStepText)
   strInsert = strInsert & ", " & mFieldValue.MakeStringFieldValid(mstrStartDir)

   strInsert = strInsert & ", " & Str(mlngParentStepId) & _
```

```
      ", " & mFieldValue.MakeStringFieldValid(mstrParentVersionNo) & _
      ", " & Str(mintSequenceNo) & _
      ", " & Str(mblnEnabledFlag) & ", " & Str(mintStepLevel)

  strInsert = strInsert & ", " & mFieldValue.MakeStringFieldValid(mstrDegreeParallelism)
  strInsert = strInsert & ", " & Str(mintExecutionMechanism)

  strInsert = strInsert & ", " & mFieldValue.MakeStringFieldValid(mstrFailureDetails) & _
      ", " & Str(mintContinuationCriteria) & _
      ", " & Str(mblnGlobalFlag) & _
      ", " & Str(mblnArchivedFlag)

  strInsert = strInsert & ", " & mFieldValue.MakeStringFieldValid(mstrOutputFile)
'   strInsert = strInsert & ", " & mFieldValue.MakeStringFieldValid(mstrLogFile)
  strInsert = strInsert & ", " & mFieldValue.MakeStringFieldValid(mstrErrorFile)
  strInsert = strInsert & ", " & mFieldValue.MakeStringFieldValid(mstrIteratorName)

  strInsert = strInsert & " ) "

  BugMessage strInsert
  mdbsDatabase.Execute strInsert, dbFailOnError

#End If

  Exit Sub

InsertStepRecErr:
  mstrSource = mstrModuleName & "InsertStepRec"
  LogErrors Errors
  On Error GoTo 0
  Err.Raise vbObjectError + errInsertStepFailed, _
        mstrSource, LoadResString(errInsertStepFailed)
End Sub
Private Sub UpdOldVersionsArchFlg()
  ' Updates the archived flag on all old version for the step to True

  Dim sUpdate As String
  Dim qy As DAO.QueryDef

  On Error GoTo UpdOldVersionsArchFlgErr
  mstrSource = mstrModuleName & "UpdOldVersionsArchFlg"

#If USE_JET Then

  sUpdate = "update att_steps " & _
     " set archived_flag = True "

  ' Append the Where clause
  sUpdate = sUpdate & " where step_id = [s_id] " & _
     " and version_no <> [ver_no]"

  Set qy = mdbsDatabase.CreateQueryDef(gstrEmptyString, sUpdate)

  ' Call a procedure to execute the Querydef object
```

```
  Call AssignParameters(qy)
  qy.Execute dbFailOnError

  If qy.RecordsAffected = 0 Then
     On Error GoTo 0
     Err.Raise vbObjectError + errModifyStepFailed, _
           mstrSource, LoadResString(errModifyStepFailed)
  End If

  qy.Close

#Else

  sUpdate = "update att_steps " & _
     " set archived_flag = True "

  sUpdate = sUpdate & " where step_id = " & Str(mlngStepId) & _
     " and version_no <> " & mFieldValue.MakeStringFieldValid(mstrVersionNo)

  BugMessage sUpdate
  mdbsDatabase.Execute sUpdate, dbFailOnError
#End If

  Exit Sub

UpdOldVersionsArchFlgErr:
  mstrSource = mstrModuleName & "UpdOldVersionsArchFlg"
  LogErrors Errors
  On Error GoTo 0
  Err.Raise vbObjectError + errModifyStepFailed, _
        mstrSource, LoadResString(errModifyStepFailed)
End Sub
Public Sub InsertIterator(cItRecord As cIterator)
  ' Inserts the iterator record into the database

  Call cItRecord.Add(mlngStepId, mstrVersionNo)

End Sub
Public Sub UpdateIterator(cItRecord As cIterator)
  ' Updates the iterator record in the database

  Call cItRecord.Update(mlngStepId, mstrVersionNo)

End Sub
Public Sub UpdateIteratorVersion()
  ' Updates the iterator record in the database

  Dim lngIndex As Long
  Dim cTempIt As cIterator

  On Error GoTo UpdateIteratorVersionErr

  For lngIndex = 0 To mcIterators.Count - 1
     ' Increase the array dimension and add the constraint
```

```
      ' to it
      Set cTempIt = mcIterators(lngIndex)

      If cTempIt.IndOperation <> DeleteOp Then
         ' Set the operation to indicate an insert
         cTempIt.IndOperation = InsertOp
      End If

   Next lngIndex

   Exit Sub

UpdateIteratorVersionErr:
   mstrSource = mstrModuleName & "UpdateIteratorVersion"
   LogErrors Errors
   On Error GoTo 0
   Err.Raise vbObjectError + errUpdateFailed, _
         mstrSource, LoadResString(errUpdateFailed)

End Sub
Public Sub AddIterator(cItRecord As cIterator)
   ' Adds the iterator record to the collection of iterators
   ' for the step

   Call mcIterators.Add(cItRecord)

End Sub
Public Sub AddAllIterators()
   ' Sets the indicator variable for all iterators to insert

   Dim lngIndex As Long

   For lngIndex = 0 To mcIterators.Count - 1
      mcIterators(lngIndex).Validate
      mcIterators(lngIndex).IndOperation = InsertOp
   Next lngIndex

End Sub

Public Sub LoadIterator(cItRecord As cIterator)
   ' Adds the iterator record to the collection of iterators
   ' for the step

   Call mcIterators.Load(cItRecord)

End Sub
Public Sub UnloadIterators()
   ' Unloads all iterator records for the step

   Dim lngIndex As Long

   For lngIndex = mcIterators.Count - 1 To 0 Step -1
      ' Calls the collection method to unload the node
      ' from the array
```

```
      mcIterators.Unload lngIndex
  Next lngIndex

End Sub
Public Sub ModifyIterator(cItRecord As cIterator)
  ' Modifies the iterator record in the collection

  Call mcIterators.Modify(cItRecord)

End Sub
Public Sub DeleteIterator(cItRecord As cIterator)
  ' Deletes the iterator record from the database

  Call cItRecord.Delete(mlngStepId, mstrVersionNo)

End Sub
Public Sub RemoveIterator(cItRecord As cIterator)
  ' Marks the iterator record in the collection to
  ' indicate a delete

  Call mcIterators.Delete(cItRecord.Position)

End Sub


Private Sub AssignParameters(qyExec As DAO.QueryDef)
  ' Assigns values to the parameters in the querydef object
  ' The parameter names are cryptic to make them different
  ' from the actual field names. When the parameter names
  ' are the same as the field names, parameters in the
  ' where clause do not get created.

  Dim prmParam As DAO.Parameter

  On Error GoTo AssignParametersErr
  mstrSource = mstrModuleName & "AssignParameters"

  For Each prmParam In qyExec.Parameters
     Select Case prmParam.Name
        Case "[w_id]"
           prmParam.Value = mlngWorkspaceId
        Case "[s_id]"
           prmParam.Value = mlngStepId
        Case "[ver_no]"
           prmParam.Value = mstrVersionNo
        Case "[s_label]"
           prmParam.Value = mstrStepLabel
        Case "[s_file_name]"
           prmParam.Value = mstrStepTextFile
        Case "[s_text]"
           prmParam.Value = mstrStepText
        Case "[s_start_dir]"
           prmParam.Value = mstrStartDir
        Case "[p_step_id]"
```

```
            prmParam.Value = mlngParentStepId
         Case "[p_version_no]"
            prmParam.Value = mstrParentVersionNo
         Case "[seq_no]"
            prmParam.Value = mintSequenceNo
         Case "[enabled]"
            prmParam.Value = mblnEnabledFlag
         Case "[s_level]"
            prmParam.Value = mintStepLevel
         Case "[deg_parallelism]"
            prmParam.Value = mstrDegreeParallelism
         Case "[exec_mechanism]"
            prmParam.Value = mintExecutionMechanism
         Case "[fail_dtls]"
            prmParam.Value = mstrFailureDetails
         Case "[cont_criteria]"
            prmParam.Value = mintContinuationCriteria
         Case "[global]"
            prmParam.Value = mblnGlobalFlag
         Case "[archived]"
            prmParam.Value = mblnArchivedFlag
         Case "[output_file]"
            prmParam.Value = mstrOutputFile
'         Case "[log_file]"
'            prmParam.Value = mstrLogFile
         Case "[error_file]"
            prmParam.Value = mstrErrorFile
         Case "[it_name]"
            prmParam.Value = mstrIteratorName
         Case Else
            ' Write the parameter name that is faulty
            WriteError errInvalidParameter, mstrSource, _
                  prmParam.Name
            On Error GoTo 0
            Err.Raise errInvalidParameter, mstrSource, _
                  LoadResString(errInvalidParameter)
      End Select
   Next prmParam

   If qyExec.Parameters("s_id") = 0 Or StringEmpty(qyExec.Parameters("ver_no")) Then
      WriteError errInvalidParameter, mstrSource
      On Error GoTo 0
      Err.Raise errInvalidParameter, mstrSource, LoadResString(errInvalidParameter)
   End If

   Exit Sub

AssignParametersErr:

   mstrSource = mstrModuleName & "AssignParameters"
   Call LogErrors(Errors)
   On Error GoTo 0
   Err.Raise vbObjectError + errAssignParametersFailed, _
      mstrSource, LoadResString(errAssignParametersFailed)
```

```
End Sub

Public Sub Modify()

  Dim strUpdate As String
  Dim qy As QueryDef

  On Error GoTo ModifyErr
  mstrSource = mstrModuleName & "Modify"

  ' Check if the database object is valid
  Call CheckDB

  ' Check if the step record is valid
  Call Validate

  ' The step_id and version_no will never be updated -
  ' whenever a step is modified a copy of the old step will
  ' be created with an incremented version_no

#If USE_JET Then

  strUpdate = "update att_steps " & _
     " set step_label = [s_label] " & _
     " , step_file_name = [s_file_name] " & _
     " , step_text = [s_text] " & _
     " , start_directory = [s_start_dir] " & _
     " , workspace_id = [w_id] " & _
     " , parent_step_id = [p_step_id] " & _
     " , parent_version_no = [p_version_no] " & _
     " , sequence_no = [seq_no] " & _
     " , step_level = [s_level] " & _
     " , enabled_flag = [enabled] " & _
     " , degree_parallelism = [deg_parallelism] " & _
     " , execution_mechanism = [exec_mechanism] " & _
     " , failure_details = [fail_dtls] " & _
     " , continuation_criteria = [cont_criteria] " & _
     " , global_flag = [global] " & _
     " , archived_flag = [archived] " & _
     " , output_file_name = [output_file] " & _
     " , error_file_name = [error_file] " & _
     " , iterator_name = [it_name] "

     ' " , log_file_name = [log_file] " & _

  ' Append the Where clause
  strUpdate = strUpdate & " where step_id = [s_id] " & _
     " and version_no = [ver_no]"

  Set qy = mdbsDatabase.CreateQueryDef(gstrEmptyString, strUpdate)

  ' Call a procedure to execute the Querydef object
  Call AssignParameters(qy)
```

```
    qy.Execute dbFailOnError

    If qy.RecordsAffected = 0 Then
        On Error GoTo 0
        Err.Raise vbObjectError + errModifyStepFailed, _
                mstrSource, LoadResString(errModifyStepFailed)
    End If

    qy.Close

#Else

    strUpdate = "update att_steps " & _
        " set step_label = "

    ' For fields that may be null, call a function to determine
    ' the string to be appended to the update statement
    strUpdate = strUpdate & mFieldValue.MakeStringFieldValid(mstrStepLabel)

    strUpdate = strUpdate & " , step_file_name = " & mFieldValue.MakeStringFieldValid(mstrStepTextFile)
    strUpdate = strUpdate & " , step_text = " & mFieldValue.MakeStringFieldValid(mstrStepText)
    strUpdate = strUpdate & " , start_directory = " & mFieldValue.MakeStringFieldValid(mstrStartDir)

    strUpdate = strUpdate & " , workspace_id = " & Str(mlngWorkspaceId) & _
        " , parent_step_id = " & Str(mlngParentStepId) & _
        " , parent_version_no = " & mFieldValue.MakeStringFieldValid(mstrParentVersionNo) & _
        " , sequence_no = " & Str(mintSequenceNo) & _
        " , step_level = " & Str(mintStepLevel) & _
        " , enabled_flag = " & Str(mblnEnabledFlag) & _
        " , degree_parallelism = " & mFieldValue.MakeStringFieldValid(mstrDegreeParallelism) & _
        " , execution_mechanism = " & Str(mintExecutionMechanism) & _
        " , failure_details = " & mFieldValue.MakeStringFieldValid(mstrFailureDetails) & _
        " , continuation_criteria = " & Str(mintContinuationCriteria) & _
        " , global_flag = " & Str(mblnGlobalFlag) & _
        " , archived_flag = " & Str(mblnArchivedFlag) & _
        " , output_file_name = " & mFieldValue.MakeStringFieldValid(mstrOutputFile) & _
        " , error_file_name = " & mFieldValue.MakeStringFieldValid(mstrErrorFile) & _
        " , iterator_name = " & mFieldValue.MakeStringFieldValid(mstrIteratorName)

'       " , log_file_name = " & mFieldValue.MakeStringFieldValid(mstrLogFile) & _

    strUpdate = strUpdate & " where step_id = " & Str(mlngStepId) & _
        " and version_no = " & mFieldValue.MakeStringFieldValid(mstrVersionNo)

    BugMessage strUpdate
    mdbsDatabase.Execute strUpdate, dbFailOnError
#End If

    Exit Sub

ModifyErr:
    LogErrors Errors
    mstrSource = mstrModuleName & "Modify"
    On Error GoTo 0
```

```
  Err.Raise vbObjectError + errModifyStepFailed, _
        mstrSource, LoadResString(errModifyStepFailed)
End Sub
Private Sub CheckDB()
  ' Check if the database object has been initialized

  If mdbsDatabase Is Nothing Then
     ShowError errInvalidDB
     On Error GoTo 0
     Err.Raise vbObjectError + errInvalidDB, _
        mstrModuleName, LoadResString(errInvalidDB)
  End If

End Sub

Public Sub Delete()

  Dim strDelete As String
  Dim qy As DAO.QueryDef

  On Error GoTo DeleteErr

  Call CheckDB

  strDelete = "delete from att_steps " & _
        " where step_id = [s_id] " & _
        " and version_no = [ver_no] "
'   mdbsDatabase.Execute strDelete, dbFailOnError
  Set qy = mdbsDatabase.CreateQueryDef(gstrEmptyString, strDelete)

  Call AssignParameters(qy)
  qy.Execute dbFailOnError

  qy.Close

  Exit Sub

DeleteErr:
  LogErrors Errors
  On Error GoTo 0
  Err.Raise vbObjectError + errDeleteStepFailed, _
        mstrModuleName & "Delete", LoadResString(errDeleteStepFailed)
End Sub
Public Property Get DegreeParallelism() As String

  DegreeParallelism = mstrDegreeParallelism

End Property
Public Property Get Position() As Long

  Position = mlngPosition

End Property
```

```
Public Property Let DegreeParallelism(ByVal vdata As String)

  ' The degree of parallelism must be zero for all global steps
  ' This check must be made by the global step class. Only
  ' generic step validations will be carried out by this
  ' class
  mstrDegreeParallelism = vdata

End Property

Public Property Let ExecutionMechanism(ByVal vdata As ExecutionMethod)

  BugAssert vdata = gintExecuteODBC Or vdata = gintExecuteShell Or vdata = gintNoOption, _
        "Execution mechanism invalid"
  mintExecutionMechanism = vdata

End Property

Public Property Let FailureDetails(ByVal vdata As String)

  mstrFailureDetails = vdata

End Property
Public Property Let SequenceNo(ByVal vdata As Integer)
  mintSequenceNo = vdata
End Property

Public Property Let Position(ByVal vdata As Long)
  mlngPosition = vdata
End Property

Public Property Let ParentStepId(ByVal vdata As Long)
  mlngParentStepId = vdata
End Property

Public Property Get SequenceNo() As Integer

  SequenceNo = mintSequenceNo

End Property

Public Property Get StepLevel() As Integer
  StepLevel = mintStepLevel
End Property

Public Property Get ParentVersionNo() As String
  ParentVersionNo = mstrParentVersionNo
End Property

Public Property Let ParentVersionNo(ByVal vdata As String)
  mstrParentVersionNo = vdata
End Property

Public Property Get ParentStepId() As Long
```

```
  ParentStepId = mlngParentStepId
End Property

Public Property Let WorkspaceId(ByVal vdata As Long)
  mlngWorkspaceId = vdata
End Property

Public Property Let VersionNo(ByVal vdata As String)
  ' The version number of a step is stored in the x.y format where
  ' x represents a change to the step as a result of modifications
  ' to any of the step properties
  ' y represents a change to the step as a result of modifications
  ' to the sub-steps associated with it. Hence the y-component
  ' of the version will be incremented when a sub-step is added,
  ' modified or deleted
  ' x will be referred to throughout this code as the parent
  ' component of the version and y will be referred to as the
  ' child component of the version
  ' The version information for a step is maintained by the
  ' calling function

  mstrVersionNo = vdata

End Property

Public Property Get StepType() As gintStepType

  On Error GoTo StepTypeErr

  If mintStepType = 0 Then
     ' The step type variable has not been initialized -
     If mblnGlobalFlag Then
        mintStepType = gintGlobalStep
     ElseIf IsStringEmpty(mstrStepText) And _
           IsStringEmpty(mstrStepTextFile) Then
        mintStepType = gintManagerStep
     Else
        mintStepType = gintWorkerStep
     End If
  End If

  StepType = mintStepType

  Exit Property

StepTypeErr:
  LogErrors Errors
  mstrSource = mstrModuleName & "StepType"
  On Error GoTo 0
  Err.Raise vbObjectError + errGetStepTypeFailed, _
        mstrSource, _
        LoadResString(errGetStepTypeFailed)

End Property
```

```
Public Property Let StepType(vdata As gintStepType)

  On Error GoTo StepTypeErr

  Select Case vdata
     Case gintGlobalStep, gintManagerStep, gintWorkerStep
        mintStepType = vdata

     Case Else
        On Error GoTo 0
        Err.Raise vbObjectError + errStepTypeInvalid, _
              mstrModuleName & "StepType", LoadResString(errStepTypeInvalid)
  End Select
  Exit Property

StepTypeErr:
  LogErrors Errors
  mstrSource = mstrModuleName & "StepType"
  On Error GoTo 0
  Err.Raise vbObjectError + errLetStepTypeFailed, _
        mstrSource, _
        LoadResString(errLetStepTypeFailed)

End Property

Public Property Get WorkspaceId() As Long
  WorkspaceId = mlngWorkspaceId
End Property

Public Property Get ContinuationCriteria() As ContinuationCriteria

  ContinuationCriteria = mintContinuationCriteria

End Property

Public Property Let ContinuationCriteria(ByVal vdata As ContinuationCriteria)

  ' The Continuation criteria must be null for all global steps
  ' and non-null for all manager and worker steps
  ' These checks will have to be made by the corresponding
  ' classes - only generic step validations will be made
  ' by this class
  BugAssert vdata = gintOnFailureAbortSiblings Or vdata = gintOnFailureCompleteSiblings _
           Or vdata = gintOnFailureSkipSiblings Or vdata = gintOnFailureAbort _
           Or vdata = gintOnFailureContinue Or vdata = gintOnFailureAsk _
           Or vdata = gintNoOption, _
           "Invalid continuation criteria"
  mintContinuationCriteria = vdata

End Property
Public Property Get ExecutionMechanism() As ExecutionMethod

  ExecutionMechanism = mintExecutionMechanism
```

```
End Property


Public Property Get FailureDetails() As String

  FailureDetails = mstrFailureDetails

End Property

Public Property Let StepText(ByVal vdata As String)
  ' Has to be null for manager steps
  ' The check will have to be made by the user interface or
  ' by the manager step class
  mstrStepText = vdata
End Property
Public Property Let StepLevel(ByVal vdata As Integer)

  ' The step level must be zero for all global steps
  ' This check must be made in the global step class
  mintStepLevel = vdata

End Property
Public Property Get StepText() As String
  StepText = mstrStepText
End Property

Public Property Let StepTextFile(ByVal vdata As String)
  ' Has to be null for manager steps
  ' The check will have to be made by the user interface and
  ' by the manager step class
  mstrStepTextFile = vdata
End Property

Public Property Get StepTextFile() As String
  StepTextFile = mstrStepTextFile
End Property

Public Property Let StepLabel(ByVal vdata As String)
  ' Cannot be null for manager steps
  ' But this check cannot be made here since we do not know
  ' at this point if the step being created is a manager
  ' or a worker step
  ' The check will have to be made by the user interface and
  ' by the manager step class
  mstrStepLabel = vdata
End Property

Public Property Get StepLabel() As String
  StepLabel = mstrStepLabel
End Property

Public Property Let StartDir(ByVal vdata As String)
  mstrStartDir = vdata
```

```
End Property

Public Property Get StartDir() As String
  StartDir = mstrStartDir
End Property

Public Property Get VersionNo() As String
  ' The version number of a step is stored in the x.y format where
  ' x represents a change to the step as a result of modifications
  ' to any of the step properties
  ' y represents a change to the step as a result of modifications
  ' to the sub-steps associated with it. Hence the y-component
  ' of the version will be incremented when a sub-step is added,
  ' modified or deleted
  ' x will be referred to throughout this code as the parent
  ' component of the version and y will be referred to as the
  ' child component of the version
  ' The version information for a step is maintained by the
  ' calling function

  VersionNo = mstrVersionNo

End Property

Public Property Get StepId() As Long

  StepId = mlngStepId

End Property
Public Property Get NextStepId() As Long

  Dim lngNextId As Long

  On Error GoTo NextStepIdErr

  ' First check if the database object is valid
  Call CheckDB

  ' Retrieve the next identifier using the sequence class
  Set mStepSeq = New cSequence
  Set mStepSeq.IdDatabase = mdbsDatabase
  mStepSeq.IdentifierColumn = "step_id"
  lngNextId = mStepSeq.Identifier
  Set mStepSeq = Nothing

  NextStepId = lngNextId
  Exit Property

NextStepIdErr:
  LogErrors Errors
  mstrSource = mstrModuleName & "NextStepId"
  On Error GoTo 0
  Err.Raise vbObjectError + errStepIdGetFailed, _
     mstrSource, LoadResString(errStepIdGetFailed)
```

```
End Property
Public Property Let StepId(ByVal vdata As Long)

   mlngStepId = vdata

End Property

Private Sub Class_Initialize()

   ' Initialize the operation indicator variable to Query
   ' It will be modified later by the collection class when
   ' inserts, updates or deletes are performed
   mintOperation = QueryOp
   mbIsNewVersion = False
   msOldVersion = gstrEmptyString

   Set mFieldValue = New cStringSM
   Set mcIterators = New cNodeCollections

End Sub

Private Sub Class_Terminate()

   Set mFieldValue = Nothing
   Set mcIterators = Nothing

End Sub


VERSION 1.0 CLASS
BEGIN
 MultiUse = -1  'True
 Persistable = 0  'NotPersistable
 DataBindingBehavior = 0  'vbNone
 DataSourceBehavior  = 0  'vbNone
 MTSTransactionMode  = 0  'NotAnMTSObject
END
Attribute VB_Name = "cStepTree"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
'  FILE:       cStepTree.cls
'              Microsoft TPC-H Kit Ver. 2.7.0-1005
'              Copyright Microsoft, 2008
'              All Rights Reserved
'
'
'  PURPOSE:    Implements step navigation functions such as determining
'              the child of a step and so on.
'  Contact:    Reshma Tharamal (reshmat@microsoft.com)
'
Option Explicit
```

```
' Used to indicate the source module name when errors
' are raised by this class
Private Const mstrModuleName As String = "cStepTree."
Private mstrSource As String

Public StepRecords As cArrSteps
Public Property Get HasChild(Optional ByVal StepKey As String, _
      Optional ByVal StepId As Long = 0) As Boolean

   Dim lTemp As Long

   HasChild = False
   StepId = GetStepId(StepKey, StepId)

   For lTemp = 0 To StepRecords.StepCount - 1
      If StepRecords(lTemp).StepType <> gintGlobalStep And StepRecords(lTemp).ParentStepId = StepId Then
         HasChild = True
         Exit For
      End If
   Next lTemp

End Property
Public Property Get ChildStep(Optional ByVal StepKey As String, _
      Optional ByVal StepId As Long = 0) As cStep

   Dim lTemp As Long

   Set ChildStep = Nothing
   StepId = GetStepId(StepKey, StepId)

   For lTemp = 0 To StepRecords.StepCount - 1
      If StepRecords(lTemp).StepType <> gintGlobalStep And StepRecords(lTemp).ParentStepId = StepId And _
            StepRecords(lTemp).SequenceNo = gintMinSequenceNo Then
         Set ChildStep = StepRecords(lTemp)
         Exit For
      End If
   Next lTemp

End Property
Public Property Get NextStep(Optional ByVal StepKey As String, _
      Optional ByVal StepId As Long = 0) As cStep

   Dim lTemp As Long
   Dim cChildStep As cStep

   Set NextStep = Nothing
   StepId = GetStepId(StepKey, StepId)
   Set cChildStep = StepRecords.QueryStep(StepId)

   For lTemp = 0 To StepRecords.StepCount - 1
      If StepRecords(lTemp).StepType <> gintGlobalStep And _
            StepRecords(lTemp).ParentStepId = cChildStep.ParentStepId And _
            StepRecords(lTemp).SequenceNo = cChildStep.SequenceNo + 1 Then
```

```
        Set NextStep = StepRecords(lTemp)
        Exit For
      End If
    Next lTemp

End Property
Private Function GetStepId(Optional ByVal StepKey As String, _
      Optional ByVal StepId As Long = 0) As Long
    If StepId = 0 Then
      If StringEmpty(StepKey) Then
        Err.Raise vbObjectError + errMandatoryParameterMissing, _
              mstrModuleName & "GetStepId", LoadResString(errMandatoryParameterMissing)
      Else
        GetStepId = IIf(IsLabel(StepKey), 0, MakeIdentifierValid(StepKey))
      End If
    Else
      GetStepId = StepId
    End If
End Function
VERSION 1.0 CLASS
BEGIN
 MultiUse = -1  'True
 Persistable = 0  'NotPersistable
 DataBindingBehavior = 0  'vbNone
 DataSourceBehavior  = 0  'vbNone
 MTSTransactionMode  = 0  'NotAnMTSObject
END
Attribute VB_Name = "cStringSM"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
'  FILE:       cStringSM.cls
'              Microsoft TPC-H Kit Ver. 2.7.0-1005
'              Copyright Microsoft, 2008
'              All Rights Reserved
'
'
'  PURPOSE:     This module contains common procedures that can be used
'              to manipulate strings
'              It is called StringSM, since String is a Visual Basic keyword
'  Contact:     Reshma Tharamal (reshmat@microsoft.com)
'
Option Explicit

' Used to indicate the source module name when errors
' are raised by this class
Private mstrSource As String
Private Const mstrModuleName As String = "cStringSM."

Private mstrText As String

Private Const mstrNullValue = "null"
Private Const mstrSQ = """
```

```
Private Const mstrEnvVarSeparator = "%"
Public Function InsertEnvVariables( _
      Optional ByVal strComString As String) As String
  ' This function replaces all environment variables in
  ' the passed in string with their values - they are
  ' enclosed by "%"

  Dim intPos As Integer
  Dim intEndPos As Integer
  Dim strEnvVariable As String
  Dim strValue As String
  Dim strCommand As String

  On Error GoTo InsertEnvVariablesErr
  mstrSource = mstrModuleName & "InsertEnvVariables"

  ' Initialize the return value of the function to the
  ' passed in command
  If IsStringEmpty(strComString) Then
     strCommand = mstrText
  Else
     strCommand = strComString
  End If

  intPos = InStr(strCommand, mstrEnvVarSeparator)
  Do While intPos <> 0
     ' Extract the environment variable from the passed
     ' in string
     intEndPos = InStr(intPos + 1, strCommand, mstrEnvVarSeparator)
     strEnvVariable = Mid(strCommand, intPos + 1, intEndPos - intPos - 1)

     ' Get the value of the variable and call a function
     ' to replace the variable with it's value
     strValue = Environ$(strEnvVariable)
     strCommand = ReplaceSubString(strCommand, _
           mstrEnvVarSeparator & strEnvVariable & mstrEnvVarSeparator, _
           strValue)

     intPos = InStr(strCommand, mstrEnvVarSeparator)
  Loop

  InsertEnvVariables = strCommand
  Exit Function

InsertEnvVariablesErr:
  ' Log the error code raised by Visual Basic
  Call LogErrors(Errors)
  ' Return an empty string
  InsertEnvVariables = gstrEmptyString

End Function
Public Function MakeStringFieldValid( _
      Optional strField As String = gstrEmptyString) As String
  ' Returns a string that can be appended to any insert
```

```
  ' or modify (sql) statement
  ' If an argument is not passed to this function, the
  ' default text property is used

  Dim strTemp As String

  On Error GoTo MakeStringFieldValidErr

  If IsStringEmpty(strField) Then
     strTemp = mstrText
  Else
     strTemp = strField
  End If

  ' It checks whether the text is empty
  ' If so, it returns the string, "null"
  If IsStringEmpty(strTemp) Then
     MakeStringFieldValid = mstrNullValue
  Else
     ' Single-quotes have to be replaced by two single-quotes,
     ' since a single-quote is the identifier delimiter
     ' character - call a procedure to do the replace
     strTemp = ReplaceSubString(strTemp, mstrSQ, mstrSQ & mstrSQ)

     ' Replace pipe characters with the corresponding chr function
     strTemp = ReplaceSubString(strTemp, "|", "' & Chr(124) & "')

     ' Enclose the string in single quotes
     MakeStringFieldValid = mstrSQ & strTemp & mstrSQ

  End If

  Exit Function

MakeStringFieldValidErr:
  mstrSource = mstrModuleName & "MakeStringFieldValid"
  LogErrors Errors
  On Error GoTo 0
  Err.Raise vbObjectError + errMakeFieldValidFailed, _
        mstrSource, LoadResString(errMakeFieldValidFailed)

End Function
Public Function MakeDateFieldValid( _
     Optional dtmField As Date = gdtmEmpty) As String
  ' Returns a string that can be appended to any insert
  ' or modify (sql) statement

  ' Enclose the date in single quotes
  MakeDateFieldValid = mstrSQ & dtmField & mstrSQ

End Function

Private Function IsStringEmpty(strToCheck As String) As Boolean
```

```
  If strToCheck = gstrEmptyString Then
     IsStringEmpty = True
  Else
     IsStringEmpty = False
  End If

End Function
Public Function ReplaceSubString(ByVal MainString As String, _
      ByVal ReplaceString As String, _
      ByVal ReplaceWith As String) As String

  ' Replaces all occurrences of ReplaceString in MainString with ReplaceWith

  Dim intPos As Integer
  Dim strTemp As String

  On Error GoTo ReplaceSubStringErr

  strTemp = MainString

  intPos = InStr(strTemp, ReplaceString)
  Do While intPos <> 0
     strTemp = Left(strTemp, intPos - 1) & ReplaceWith & _
           Mid(strTemp, intPos + Len(ReplaceString))
     intPos = InStr(intPos + Len(ReplaceString) + 1, strTemp, ReplaceString)
  Loop
  ReplaceSubString = strTemp

  Exit Function

ReplaceSubStringErr:
  Call LogErrors(Errors)
  mstrSource = mstrModuleName & "ReplaceSubString"
  On Error GoTo 0
  Err.Raise vbObjectError + errParseStringFailed, _
     mstrSource, _
     LoadResString(errParseStringFailed)

End Function

Public Property Get Text() As String
Attribute Text.VB_UserMemId = 0
  Text = mstrText
End Property

Public Property Let Text(ByVal vdata As String)
  mstrText = vdata
End Property

VERSION 1.0 CLASS
BEGIN
 MultiUse = -1  'True
 Persistable = 0  'NotPersistable
 DataBindingBehavior = 0  'vbNone
```

```
 DataSourceBehavior  = 0  'vbNone
 MTSTransactionMode  = 0  'NotAnMTSObject
END
Attribute VB_Name = "cSubStep"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
'  FILE:       cSubStep.cls
'              Microsoft TPC-H Kit Ver. 2.7.0-1005
'              Copyright Microsoft, 2008
'              All Rights Reserved
'
'
'  PURPOSE:     This module encapsulates the properties of sub-steps
'               that are used during the execution of a workspace.
'  Contact:     Reshma Tharamal (reshmat@microsoft.com)
'
Option Explicit

' Used to indicate the source module name when errors
' are raised by this class
Private Const mstrModuleName As String = "cSubStep"

Private mlngStepId As Long
Private mintRunning As Integer ' Number of running tasks
Private mintComplete As Integer ' Number of completed tasks
' The last iterator for this sub-step
Private mcLastIterator As cRunItDetails

Public Function NewIteration(cStepRec As cStep) As cIterator
  ' Calls a procedure to determine the next iterator value
  ' for the passed in step - returns the value to be used
  ' in the iteration.
  ' It updates the instance node with the new iteration
  ' for the step.

  Dim cItRec As cIterator

  On Error GoTo NewIterationErr

  ' Call a function that will populate an iterator record
  ' with the iterator values
  Set cItRec = NextIteration(cStepRec)

  ' Initialize the run node with the new iterator
  ' values
  If Not mcLastIterator Is Nothing Then
     If cItRec Is Nothing Then
        mcLastIterator.Value = gstrEmptyString
     Else
        mcLastIterator.Value = cItRec.Value

        ' And if the iterator is a list of values, then update
```

```
        ' the sequence number as well
        If mcLastIterator.IteratorType = gintValue Then
          mcLastIterator.Sequence = cItRec.SequenceNo
        End If
      End If
    End If

    Set NewIteration = cItRec
    Set cItRec = Nothing

    Exit Function

NewIterationErr:
    ' Log the error code raised by Visual Basic
    Call LogErrors(Errors)
    On Error GoTo 0
    Err.Raise vbObjectError + errIterateFailed, mstrModuleName, _
      LoadResString(errIterateFailed)

End Function
Public Function NextIteration(cStepRec As cStep) As cIterator

    ' Retrieves the next iterator value for the passed in step -
    ' returns an iterator record with the new iterator values

    Dim cItRec As cIterator
    Dim vntIterators As Variant
    Dim lngValue As String

    On Error GoTo NextIterationErr

    vntIterators = cStepRec.Iterators

    If Not mcLastIterator Is Nothing Then
      ' The run node contains the iterator details
      ' Get the next value for the iterator
      If mcLastIterator.IteratorType = gintValue Then
        ' Find the next iterator that appears in the list of
        ' iterator values
        Set cItRec = NextInSequence(vntIterators, mcLastIterator.Sequence)
      Else
        lngValue = CLng(Trim$(mcLastIterator.Value))
        ' Determine whether the new iterator value falls in the
        ' range between From and To
        If (mcLastIterator.RangeStep > 0 And _
            (mcLastIterator.RangeFrom <= mcLastIterator.RangeTo) And _
            (mcLastIterator.RangeStep + lngValue) <= mcLastIterator.RangeTo) Or _
            (mcLastIterator.RangeStep < 0 And _
            (mcLastIterator.RangeFrom >= mcLastIterator.RangeTo) And _
            (mcLastIterator.RangeStep + lngValue) >= mcLastIterator.RangeTo) Then
          Set cItRec = New cIterator
          cItRec.Value = Trim$(CStr(mcLastIterator.RangeStep + lngValue))
        Else
          Set cItRec = Nothing
```

```
            End If
        End If
    Else
        Set cItRec = Nothing
    End If

    Set NextIteration = cItRec
    Exit Function

NextIterationErr:
    ' Log the error code raised by Visual Basic
    Call LogErrors(Errors)
    On Error GoTo 0
    Err.Raise vbObjectError + errIterateFailed, mstrModuleName, _
        LoadResString(errIterateFailed)

End Function
Public Sub InitializeIt(cPendingStep As cStep, _
        ColParameters As cArrParameters, _
        Optional vntIterators As Variant)

    ' Initializes the LastIteration structure with the iterator details for the
    ' passed in step

    On Error GoTo InitializeItErr

    If IsMissing(vntIterators) Then
        vntIterators = cPendingStep.Iterators
    End If

    If IsArray(vntIterators) And Not IsEmpty(vntIterators) Then
        mcLastIterator.IteratorName = cPendingStep.IteratorName
        If vntIterators(LBound(vntIterators)).IteratorType = _
                gintValue Then
            mcLastIterator.IteratorType = gintValue
            ' Since the sequence numbers begin at 0
            mcLastIterator.Sequence = gintMinIteratorSequence - 1
        Else
            mcLastIterator.IteratorType = gintFrom
            Call InitializeItRange(vntIterators, cPendingStep.WorkspaceId, _
                    ColParameters)
        End If
    Else
        Set mcLastIterator = Nothing
    End If

    Exit Sub

InitializeItErr:
    ' Log the error code raised by Visual Basic
    Call LogErrors(Errors)
    On Error GoTo 0
    Err.Raise vbObjectError + errIterateFailed, mstrModuleName, _
        LoadResString(errIterateFailed)
```

```
End Sub

Private Sub InitializeItRange(vntIterators As Variant, ByVal lWorkspace As Long, _
      ColParameters As cArrParameters)

  ' Initializes the LastIteration structure for range iterators from the
  ' passed in variant containing the iterator records

  Dim lngIndex As Long
  Dim cItRec As cIterator

  On Error GoTo InitializeItRangeErr

  If IsArray(vntIterators) And Not IsEmpty(vntIterators) Then

     ' Check if the iterator range has been completely initialized
     RangeComplete (vntIterators)

     ' Initialize the Run node with the values for the From,
     ' To and Step boundaries
     For lngIndex = LBound(vntIterators) To UBound(vntIterators)
        Set cItRec = vntIterators(lngIndex)
        Select Case cItRec.IteratorType
           Case gintFrom
              mcLastIterator.RangeFrom = SubstituteParameters(cItRec.Value, lWorkspace,
WspParameters:=ColParameters)
           Case gintTo
              mcLastIterator.RangeTo = SubstituteParameters(cItRec.Value, lWorkspace,
WspParameters:=ColParameters)
           Case gintStep
              mcLastIterator.RangeStep = SubstituteParameters(cItRec.Value, lWorkspace,
WspParameters:=ColParameters)
           Case Else
              On Error GoTo 0
              Err.Raise vbObjectError + errTypeInvalid, mstrModuleName, _
                    LoadResString(errTypeInvalid)
        End Select
     Next lngIndex

     mcLastIterator.Value = Trim$(CStr(mcLastIterator.RangeFrom - mcLastIterator.RangeStep))
  End If

  Exit Sub

InitializeItRangeErr:
  ' Log the error code raised by Visual Basic
  Call LogErrors(Errors)
  On Error GoTo 0
  Err.Raise vbObjectError + errIterateFailed, mstrModuleName, _
     LoadResString(errIterateFailed)

End Sub
Private Function NextInSequence(vntIterators As Variant, _
```

```
    lngOldSequence As Long) As cIterator

  Dim lngIndex As Long
  Dim cItRec As cIterator

  On Error GoTo NextInSequenceErr

  If IsArray(vntIterators) And Not IsEmpty(vntIterators) Then
    For lngIndex = LBound(vntIterators) To UBound(vntIterators)
      Set cItRec = vntIterators(lngIndex)
      If cItRec.IteratorType <> gintValue Then
        On Error GoTo 0
        Err.Raise vbObjectError + errTypeInvalid, mstrModuleName, _
            LoadResString(errTypeInvalid)
      End If
      If cItRec.SequenceNo = lngOldSequence + 1 Then
        Exit For
      End If

    Next lngIndex

    If cItRec.SequenceNo <> lngOldSequence + 1 Then
      Set cItRec = Nothing
    End If
  Else
    Set cItRec = Nothing
  End If

  Set NextInSequence = cItRec

  Exit Function

NextInSequenceErr:
  ' Log the error code raised by Visual Basic
  Call LogErrors(Errors)
  On Error GoTo 0
  Err.Raise vbObjectError + errIterateFailed, mstrModuleName, _
    LoadResString(errIterateFailed)

End Function

Public Property Get LastIterator() As cRunItDetails

  Set LastIterator = mcLastIterator

End Property
Public Property Set LastIterator(vdata As cRunItDetails)

  Set mcLastIterator = vdata

End Property

Public Property Get TasksRunning() As Integer
```

```
    TasksRunning = mintRunning

End Property

Public Property Let TasksRunning(ByVal vdata As Integer)

    mintRunning = vdata

End Property

Public Property Get TasksComplete() As Integer

    TasksComplete = mintComplete

End Property
Public Property Let TasksComplete(ByVal vdata As Integer)

    mintComplete = vdata

End Property
Public Property Get StepId() As Long

    StepId = mlngStepId

End Property
Public Property Let StepId(ByVal vdata As Long)

    mlngStepId = vdata

End Property
VERSION 1.0 CLASS
BEGIN
  MultiUse = -1  'True
  Persistable = 0  'NotPersistable
  DataBindingBehavior = 0  'vbNone
  DataSourceBehavior  = 0  'vbNone
  MTSTransactionMode  = 0  'NotAnMTSObject
END
Attribute VB_Name = "cSubSteps"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
'  FILE:        cSubSteps.cls
'               Microsoft TPC-H Kit Ver. 2.7.0-1005
'               Copyright Microsoft, 2008
'               All Rights Reserved
'
'
'  PURPOSE:     This module provides a type-safe wrapper around cVector to
'               implement a collection of cSubStep objects.
'  Contact:     Reshma Tharamal (reshmat@microsoft.com)
'
Option Explicit
```

```
Private mcSubSteps As cVector

Public Sub Add(ByVal objItem As cSubStep)

  mcSubSteps.Add objItem

End Sub


Public Sub Clear()

  mcSubSteps.Clear

End Sub


Public Function Count() As Long

  Count = mcSubSteps.Count

End Function


Public Function Delete(ByVal lngDelete As Long) As cSubStep

  Set Delete = mcSubSteps.Delete(lngDelete)

End Function


Public Property Get Item(ByVal Position As Long) As cSubStep
Attribute Item.VB_UserMemId = 0

  Set Item = mcSubSteps.Item(Position)

End Property

Private Sub Class_Initialize()

  Set mcSubSteps = New cVector

End Sub

Private Sub Class_Terminate()

  Set mcSubSteps = Nothing

End Sub


VERSION 1.0 CLASS
BEGIN
 MultiUse = -1  'True
```

```
 Persistable = 0  'NotPersistable
 DataBindingBehavior = 0  'vbNone
 DataSourceBehavior  = 0  'vbNone
 MTSTransactionMode  = 0  'NotAnMTSObject
END
Attribute VB_Name = "cTermProcess"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
'  FILE:       cTermProcess.cls
'              Microsoft TPC-H Kit Ver. 2.7.0-1005
'              Copyright Microsoft, 2008
'              All Rights Reserved
'
'
'  PURPOSE:    This module raises an event if a completed step exists.
'  Contact:    Reshma Tharamal (reshmat@microsoft.com)
'
Option Explicit

Private WithEvents moTimer As cTimerSM
Attribute moTimer.VB_VarHelpID = -1
Private bTermProcessExists As Boolean
Public Event TermProcessExists()

Public Sub ProcessTerminated()

  bTermProcessExists = True
  moTimer.Enabled = True

End Sub

Private Sub Class_Initialize()

  bTermProcessExists = False

  Set moTimer = New cTimerSM
  moTimer.Enabled = False

End Sub

Private Sub Class_Terminate()

  Set moTimer = Nothing

End Sub

Private Sub moTimer_Timer()

  On Error GoTo moTimer_TimerErr

  If bTermProcessExists Then
     RaiseEvent TermProcessExists
```

```
  End If

  moTimer.Enabled = False
  bTermProcessExists = False

  Exit Sub

moTimer_TimerErr:
  LogErrors Errors

End Sub

VERSION 1.0 CLASS
BEGIN
 MultiUse = -1  'True
 Persistable = 0  'NotPersistable
 DataBindingBehavior = 0  'vbNone
 DataSourceBehavior  = 0  'vbNone
 MTSTransactionMode  = 0  'NotAnMTSObject
END
Attribute VB_Name = "cTermStep"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
'  FILE:       cTermStep.cls
'              Microsoft TPC-H Kit Ver. 2.7.0-1005
'              Copyright Microsoft, 2008
'              All Rights Reserved
'
'
'  PURPOSE:    This module encapsulates the properties of steps that
'              have completed execution such as status and time of completion.
'  Contact:    Reshma Tharamal (reshmat@microsoft.com)
'
Option Explicit

Public TimeComplete As Currency
Public Index As Long
Public InstanceId As Long
Public ExecutionStatus As InstanceStatus

VERSION 1.0 CLASS
BEGIN
 MultiUse = -1  'True
 Persistable = 0  'NotPersistable
 DataBindingBehavior = 0  'vbNone
 DataSourceBehavior  = 0  'vbNone
 MTSTransactionMode  = 0  'NotAnMTSObject
END
Attribute VB_Name = "cTermSteps"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
```

```
Attribute VB_Exposed = False
'  FILE:       cTermSteps.cls
'              Microsoft TPC-H Kit Ver. 2.7.0-1005
'              Copyright Microsoft, 2008
'              All Rights Reserved
'
'
'  PURPOSE:    This module provides a type-safe wrapper around cVector to
'              implement a collection of cTermStep objects. Raises an
'              event if a step that has completed execution exists.
'  Contact:    Reshma Tharamal (reshmat@microsoft.com)
'
Option Explicit

Private mcTermSteps As cVector
Private WithEvents moTimer As cTimerSM
Attribute moTimer.VB_VarHelpID = -1
Public Event TermStepExists(cStepDetails As cTermStep)

Public Sub Add(ByVal citem As cTermStep)

  Call mcTermSteps.Add(citem)
  moTimer.Enabled = True

End Sub

Public Sub Clear()

  mcTermSteps.Clear

End Sub

Public Function Delete()

  Call mcTermSteps.Delete(0)
  ' Disable the timer if there are no more pending events
  If mcTermSteps.Count = 0 Then moTimer.Enabled = False

End Function

Public Property Get Item(ByVal Position As Long) As cTermStep

  Set Item = mcTermSteps(Position)

End Property

Public Function Count() As Long

  Count = mcTermSteps.Count

End Function

Private Sub Class_Initialize()
```

```
  Set mcTermSteps = New cVector

  Set moTimer = New cTimerSM
  moTimer.Enabled = False

End Sub

Private Sub Class_Terminate()

  Set mcTermSteps = Nothing
  Set moTimer = Nothing

End Sub

Private Sub moTimer_Timer()

  On Error GoTo moTimer_TimerErr

  If mcTermSteps.Count > 0 Then
     ' Since items are appended to the end of the array
     RaiseEvent TermStepExists(mcTermSteps(0))
  Else
     moTimer.Enabled = False
  End If
  Exit Sub

moTimer_TimerErr:
  LogErrors Errors

End Sub
VERSION 1.0 CLASS
BEGIN
 MultiUse = -1  'True
 Persistable = 0  'NotPersistable
 DataBindingBehavior = 0  'vbNone
 DataSourceBehavior  = 0  'vbNone
 MTSTransactionMode  = 0  'NotAnMTSObject
END
Attribute VB_Name = "cTimerSM"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
'  FILE:       cTimer.cls
'              Microsoft TPC-H Kit Ver. 2.7.0-1005
'              Copyright Microsoft, 2008
'              All Rights Reserved
'
'
'  PURPOSE:    This module implements a timer.
'  Contact:    Reshma Tharamal (reshmat@microsoft.com)
'

Option Explicit
```

```
Public Event Timer()

Private Const mnDefaultInterval As Long = 1

Private mnTimerID As Long
Private mnInterval As Long
Private mfEnabled As Boolean

Public Property Get Interval() As Long
  Interval = mnInterval
End Property
Public Property Let Interval(Value As Long)
  If mnInterval <> Value Then
     mnInterval = Value
     If mfEnabled Then
        SetInterval mnInterval, mnTimerID
     End If
  End If
End Property

Public Property Get Enabled() As Boolean
  Enabled = mfEnabled
End Property
Public Property Let Enabled(Value As Boolean)
  If mfEnabled <> Value Then
     If Value Then
        mnTimerID = StartTimer(mnInterval)
        If mnTimerID <> 0 Then
           mfEnabled = True
           'Storing Me in the global would add a reference to Me, which
           '  would prevent Me from being released, which in turn would
           '  prevent my Class_Terminate code from running. To prevent
           '  this, I store a "soft reference" - the collection holds a
           '  pointer to me without incrementing my reference count.
           gcTimerObjects.Add ObjPtr(Me), Str$(mnTimerID)
        End If
     Else
        StopTimer mnTimerID
        mfEnabled = False
        gcTimerObjects.Remove Str$(mnTimerID)
     End If
  End If
End Property

Private Sub Class_Initialize()
  If gcTimerObjects Is Nothing Then Set gcTimerObjects = New Collection
  mnInterval = mnDefaultInterval
End Sub

Private Sub Class_Terminate()
  Enabled = False
End Sub
```

```
Friend Sub Tick()
  RaiseEvent Timer
End Sub
VERSION 1.0 CLASS
BEGIN
 MultiUse = -1  'True
 Persistable = 0  'NotPersistable
 DataBindingBehavior = 0  'vbNone
 DataSourceBehavior  = 0  'vbNone
 MTSTransactionMode  = 0  'NotAnMTSObject
END
Attribute VB_Name = "cVBErrorsSM"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
Attribute VB_Ext_KEY = "SavedWithClassBuilder" ,"Yes"
Attribute VB_Ext_KEY = "Top_Level" ,"Yes"
'  FILE:       cVBErrors.cls
'              Microsoft TPC-H Kit Ver. 2.7.0-1005
'              Copyright Microsoft, 2008
'              All Rights Reserved
'
'
'  PURPOSE:    This module encapsulates the handling of Visual Basic errors.
'              This module does not do any error handling - any error handler
'              will erase the errors object!
'  Contact:    Reshma Tharamal (reshmat@microsoft.com)
'
Option Explicit

' The Execute class exposes a method, WriteError through which we can write to the
' error log that is currently being used by the Execute object. Store a reference to
' Execute object locally.
Private mcExecObjRef As EXECUTEDLLLib.Execute
Public Sub WriteError(ByVal ErrorCode As errErrorConstants, _
      Optional ByVal ErrorSource As String = gstrEmptyString, _
      Optional ByVal OptArgs As String = gstrEmptyString)

  Dim sError As String

  sError = "StepMaster Error:" & ErrorCode & vbCrLf & LoadResString(ErrorCode) & vbCrLf

  If Not StringEmpty(ErrorSource) Then
     sError = sError & "(Source: " & ErrorSource & ")" & vbCrLf
  End If
  sError = sError & OptArgs

  Call LogMessage(sError)

End Sub
Private Function InitErrorString() As String
  ' Initializes a string with all the properties of the
  ' Err object
```

```
  Dim strError As String
  Dim errCode As Long

  If Err.Number = 0 Then
     InitErrorString = gstrEmptyString
  Else
  With Err
     If Err.Number > vbObjectError And Err.Number < (vbObjectError + 65536) Then
        errCode = .Number - vbObjectError
     Else
        errCode = .Number
     End If
     strError = "Error #: " & errCode & vbCrLf
     strError = strError & "Description: " & .Description & vbCrLf
     strError = strError & "Source: " & Err.Source & vbCrLf
  End With

  Debug.Print strError
  InitErrorString = strError
  End If

End Function
Public Sub LogVBErrors()

  Dim strErr As String

  strErr = InitErrorString

  On Error GoTo LogVBErrorsErr

  If Not StringEmpty(strErr) Then
     ' Write an error using the WriteError method of the Execute object.
     If Not mcExecObjRef Is Nothing Then
        mcExecObjRef.WriteError strErr
     Else
        WriteMessage strErr
     End If
  End If

  Err.Clear

  Exit Sub

LogVBErrorsErr:
  Call LogErrors(Errors)
  ' Since write to the error file for the step has failed, write to the project log
  Call WriteMessage(strErr)

End Sub
Public Sub DisplayErrors()

  Dim strErr As String
```

```
  strErr = InitErrorString

  If Not StringEmpty(strErr) Then
     ' Display the error message
     MsgBox strErr
  End If

  Err.Clear

End Sub
Public Sub LogMessage(strMsg As String)

  On Error GoTo LogMessageErr

  ' Write an error using the WriteError method of the Execute object.
  If Not mcExecObjRef Is Nothing Then
     mcExecObjRef.WriteError strMsg
  Else
     WriteMessage strMsg
  End If

  Exit Sub

LogMessageErr:
  Call LogErrors(Errors)
  ' Since write to the error file for the step has failed, write to the project log
  Call WriteMessage(strMsg)

End Sub
Public Property Set ErrorFile(vdata As EXECUTEDLLLib.Execute)

  Set mcExecObjRef = vdata

End Property
Private Sub Class_Terminate()

  Set mcExecObjRef = Nothing

End Sub
VERSION 1.0 CLASS
BEGIN
 MultiUse = -1  'True
 Persistable = 0  'NotPersistable
 DataBindingBehavior = 0  'vbNone
 DataSourceBehavior  = 0  'vbNone
 MTSTransactionMode  = 0  'NotAnMTSObject
END
Attribute VB_Name = "cVector"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
'  FILE:       cVector.cls
'              Microsoft TPC-H Kit Ver. 2.7.0-1005
```

```
'               Copyright Microsoft, 2008
'               All Rights Reserved
'
'
'  PURPOSE:     This class implements an array of objects.
'  Contact:     Reshma Tharamal (reshmat@microsoft.com)
'
Option Explicit

' Used to indicate the source module name when errors
' are raised by this class
Private mstrSource As String
Private Const mstrModuleName As String = "cVector."

' Array counter
Private mlngCount As Long
Private mcarrItems() As Object

Public Sub Add(ByVal objItem As Object)
  ' Adds the passed in Object variable to the array

  On Error GoTo AddErr

  ReDim Preserve mcarrItems(mlngCount)

  ' Set the newly added element in the array to the
  ' passed in variable
  Set mcarrItems(mlngCount) = objItem
  mlngCount = mlngCount + 1

  Exit Sub

AddErr:
  LogErrors Errors
  gstrSource = mstrModuleName & "Add"
  On Error GoTo 0
  Err.Raise vbObjectError + errLoadInArrayFailed, _
        mstrSource, _
        LoadResString(errLoadInArrayFailed)

End Sub
Public Sub Clear()

  ' Clear the array
  ReDim mcarrItems(0)
  mlngCount = 0

End Sub

Public Function Delete(ByVal lngDelete As Long) As Object

  Dim lngIndex As Long

  On Error GoTo DeleteErr
```

```
  If lngDelete < (mlngCount - 1) Then

     ' We want to maintain the order of all items in the
     ' array - so move all remaining elements in the array
     ' up by 1
     For lngIndex = lngDelete To mlngCount - 2
        MoveDown lngIndex
     Next lngIndex

  End If

  ' Return the deleted node
  Set Delete = mcarrItems(mlngCount - 1)

  ' Delete the last Node from the array
  mlngCount = mlngCount - 1
  If mlngCount > 0 Then
     ReDim Preserve mcarrItems(0 To mlngCount - 1)
  Else
     ReDim mcarrItems(0)
  End If

  Exit Function

DeleteErr:
  LogErrors Errors
  mstrSource = mstrModuleName & "Delete"
  On Error GoTo 0
  Err.Raise vbObjectError + errDeleteArrayElementFailed, _
        mstrSource, _
        LoadResString(errDeleteArrayElementFailed)

End Function
Public Property Get Item(ByVal Position As Long) As Object
Attribute Item.VB_UserMemId = 0

  ' Returns the element at the passed in position in the array
  If Position >= 0 And Position < mlngCount Then
     Set Item = mcarrItems(Position)
  Else
     On Error GoTo 0
     Err.Raise vbObjectError + errItemDoesNotExist, mstrSource, _
        LoadResString(errItemDoesNotExist)
  End If

End Property
Public Property Set Item(ByVal Position As Long, _
     ByVal Value As Object)

  ' Returns the element at the passed in position in the array
  If Position >= 0 Then
     ' If the passed in position is outside the array
     ' bounds, then resize the array
```

```
      If Position >= mlngCount Then
         ReDim Preserve mcarrItems(Position)
         mlngCount = Position + 1
      End If

      ' Set the newly added element in the array to the
      ' passed in variable
      Set mcarrItems(Position) = Value
   Else
      On Error GoTo 0
      Err.Raise vbObjectError + errItemDoesNotExist, mstrSource, _
         LoadResString(errItemDoesNotExist)
   End If

End Property
Public Sub MoveUp(ByVal Position As Long)
   ' Moves the element at the passed in position up by 1

   Dim cTemp As Object

   If Position > 0 And Position < mlngCount Then
      Set cTemp = mcarrItems(Position)

      Set mcarrItems(Position) = mcarrItems(Position - 1)
      Set mcarrItems(Position - 1) = cTemp
   End If

End Sub
Public Sub MoveDown(ByVal Position As Long)
   ' Moves the element at the passed in position down by 1

   Dim cTemp As Object

   If Position >= 0 And Position < mlngCount - 1 Then
      Set cTemp = mcarrItems(Position)

      Set mcarrItems(Position) = mcarrItems(Position + 1)
      Set mcarrItems(Position + 1) = cTemp
   End If

End Sub

Public Function Count() As Long

   Count = mlngCount

End Function


Private Sub Class_Initialize()

   mlngCount = 0

End Sub
```

```
Private Sub Class_Terminate()

   Call Clear

End Sub

VERSION 1.0 CLASS
BEGIN
 MultiUse = -1  'True
 Persistable = 0  'NotPersistable
 DataBindingBehavior = 0  'vbNone
 DataSourceBehavior  = 0  'vbNone
 MTSTransactionMode  = 0  'NotAnMTSObject
END
Attribute VB_Name = "cVectorLng"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
'  FILE:       cVectorLng.cls
'              Microsoft TPC-H Kit Ver. 2.7.0-1005
'              Copyright Microsoft, 2008
'              All Rights Reserved
'
'
'  PURPOSE:     This class implements an array of longs.
'  Contact:     Reshma Tharamal (reshmat@microsoft.com)
'
Option Explicit

' Used to indicate the source module name when errors
' are raised by this class
Private mstrSource As String
Private Const mstrModuleName As String = "cVectorLng."

' Array counter
Private mlngCount As Long
Private mcarrItems() As Long

Public Sub Add(ByVal lngItem As Long)
   ' Adds the passed in long variable to the array

   On Error GoTo AddErr

   ReDim Preserve mcarrItems(mlngCount)

   ' Set the newly added element in the array to the
   ' passed in variable
   mcarrItems(mlngCount) = lngItem
   mlngCount = mlngCount + 1

   Exit Sub
```

```
AddErr:
  LogErrors Errors
  gstrSource = mstrModuleName & "Add"
  On Error GoTo 0
  Err.Raise vbObjectError + errLoadInArrayFailed, _
        mstrSource, _
        LoadResString(errLoadInArrayFailed)

End Sub
Public Sub Clear()

  ' Clear the array
  ReDim mcarrItems(0)

End Sub

Public Sub Delete(Optional ByVal Position As Long = -1, _
     Optional ByVal Item As Long = -1)
  ' The user can opt to delete either a specific item in
  ' the list or the item at a specified position. If no
  ' parameters are passed in, we delete the element at
  ' position 0!

  Dim lngDelete As Long
  Dim lngIndex As Long

  On Error GoTo DeleteErr

  If Position = -1 Then
     ' Since we can never store an element at position -1,
     ' we can be sure that the user is trying to delete
     ' a given item
     lngDelete = Find(Item)
  Else
     lngDelete = Position
  End If

  If lngDelete < (mlngCount - 1) Then

     ' We want to maintain the order of all items in the
     ' array - so move all remaining elements in the array
     ' up by 1
     For lngIndex = lngDelete To mlngCount - 2
        MoveDown lngIndex
     Next lngIndex

  End If

  ' Delete the last Node from the array
  mlngCount = mlngCount - 1
  If mlngCount > 0 Then
     ReDim Preserve mcarrItems(0 To mlngCount - 1)
  Else
```

```
      ReDim mcarrItems(0)
   End If

   Exit Sub

DeleteErr:
   LogErrors Errors
   mstrSource = mstrModuleName & "Delete"
   On Error GoTo 0
   Err.Raise vbObjectError + errDeleteArrayElementFailed, _
         mstrSource, _
         LoadResString(errDeleteArrayElementFailed)

End Sub
Public Function Find(ByVal Item As Long) As Long

   ' Returns the position at which the passed in value occurs
   ' in the array

   Dim lngIndex As Long

   On Error GoTo FindErr

   ' Find the element in the array to be deleted
   For lngIndex = 0 To mlngCount - 1

      If mcarrItems(lngIndex) = Item Then
         Find = lngIndex
         Exit Function
      End If

   Next lngIndex

   Find = -1

   Exit Function

FindErr:
   LogErrors Errors
   mstrSource = mstrModuleName & "Find"
   On Error GoTo 0
   Err.Raise vbObjectError + errItemNotFound, mstrSource, _
      LoadResString(errItemNotFound)

End Function
Public Property Get Item(ByVal Position As Long) As Long
Attribute Item.VB_UserMemId = 0

   ' Returns the element at the passed in position in the array
   If Position >= 0 And Position < mlngCount Then
      Item = mcarrItems(Position)
   Else
      On Error GoTo 0
      Err.Raise vbObjectError + errItemDoesNotExist, mstrSource, _
```

```
        LoadResString(errItemDoesNotExist)
    End If

End Property
Public Property Let Item(ByVal Position As Long, _
    ByVal Value As Long)

    ' Returns the element at the passed in position in the array
    If Position >= 0 Then
        ' If the passed in position is outside the array
        ' bounds, then resize the array
        If Position >= mlngCount Then
            ReDim Preserve mcarrItems(Position)
            mlngCount = Position + 1
        End If

        ' Set the newly added element in the array to the
        ' passed in variable
        mcarrItems(Position) = Value
    Else
        On Error GoTo 0
        Err.Raise vbObjectError + errItemDoesNotExist, mstrSource, _
            LoadResString(errItemDoesNotExist)
    End If

End Property
Public Sub MoveUp(ByVal Position As Long)
    ' Moves the element at the passed in position up by 1

    Dim lngTemp As Long

    If Position > 0 And Position < mlngCount Then
        lngTemp = mcarrItems(Position)

        mcarrItems(Position) = mcarrItems(Position - 1)
        mcarrItems(Position - 1) = lngTemp
    End If

End Sub
Public Sub MoveDown(ByVal Position As Long)
    ' Moves the element at the passed in position down by 1

    Dim lngTemp As Long

    If Position >= 0 And Position < mlngCount - 1 Then
        lngTemp = mcarrItems(Position)

        mcarrItems(Position) = mcarrItems(Position + 1)
        mcarrItems(Position + 1) = lngTemp
    End If

End Sub

Public Function Count() As Long
```

```
   Count = mlngCount

End Function


Private Sub Class_Initialize()

   mlngCount = 0

End Sub


Private Sub Class_Terminate()

   Call Clear

End Sub

VERSION 1.0 CLASS
BEGIN
 MultiUse = -1  'True
 Persistable = 0  'NotPersistable
 DataBindingBehavior = 0  'vbNone
 DataSourceBehavior  = 0  'vbNone
 MTSTransactionMode  = 0  'NotAnMTSObject
END
Attribute VB_Name = "cVectorStr"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
'  FILE:       cVectorStr.cls
'              Microsoft TPC-H Kit Ver. 2.7.0-1005
'              Copyright Microsoft, 2008
'              All Rights Reserved
'
'
'  PURPOSE:    This class implements an array of strings.
'  Contact:    Reshma Tharamal (reshmat@microsoft.com)
'
Option Explicit

' Used to indicate the source module name when errors
' are raised by this class
Private mstrSource As String
Private Const mstrModuleName As String = "cVectorStr."

' Array counter
Private mlngCount As Long
Private mcarrItems() As String

Public Sub Add(ByVal strItem As String)
   ' Adds the passed in string variable to the array
```

```
  On Error GoTo AddErr

  ReDim Preserve mcarrItems(mlngCount)

  ' Set the newly added element in the array to the
  ' passed in variable
  mcarrItems(mlngCount) = strItem
  mlngCount = mlngCount + 1

  Exit Sub

AddErr:
  Call LogErrors(Errors)
  gstrSource = mstrModuleName & "Add"
  On Error GoTo 0
  Err.Raise vbObjectError + errLoadInArrayFailed, _
        mstrSource, _
        LoadResString(errLoadInArrayFailed)

End Sub
Public Sub Clear()

  ' Clear the array
  ReDim mcarrItems(0)

End Sub

Public Sub Delete(Optional ByVal Position As Long = -1, _
     Optional ByVal Item As String = -1)
  ' The user can opt to delete either a specific item in
  ' the list or the item at a specified position. If no
  ' parameters are passed in, we delete the element at
  ' position 0!

  Dim lngDelete As Long
  Dim lngIndex As Long

  On Error GoTo DeleteErr
  mstrSource = mstrModuleName & "Delete"

  If Position = -1 Then
     ' Since we can never store an element at position -1,
     ' we can be sure that the user is trying to delete
     ' a given item
     lngDelete = Find(Item)
  Else
     lngDelete = Position
  End If

  If lngDelete < (mlngCount - 1) Then

     ' We want to maintain the order of all items in the
     ' array - so move all remaining elements in the array
```

```
      ' up by 1
      For lngIndex = lngDelete To mlngCount - 2
         MoveDown lngIndex
      Next lngIndex

   End If

   ' Delete the last Node from the array
   mlngCount = mlngCount - 1
   If mlngCount > 0 Then
      ReDim Preserve mcarrItems(0 To mlngCount - 1)
   Else
      ReDim mcarrItems(0)
   End If

   Exit Sub

DeleteErr:
   Call LogErrors(Errors)
   mstrSource = mstrModuleName & "Delete"
   On Error GoTo 0
   Err.Raise vbObjectError + errDeleteArrayElementFailed, _
         mstrSource, _
         LoadResString(errDeleteArrayElementFailed)

End Sub
Public Function Find(ByVal Item As String) As Long

   ' Returns the position at which the passed in value occurs
   ' in the array

   Dim lngIndex As Long

   On Error GoTo FindErr
   mstrSource = mstrModuleName & "Find"

   ' Find the element in the array to be deleted
   For lngIndex = 0 To mlngCount - 1

      If mcarrItems(lngIndex) = Item Then
         Find = lngIndex
         Exit Function
      End If

   Next lngIndex

   Find = -1

   Exit Function

FindErr:
   Call LogErrors(Errors)
   mstrSource = mstrModuleName & "Find"
   On Error GoTo 0
```

```
  Err.Raise vbObjectError + errItemNotFound, mstrSource, _
     LoadResString(errItemNotFound)

End Function
Public Property Get Item(ByVal Position As Long) As String
Attribute Item.VB_UserMemId = 0

  ' Returns the element at the passed in position in the array
  If Position >= 0 And Position < mlngCount Then
     Item = mcarrItems(Position)
  Else
     On Error GoTo 0
     Err.Raise vbObjectError + errItemDoesNotExist, mstrSource, _
        LoadResString(errItemDoesNotExist)
  End If

End Property
Public Property Let Item(ByVal Position As Long, _
     ByVal Value As String)

  ' Returns the element at the passed in position in the array
  If Position >= 0 Then
     ' If the passed in position is outside the array
     ' bounds, then resize the array
     If Position >= mlngCount Then
        ReDim Preserve mcarrItems(Position)
        mlngCount = Position + 1
     End If

     ' Set the newly added element in the array to the
     ' passed in variable
     mcarrItems(Position) = Value
  Else
     On Error GoTo 0
     Err.Raise vbObjectError + errItemDoesNotExist, mstrSource, _
        LoadResString(errItemDoesNotExist)
  End If

End Property
Public Sub MoveUp(ByVal Position As Long)
  ' Moves the element at the passed in position up by 1

  Dim strTemp As String

  If Position > 0 And Position < mlngCount Then
     strTemp = mcarrItems(Position)

     mcarrItems(Position) = mcarrItems(Position - 1)
     mcarrItems(Position - 1) = strTemp
  End If

End Sub
Public Sub MoveDown(ByVal Position As Long)
  ' Moves the element at the passed in position down by 1
```

```
  Dim strTemp As String

  If Position >= 0 And Position < mlngCount - 1 Then
     strTemp = mcarrItems(Position)

     mcarrItems(Position) = mcarrItems(Position + 1)
     mcarrItems(Position + 1) = strTemp
  End If

End Sub

Public Function Count() As Long

  Count = mlngCount

End Function


Private Sub Class_Initialize()

  mlngCount = 0

End Sub
Private Sub Class_Terminate()

  Call Clear

End Sub


VERSION 1.0 CLASS
BEGIN
 MultiUse = -1  'True
 Persistable = 0  'NotPersistable
 DataBindingBehavior = 0  'vbNone
 DataSourceBehavior  = 0  'vbNone
 MTSTransactionMode  = 0  'NotAnMTSObject
END
Attribute VB_Name = "cWorker"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
'  FILE:       cWorker.cls
'              Microsoft TPC-H Kit Ver. 2.7.0-1005
'              Copyright Microsoft, 2008
'              All Rights Reserved
'
'
'  PURPOSE:    Encapsulates the properties and methods of a worker step.
'              Implements the cStep class - carries out initializations
'              and validations that are specific to worker steps.
'  Contact:    Reshma Tharamal (reshmat@microsoft.com)
```

```
'
Option Explicit

Implements cStep

' Object variable to keep the step reference in
Private mcStep As cStep

' Used to indicate the source module name when errors
' are raised by this class
Private mstrSource As String
Private Const mstrModuleName As String = "cWorker."
Private Sub cStep_AddAllIterators()

  Call mcStep.AddAllIterators

End Sub

Private Property Let cStep_StartDir(ByVal RHS As String)

  mcStep.StartDir = RHS

End Property

Private Property Get cStep_StartDir() As String

  cStep_StartDir = mcStep.StartDir

End Property

Private Property Set cStep_NodeDB(RHS As DAO.Database)

  Set mcStep.NodeDB = RHS

End Property

Private Property Get cStep_NodeDB() As DAO.Database

  Set cStep_NodeDB = mcStep.NodeDB

End Property

Private Function cStep_IncVersionY() As String

  cStep_IncVersionY = mcStep.IncVersionY

End Function
Private Function cStep_IsNewVersion() As Boolean
  cStep_IsNewVersion = mcStep.IsNewVersion
End Function
Private Function cStep_OldVersionNo() As String
  cStep_OldVersionNo = mcStep.OldVersionNo
End Function
```

```
Private Function cStep_IncVersionX() As String

  cStep_IncVersionX = mcStep.IncVersionX

End Function
Private Sub cStep_UpdateIteratorVersion()

  Call mcStep.UpdateIteratorVersion

End Sub

Private Function cStep_IteratorCount() As Long

  cStep_IteratorCount = mcStep.IteratorCount

End Function

Private Sub cStep_UnloadIterators()

  Call mcStep.UnloadIterators

End Sub

Private Sub cStep_SaveIterators()

  Call mcStep.SaveIterators

End Sub
Private Property Get cStep_IteratorName() As String

  cStep_IteratorName = mcStep.IteratorName

End Property
Private Property Let cStep_IteratorName(ByVal RHS As String)

  mcStep.IteratorName = RHS

End Property

Private Sub cStep_LoadIterator(cItRecord As cIterator)

  Call mcStep.LoadIterator(cItRecord)

End Sub
Private Sub cStep_DeleteIterator(cItRecord As cIterator)

  Call mcStep.DeleteIterator(cItRecord)

End Sub

Private Sub cStep_InsertIterator(cItRecord As cIterator)

  Call mcStep.InsertIterator(cItRecord)
```

```
End Sub
Private Function cStep_Iterators() As Variant

  cStep_Iterators = mcStep.Iterators

End Function
Private Sub cStep_ModifyIterator(cItRecord As cIterator)

  Call mcStep.ModifyIterator(cItRecord)

End Sub
Private Sub cStep_RemoveIterator(cItRecord As cIterator)

  Call mcStep.RemoveIterator(cItRecord)

End Sub
Private Sub cStep_UpdateIterator(cItRecord As cIterator)

  Call mcStep.UpdateIterator(cItRecord)

End Sub
Private Sub cStep_AddIterator(cItRecord As cIterator)

  Call mcStep.AddIterator(cItRecord)

End Sub

Private Property Let cStep_Position(ByVal RHS As Long)

  mcStep.Position = RHS

End Property

Private Property Get cStep_Position() As Long

  cStep_Position = mcStep.Position

End Property

Private Function cStep_Clone(Optional cCloneStep As cStep) As cStep

  Dim cNewWorker As cWorker

  Set cNewWorker = New cWorker
  Set cStep_Clone = mcStep.Clone(cNewWorker)

End Function

Private Sub StepTextOrFileEntered()
  ' Checks if either the step text or the name of the file containing
  ' the text has been entered
  ' If both of them are null or both of them are not null,
  ' the worker step is invalid and an error is raised
  If StringEmpty(mcStep.StepText) And StringEmpty(mcStep.StepTextFile) Then
```

```
      ShowError errStepTextAndFileNull
      On Error GoTo 0
      Err.Raise vbObjectError + errStepTextAndFileNull, _
         mstrSource, LoadResString(errStepTextAndFileNull)
   End If

End Sub

Private Property Get cStep_IndOperation() As Operation

   cStep_IndOperation = mcStep.IndOperation

End Property

Private Property Let cStep_IndOperation(ByVal RHS As Operation)

   mcStep.IndOperation = RHS

End Property

Private Property Get cStep_NextStepId() As Long

   cStep_NextStepId = mcStep.NextStepId

End Property

Private Property Let cStep_OutputFile(ByVal RHS As String)

   mcStep.OutputFile = RHS

End Property

Private Property Get cStep_OutputFile() As String

   cStep_OutputFile = mcStep.OutputFile

End Property

Private Property Let cStep_ErrorFile(ByVal RHS As String)

   mcStep.ErrorFile = RHS

End Property

Private Property Get cStep_ErrorFile() As String

   cStep_ErrorFile = mcStep.ErrorFile

End Property
'Private Property Let cStep_LogFile(ByVal RHS As String)
'
'    mcStep.LogFile = RHS
'
'End Property
```

```
'
'Private Property Get cStep_LogFile() As String
'
'    cStep_LogFile = mcStep.LogFile
'
'End Property

Private Property Let cStep_ArchivedFlag(ByVal RHS As Boolean)

  mcStep.ArchivedFlag = RHS

End Property

Private Property Get cStep_ArchivedFlag() As Boolean

  cStep_ArchivedFlag = mcStep.ArchivedFlag

End Property

Private Sub Class_Initialize()

  ' Create the object
  Set mcStep = New cStep

  ' Initialize the object with valid values for a Worker step
  ' The global flag should be the first field to be initialized
  ' since subsequent validations might try to check if the
  ' step being created is global
  mcStep.GlobalFlag = False
'   mcStep.GlobalRunMethod = gintNoOption
  mcStep.StepType = gintWorkerStep

End Sub
Private Sub Class_Terminate()

  ' Remove the step object
  Set mcStep = Nothing

End Sub
Private Sub cStep_Add()

  ' Call a private procedure to see if the step text has been
  ' entered - since a worker step actually executes a step, entry
  ' of the text is mandatory
  Call StepTextOrFileEntered

  ' Call the Add method of the step class to carry out the insert
  mcStep.Add

End Sub

Private Property Get cStep_ContinuationCriteria() As ContinuationCriteria

  cStep_ContinuationCriteria = mcStep.ContinuationCriteria
```

```
End Property

Private Property Let cStep_ContinuationCriteria(ByVal RHS As ContinuationCriteria)

  ' The Continuation criteria must be non-null for all worker steps.
  ' Check if the Continuation Criteria is valid
  Select Case RHS
     Case gintOnFailureAbortSiblings, gintOnFailureCompleteSiblings, _
          gintOnFailureSkipSiblings, gintOnFailureAbort, _
          gintOnFailureContinue, gintOnFailureAsk
        mcStep.ContinuationCriteria = RHS

     Case Else
        On Error GoTo 0
        Err.Raise vbObjectError + errContCriteriaInvalid, _
             mstrModuleName, LoadResString(errContCriteriaInvalid)
  End Select

End Property

Private Property Let cStep_DegreeParallelism(ByVal RHS As String)

  mcStep.DegreeParallelism = RHS

End Property

Private Property Get cStep_DegreeParallelism() As String

  cStep_DegreeParallelism = mcStep.DegreeParallelism

End Property

Private Sub cStep_Delete()

  mcStep.Delete

End Sub

Private Property Get cStep_EnabledFlag() As Boolean

  cStep_EnabledFlag = mcStep.EnabledFlag

End Property

Private Property Let cStep_EnabledFlag(ByVal RHS As Boolean)

  mcStep.EnabledFlag = RHS

End Property

Private Property Let cStep_ExecutionMechanism(ByVal RHS As ExecutionMethod)

  On Error GoTo ExecutionMechanismErr
```

```
  mstrSource = mstrModuleName & "cStep_ExecutionMechanism"

  Select Case RHS
     Case gintExecuteShell, gintExecuteODBC
        mcStep.ExecutionMechanism = RHS

     Case Else
        On Error GoTo 0
        Err.Raise vbObjectError + errExecutionMechanismInvalid, _
              mstrSource, LoadResString(errExecutionMechanismInvalid)
  End Select

  Exit Property

ExecutionMechanismErr:
  LogErrors Errors
  mstrSource = mstrModuleName & "cStep_ExecutionMechanism"
  On Error GoTo 0
  Err.Raise vbObjectError + errExecutionMechanismLetFailed, _
     mstrSource, LoadResString(errExecutionMechanismLetFailed)

End Property

Private Property Get cStep_ExecutionMechanism() As ExecutionMethod

  cStep_ExecutionMechanism = mcStep.ExecutionMechanism

End Property

Private Property Let cStep_FailureDetails(ByVal RHS As String)

  mcStep.FailureDetails = RHS

End Property

Private Property Get cStep_FailureDetails() As String

  cStep_FailureDetails = mcStep.FailureDetails

End Property

Private Property Get cStep_GlobalFlag() As Boolean

  cStep_GlobalFlag = mcStep.GlobalFlag

End Property

Private Property Let cStep_GlobalFlag(ByVal RHS As Boolean)

  ' Set the global flag to false - this flag is initialized when
  ' an instance of the class is created. Just making sure that
  ' nobody changes the value inadvertently
  mcStep.GlobalFlag = False
```

```
End Property
Private Sub cStep_Modify()

  ' Call a private procedure to see if the step text has been
  ' entered - since a worker step actually executes a step, entry
  ' of the text is mandatory
  Call StepTextOrFileEntered

  ' Call the Modify method of the step class to carry out the update
  mcStep.Modify

End Sub

Private Property Let cStep_ParentStepId(ByVal RHS As Long)

  mcStep.ParentStepId = RHS

End Property

Private Property Get cStep_ParentStepId() As Long

  cStep_ParentStepId = mcStep.ParentStepId

End Property

Private Property Let cStep_ParentVersionNo(ByVal RHS As String)

  mcStep.ParentVersionNo = RHS

End Property

Private Property Get cStep_ParentVersionNo() As String

  cStep_ParentVersionNo = mcStep.ParentVersionNo

End Property

Private Property Let cStep_SequenceNo(ByVal RHS As Integer)

  mcStep.SequenceNo = RHS

End Property

Private Property Get cStep_SequenceNo() As Integer

  cStep_SequenceNo = mcStep.SequenceNo

End Property

Private Property Let cStep_StepId(ByVal RHS As Long)

  mcStep.StepId = RHS

End Property
```

```
Private Property Get cStep_StepId() As Long
  cStep_StepId = mcStep.StepId
End Property

Private Property Let cStep_StepLabel(ByVal RHS As String)
  mcStep.StepLabel = RHS
End Property
Private Property Get cStep_StepLabel() As String
  cStep_StepLabel = mcStep.StepLabel
End Property

Private Property Let cStep_StepLevel(ByVal RHS As Integer)
  mcStep.StepLevel = RHS
End Property
Private Property Get cStep_StepLevel() As Integer
  cStep_StepLevel = mcStep.StepLevel
End Property
Private Property Let cStep_StepText(ByVal RHS As String)
  mcStep.StepText = RHS
End Property
Private Property Get cStep_StepText() As String
  cStep_StepText = mcStep.StepText
End Property
Private Property Let cStep_StepTextFile(ByVal RHS As String)
  mcStep.StepTextFile = RHS
End Property
Private Property Get cStep_StepTextFile() As String
  cStep_StepTextFile = mcStep.StepTextFile
```

```
End Property

Private Property Let cStep_StepType(RHS As gintStepType)

  mcStep.StepType = gintWorkerStep

End Property

Private Property Get cStep_StepType() As gintStepType

  cStep_StepType = mcStep.StepType

End Property

Private Sub cStep_Validate()
  ' The validate routines for each of the steps will
  ' carry out the specific validations for the type and
  ' call the generic validation routine

  On Error GoTo cStep_ValidateErr

  ' Validations specific to worker steps

  ' Check if the step text or a file name has been
  ' specified
  Call StepTextOrFileEntered

  mcStep.Validate

  Exit Sub

cStep_ValidateErr:
  LogErrors Errors
  mstrSource = mstrModuleName & "cStep_Validate"
  On Error GoTo 0
  Err.Raise vbObjectError + errValidateFailed, _
        mstrSource, _
        LoadResString(errValidateFailed)
End Sub

Private Property Let cStep_VersionNo(ByVal RHS As String)

  mcStep.VersionNo = RHS

End Property

Private Property Get cStep_VersionNo() As String

  cStep_VersionNo = mcStep.VersionNo

End Property

Private Property Let cStep_WorkspaceId(ByVal RHS As Long)
```

```
   mcStep.WorkspaceId = RHS

End Property

Private Property Get cStep_WorkspaceId() As Long

   cStep_WorkspaceId = mcStep.WorkspaceId

End Property
VERSION 1.0 CLASS
BEGIN
 MultiUse = -1  'True
 Persistable = 0  'NotPersistable
 DataBindingBehavior = 0  'vbNone
 DataSourceBehavior  = 0  'vbNone
 MTSTransactionMode  = 0  'NotAnMTSObject
END
Attribute VB_Name = "cWorkspace"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
'  FILE:       cWorkspace.cls
'              Microsoft TPC-H Kit Ver. 2.7.0-1005
'              Copyright Microsoft, 2008
'              All Rights Reserved
'
'
'  PURPOSE:    Encapsulates the properties and methods of a workspace.
'              Contains functions to insert, update and delete
'              att_workspaces records from the database.
'  Contact:    Reshma Tharamal (reshmat@microsoft.com)
'
Option Explicit

' Local variable(s) to hold property value(s)
Private mlngWorkspaceId As Long
Private mstrWorkspaceName As String
Private mblnArchivedFlag As Boolean
Private mdbsStepMaster As Database

' Used to indicate the source module name when errors
' are raised by this class
Private mstrSource As String
Private Const mstrModuleName As String = "cWorkspace."

' The cSequence class is used to generate unique workspace identifiers
Private mWorkspaceSeq As cSequence

' The StringSM class is used to carry out string operations
Private mFieldValue As cStringSM

Public Function Clone() As cWorkspace
```

```
    ' Creates a copy of a given workspace

    Dim cCloneWsp As cWorkspace

    On Error GoTo CloneErr

    Set cCloneWsp = New cWorkspace

    ' Copy all the workspace properties to the newly
    ' created workspace
    cCloneWsp.WorkspaceId = mlngWorkspaceId
    cCloneWsp.WorkspaceName = mstrWorkspaceName
    cCloneWsp.ArchivedFlag = mblnArchivedFlag

    ' And set the return value to the newly created workspace
    Set Clone = cCloneWsp

    Exit Function

CloneErr:
    LogErrors Errors
    mstrSource = mstrModuleName & "Clone"
    On Error GoTo 0
    Err.Raise vbObjectError + errCloneFailed, _
          mstrSource, LoadResString(errCloneFailed)

End Function

Public Property Let ArchivedFlag(ByVal vdata As Boolean)

    mblnArchivedFlag = vdata

End Property

Public Property Get ArchivedFlag() As Boolean

    ArchivedFlag = mblnArchivedFlag

End Property

Public Property Set WorkDatabase(vdata As Database)

    Set mdbsStepMaster = vdata

End Property

Private Sub WorkspaceNameDuplicate()
    ' Check if the workspace name already exists in the workspace

    Dim rstWorkspace As Recordset
    Dim strSql As String
    Dim qy As DAO.QueryDef
```

```
  On Error GoTo WorkspaceNameDuplicateErr
  mstrSource = mstrModuleName & "WorkspaceNameDuplicate"

  ' Create a recordset to retrieve the count of records
  ' having the same workspace name
  strSql = " Select count(*) as workspace_count " & _
     " from att_workspaces " & _
     " where workspace_name = [w_name] " & _
     " and workspace_id <> [w_id] "
  Set qy = mdbsStepMaster.CreateQueryDef(gstrEmptyString, strSql)

  ' Call a procedure to assign the parameter values
  Call AssignParameters(qy)

  Set rstWorkspace = qy.OpenRecordset(dbOpenForwardOnly)

'       mFieldValue.MakeStringFieldValid (mstrWorkspaceName) & _
'       " and workspace_id <> " & _
'       Str(mlngWorkspaceId)
'
'    Set rstWorkspace = mdbsStepMaster.OpenRecordset( _
'       strSQL, dbOpenForwardOnly)

  If rstWorkspace![workspace_count] > 0 Then
     rstWorkspace.Close
     qy.Close
     ShowError errDuplicateWorkspaceName
     On Error GoTo 0
     Err.Raise vbObjectError + errDuplicateWorkspaceName, _
        mstrSource, LoadResString(errDuplicateWorkspaceName)
  End If
  rstWorkspace.Close
  qy.Close

  Exit Sub

WorkspaceNameDuplicateErr:
  Call LogErrors(Errors)
  mstrSource = mstrModuleName & "WorkspaceNameDuplicate"
  On Error GoTo 0
  Err.Raise vbObjectError + errWorkspaceNameDuplicateFailed, _
     mstrSource, LoadResString(errWorkspaceNameDuplicateFailed)

End Sub
Public Property Let WorkspaceName(vdata As String)

  On Error GoTo WorkspaceNameErr
  mstrSource = mstrModuleName & "WorkspaceName"

  If vdata = gstrEmptyString Then

     On Error GoTo 0
     ' Propogate this error back to the caller
     Err.Raise vbObjectError + errWorkspaceNameMandatory, _
```

```
        mstrSource, LoadResString(errWorkspaceNameMandatory)
    Else
        mstrWorkspaceName = vdata
    End If
    Exit Property

WorkspaceNameErr:
    LogErrors Errors
    mstrSource = mstrModuleName & "WorkspaceName"
    On Error GoTo 0
    Err.Raise vbObjectError + errWorkspaceNameSetFailed, _
        mstrSource, LoadResString(errWorkspaceNameSetFailed)

End Property

Public Property Let WorkspaceId(vdata As Long)

    On Error GoTo WorkspaceIdErr
    mstrSource = mstrModuleName & "WorkspaceId"

    If (vdata > 0) Then
        mlngWorkspaceId = vdata
    Else
        ' Propogate this error back to the caller
        On Error GoTo 0
        Err.Raise vbObjectError + errWorkspaceIdInvalid, _
            mstrSource, LoadResString(errWorkspaceIdInvalid)
    End If

    Exit Property

WorkspaceIdErr:
    LogErrors Errors
    mstrSource = mstrModuleName & "WorkspaceId"
    On Error GoTo 0
    Err.Raise vbObjectError + errWorkspaceIdSetFailed, _
        mstrSource, LoadResString(errWorkspaceIdSetFailed)

End Property

Public Sub AddWorkspace()

    Dim strInsert As String
    Dim qy As DAO.QueryDef

    On Error GoTo AddWorkspaceErr

    ' Retrieve the next identifier using the sequence class
    Set mWorkspaceSeq = New cSequence
    Set mWorkspaceSeq.IdDatabase = mdbsStepMaster
    mWorkspaceSeq.IdentifierColumn = FLD_ID_WORKSPACE
    mlngWorkspaceId = mWorkspaceSeq.Identifier
    Set mWorkspaceSeq = Nothing
```

```
  ' Call procedure to raise an error if the Workspace name
  ' already exists in the db
  Call WorkspaceNameDuplicate

  ' A new record will have the archived_flag turned off
  mblnArchivedFlag = False

  ' Create a temporary querydef object
  strInsert = "insert into att_workspaces " & _
        "( workspace_id, workspace_name, " & _
        " archived_flag ) " & _
        " values ( [w_id], [w_name], [archived] ) "
  Set qy = mdbsStepMaster.CreateQueryDef(gstrEmptyString, strInsert)

  ' Call a procedure to assign the parameter values
  Call AssignParameters(qy)

  qy.Execute dbFailOnError
  qy.Close

'   strInsert = "insert into att_workspaces " & _
'         "( workspace_id, workspace_name, " & _
'         " archived_flag ) " & _
'         " values ( " & _
'         Str(mlngWorkspaceId) & _
'         ", " & mFieldValue.MakeStringFieldValid(mstrWorkspaceName) & _
'         ", " & Str(mblnArchivedFlag) & _
'         " ) "
'   mdbsStepMaster.Execute strInsert, dbFailOnError
'
  Exit Sub

AddWorkspaceErr:

  Call LogErrors(Errors)
  mstrSource = mstrModuleName & "AddWorkspace"
  On Error GoTo 0
  Err.Raise vbObjectError + errWorkspaceInsertFailed, _
     mstrSource, LoadResString(errWorkspaceInsertFailed)

End Sub
Private Sub AssignParameters(qyExec As DAO.QueryDef)
  ' Assigns values to the parameters in the querydef object
  ' The parameter names are cryptic to make them different
  ' from the field names. When the parameter names are
  ' the same as the field names, parameters in the where
  ' clause do not get created.

  Dim prmParam As DAO.Parameter

  On Error GoTo AssignParametersErr
  mstrSource = mstrModuleName & "AssignParameters"

  For Each prmParam In qyExec.Parameters
```

```
      Select Case prmParam.Name
         Case "[w_id]"
            prmParam.Value = mlngWorkspaceId

         Case "[w_name]"
            prmParam.Value = mstrWorkspaceName

         Case "[archived]"
            prmParam.Value = mblnArchivedFlag

         Case Else
            ' Write the parameter name that is faulty
            WriteError errInvalidParameter, mstrSource, _
                  prmParam.Name
            On Error GoTo 0
            Err.Raise errInvalidParameter, mstrSource, _
                  LoadResString(errInvalidParameter)
      End Select
   Next prmParam

   Exit Sub

AssignParametersErr:

   mstrSource = mstrModuleName & "AssignParameters"
   Call LogErrors(Errors)
   On Error GoTo 0
   Err.Raise vbObjectError + errAssignParametersFailed, _
      mstrSource, LoadResString(errAssignParametersFailed)

End Sub
Public Sub DeleteWorkspace()

   Dim strDelete As String
   Dim qy As DAO.QueryDef

   On Error GoTo DeleteWorkspaceErr

   strDelete = "delete from att_workspaces " & _
      " where workspace_id = [w_id]"
   Set qy = mdbsStepMaster.CreateQueryDef(gstrEmptyString, strDelete)

   ' Call a procedure to assign the parameter values
   Call AssignParameters(qy)

   qy.Execute dbFailOnError
   qy.Close

'    mdbsStepMaster.Execute strDelete, dbFailOnError
'       " where workspace_id = " & _
'       Str(mlngWorkspaceId)

   Exit Sub
```

```
DeleteWorkspaceErr:
  Call LogErrors(Errors)
  mstrSource = mstrModuleName & "DeleteWorkspace"
  On Error GoTo 0
  Err.Raise vbObjectError + errWorkspaceDeleteFailed, _
     mstrSource, LoadResString(errWorkspaceDeleteFailed)
End Sub

Public Sub ModifyWorkspace()

  Dim strUpdate As String
  Dim qy As DAO.QueryDef

  On Error GoTo ModifyWorkspaceErr

  ' Call procedure to raise an error if the Workspace name
  ' already exists in the db
  Call WorkspaceNameDuplicate

  strUpdate = "update att_workspaces " & _
     " set workspace_name = [w_name] " & _
     ", archived_flag = [archived] " & _
     " where workspace_id = [w_id] "
  Set qy = mdbsStepMaster.CreateQueryDef(gstrEmptyString, strUpdate)

  ' Call a procedure to assign the parameter values
  Call AssignParameters(qy)

  qy.Execute dbFailOnError
  qy.Close

'   strUpdate = "update att_workspaces " & _
'      " set workspace_name = " & _
'      mFieldValue.MakeStringFieldValid(mstrWorkspaceName) & _
'      ", archived_flag = " & _
'      Str(mblnArchivedFlag) & _
'      " where workspace_id = " & _
'      Str(mlngWorkspaceId)
'
'   mdbsStepMaster.Execute strUpdate, dbFailOnError
'
  Exit Sub

ModifyWorkspaceErr:

  Call LogErrors(Errors)
  mstrSource = mstrModuleName & "ModifyWorkspace"
  On Error GoTo 0
  Err.Raise vbObjectError + errWorkspaceUpdateFailed, _
     mstrSource, LoadResString(errWorkspaceUpdateFailed)

End Sub
Public Property Get WorkspaceName() As String
```

```
    WorkspaceName = mstrWorkspaceName

End Property

Public Property Get WorkspaceId() As Long

    WorkspaceId = mlngWorkspaceId

End Property

Private Sub Class_Initialize()

    ' Each function will append it's own name to this
    ' variable
    mstrSource = "cWorkspace."

    Set mFieldValue = New cStringSM

End Sub

Private Sub Class_Terminate()

    Set mdbsStepMaster = Nothing
    Set mFieldValue = Nothing

End Sub
Attribute VB_Name = "DatabaseSM"
'  FILE:       DatabaseSM.bas
'              Microsoft TPC-H Kit Ver. 2.7.0-1005
'              Copyright Microsoft, 2008
'              All Rights Reserved
'
'
'  PURPOSE:    Contains all the database initialization/cleanup
'              procedures for the project. Also contains upgrade
'              database upgrade functions.
'  Contact:    Reshma Tharamal (reshmat@microsoft.com)
'
' This module is called DatabaseSM, since Database is a standard
' Visual Basic object and we want to avoid any confusion with it.

Option Explicit

Public wrkJet As Workspace
Public dbsAttTool As Database
Public gblnDbOpen As Boolean
Public gRunEngine As rdoEngine

' Used to indicate the source module name when errors
' are raised by this module
Private Const mstrModuleName As String = "DatabaseSM."
Public Const gsDefDBFileExt As String = ".stp"
Private Const msDefDBFile As String = "\SMData" & gsDefDBFileExt
```

```
Private Const merrFileNotFound As Integer = 3024
Private Const merrDaoTableMissing As Integer = 3078

Private Const STEPMASTER_SETTINGS_VAL_NAME_DBFILE As String = "WorkspaceFile"

Public Const DEF_NO_COUNT_DISPLAY         As Boolean = False
Public Const DEF_NO_EXECUTE               As Boolean = False
Public Const DEF_PARSE_QUERY_ONLY         As Boolean = False
Public Const DEF_ANSI_QUOTED_IDENTIFIERS  As Boolean = False
Public Const DEF_ANSI_NULLS               As Boolean = True
Public Const DEF_SHOW_QUERY_PLAN          As Boolean = False
Public Const DEF_SHOW_STATS_TIME          As Boolean = False
Public Const DEF_SHOW_STATS_IO            As Boolean = False
Public Const DEF_PARSE_ODBC_MSG_PREFIXES  As Boolean = True
Public Const DEF_ROW_COUNT                As Long = 0
Public Const DEF_TSQL_BATCH_SEPARATOR     As String = "GO"
Public Const DEF_QUERY_TIME_OUT           As Long = 0
Public Const DEF_SERVER_LANGUAGE          As String = "(Default)"
Public Const DEF_CHARACTER_TRANSLATION    As Boolean = True
Public Const DEF_REGIONAL_SETTINGS        As Boolean = False

Public Const PARAM_DEFAULT_DIR            As String = "DEFAULT_DIR"
Public Const PARAM_DEFAULT_DIR_DESC       As String = "Default destination directory " & _
        "for all output and error files. If it is blank, the StepMaster installation directory will be used."

Public Const PARAM_RUN_ID                 As String = "RUN_ID"
Public Const PARAM_RUN_ID_DESC            As String = "The run identifier for a run. " & _
        "Any modifications will be overwritten before each run."

Public Const PARAM_OUTPUT_DIR             As String = "OUTPUT_DIR"
Public Const PARAM_OUTPUT_DIR_DESC        As String = "The output directory for a run. " & _
        "Any modifications will be overwritten before each run."

Public Const CONNECTION_STRINGS_TO_NAME_SUFFIX As String = "_NAME"

Private Const TBL_RUN_STEP_HDR As String = "run_header"
Private Const TBL_RUN_STEP_DTLS As String = "run_step_details"
Public Const TBL_CONNECTION_DTLS As String = "connection_dtls"
Public Const TBL_CONNECTION_STRINGS As String = "workspace_connections"
Public Const TBL_STEPS As String = "att_steps"

Public Const FLD_ID_CONN_NAME As String = "connection_name_id"
Public Const FLD_ID_WORKSPACE As String = "workspace_id"
Public Const FLD_ID_STEP As String = "step_id"
Public Const FLD_ID_PARAMETER As String = "parameter_id"

Public Const FLD_CONN_DTL_CONNECTION_NAME As String = "connection_name"
Public Const FLD_CONN_DTL_CONNECTION_STRING As String = "connection_string_name"
Public Const FLD_CONN_DTL_CONNECTION_TYPE As String = "connection_type"

Public Const FLD_CONN_STR_CONNECTION_NAME As String = "connection_name"

Public Const FLD_STEPS_EXEC_MECHANISM As String = "execution_mechanism"
Public Const FLD_STEPS_EXEC_DTL As String = "start_directory"
```

```
Public Const FLD_STEPS_VERSION_NO As String = "version_no"

Public Const DATA_TYPE_CURRENCY As String = "CURRENCY"
Public Const DATA_TYPE_LONG As String = "Long"
Public Const DATA_TYPE_INTEGER As String = "INTEGER"
Public Const DATA_TYPE_TEXT255 As String = "Text(255)"

Private Sub InsertBuiltInParameter(dbFile As Database, sParamName As String, _
    sParamValue As String, sParamDesc As String)

  Dim sBuf As String
  Dim cTempStr As New cStringSM
  Dim lId As Long
  Dim rTemp As DAO.Recordset
  Dim rParam As DAO.Recordset
  Dim cTempSeq As cSequence

  ' Create the passed in built-in parameter, for each workspace in the db
  Set cTempSeq = New cSequence
  Set cTempSeq.IdDatabase = dbFile
  cTempSeq.IdentifierColumn = FLD_ID_PARAMETER

  sBuf = "select * from att_workspaces "
  Set rTemp = dbFile.OpenRecordset(sBuf, dbOpenSnapshot)
  If rTemp.RecordCount <> 0 Then
    rTemp.MoveFirst

    While Not rTemp.EOF
      sBuf = "select * from workspace_parameters " & _
            " where workspace_id = " & Str(rTemp!workspace_id) & _
            " and parameter_name = " & cTempStr.MakeStringFieldValid(sParamName)
      Set rParam = dbFile.OpenRecordset(sBuf, dbOpenSnapshot)
      If rParam.RecordCount <> 0 Then
        rParam.MoveFirst
        ' Since the parameter already exists, change it to a built-in type
        sBuf = "update workspace_parameters " & _
              " set parameter_type = " & CStr(gintParameterBuiltIn) & _
              ", description = " & cTempStr.MakeStringFieldValid(sParamDesc) & _
              " where workspace_id = " & Str(rTemp!workspace_id) & _
              " and parameter_id = " & Str(rParam!parameter_id)
      Else
        ' Else, insert a parameter record
        lId = cTempSeq.Identifier
        sBuf = "insert into workspace_parameters " & _
              "( workspace_id, parameter_id, " & _
              " parameter_name, parameter_value, " & _
              " description, parameter_type ) " & _
              " values ( " & _
              Str(rTemp!workspace_id) & ", " & Str(lId) & ", " & _
              cTempStr.MakeStringFieldValid(sParamName) & ", " & _
              cTempStr.MakeStringFieldValid(sParamValue) & ", " & _
              cTempStr.MakeStringFieldValid(sParamDesc) & ", " & _
              CStr(gintParameterBuiltIn) & _
              " ) "
```

```
        End If
        dbFile.Execute sBuf, dbFailOnError
        rParam.Close

        rTemp.MoveNext
      Wend
  End If
  rTemp.Close

End Sub
Public Sub InitRunEngine()

  Set gRunEngine = New rdoEngine
  gRunEngine.rdoDefaultCursorDriver = rdUseServer

End Sub

Public Function DefaultDBFile() As String
  DefaultDBFile = GetSetting(App.Title, "Settings", STEPMASTER_SETTINGS_VAL_NAME_DBFILE,
App.Path & msDefDBFile)
End Function

Public Sub CloseDatabase()

  Dim dbsInstance As Database
  Dim recInstance As Recordset

  On Error GoTo CloseDatabaseErr

  ' Close all open recordsets and databases in the workspace
  For Each dbsInstance In wrkJet.Databases

     For Each recInstance In dbsAttTool.Recordsets
        recInstance.Close
     Next recInstance
     dbsInstance.Close

  Next dbsInstance

  Set dbsAttTool = Nothing

  gblnDbOpen = False
  wrkJet.Close

  Exit Sub

CloseDatabaseErr:

  Call LogErrors(Errors)
  Resume Next

End Sub

Private Function NoDbChanges(sVerTo As String, sVerFrom As String) As Boolean
```

```
  If sVerTo = gsVersion242 And sVerFrom = gsVersion241 Then
     NoDbChanges = True
  ElseIf sVerTo = gsVersion242 And sVerFrom = gsVersion24 Then
     NoDbChanges = True
  ElseIf sVerTo = gsVersion253 And sVerFrom = gsVersion251 Then
     NoDbChanges = True
  ElseIf sVerTo = gsVersion255 And sVerFrom = gsVersion251 Then
     NoDbChanges = True
  ElseIf sVerTo = gsVersion270 And sVerFrom = gsVersion251 Then
     NoDbChanges = True
  Else
     NoDbChanges = False
  End If

End Function

Public Function SMOpenDatabase(Optional strDbName As String = gstrEmptyString) As Boolean
  Dim sVersion As String
  Dim bOpeningDb As Boolean ' This flag is used to check if OpenDatabase failed

  On Error GoTo OpenDatabaseErr

  bOpeningDb = False
  SMOpenDatabase = False

  ' Create Microsoft Jet Workspace object.
  If Not gblnDbOpen Then
     Set wrkJet = CreateWorkspace("att_tool_workspace_setup", "admin", gstrEmptyString, dbUseJet)
  End If

  ' Prompt the user for the database file if it is not passed in
  If StringEmpty(strDbName) Then
     strDbName = BrowseDBFile
     If StringEmpty(strDbName) Then
        Exit Function
     End If
  End If

  Do
     If gblnDbOpen Then
#If Not RUN_ONLY Then
        CloseOpenWorkspaces
#End If
        Set wrkJet = CreateWorkspace("att_tool_workspace_setup", "admin", gstrEmptyString, dbUseJet)
     End If

     ' Toggle the bOpeningDb flag around the OpenDatabase method - the value
     ' of this flag will be checked by the error handler to determine if it is
     ' the OpenDatabase that failed.
     BugMessage "DB File: " & strDbName

     bOpeningDb = True
     ' Open the database for exclusive use
```

```
      Set dbsAttTool = wrkJet.OpenDatabase(strDbName, Options:=True)
      bOpeningDb = False

      If dbsAttTool Is Nothing Then
         ' If the file is not present in the directory, display
         ' an error and ask the user to enter a new path
         Call ShowError(errOpenDbFailed, OptArgs:=strDbName)

         strDbName = BrowseDBFile
      Else
         sVersion = DBVersion(dbsAttTool)

         ' Make sure the application and db version numbers match
         If sVersion = gsVersion Then
            Call InitializeData(strDbName)
            gblnDbOpen = True
            SMOpenDatabase = True
         Else
            If UpgradeDb(wrkJet, dbsAttTool, gsVersion, sVersion) Then
               Call InitializeData(strDbName)
               gblnDbOpen = True
               SMOpenDatabase = True
            Else
               dbsAttTool.Close
               Set dbsAttTool = Nothing

               ShowError errVersionMismatch, _
                     OptArgs:=" Please install Version '" & gsVersion & "' of the workspace definition file."
               strDbName = BrowseDBFile
            End If
         End If
      End If
   Loop While gblnDbOpen = False And Not StringEmpty(strDbName)

   Exit Function

OpenDatabaseErr:
   Call DisplayErrors(Errors)

   ' If the OpenDatabase failed, continue
   If bOpeningDb Then
      Resume Next
   End If

   Call ShowError(errOpenDbFailed, OptArgs:=strDbName)

End Function
Private Sub InitializeData(sDb As String)

   Set gcParameters = New cArrParameters
   Set gcParameters.ParamDatabase = dbsAttTool

   Set gcSteps = New cArrSteps
   Set gcSteps.StepDB = dbsAttTool
```

```
  Set gcConstraints = New cArrConstraints
  Set gcConstraints.ConstraintDB = dbsAttTool

  Set gcConnections = New cConnections
  Set gcConnections.ConnDb = dbsAttTool

  Set gcConnDtls = New cConnDtls
  Set gcConnDtls.ConnDb = dbsAttTool

  ' Disable the error handler since this is not a critical step
  On Error GoTo 0
  SaveSetting App.Title, "Settings", STEPMASTER_SETTINGS_VAL_NAME_DBFILE, sDb
End Sub
Private Sub UpdateContinuationCriteria(dbFile As DAO.Database)

  Dim qyTemp As DAO.QueryDef
  Dim sBuf As String

  On Error GoTo UpdateContinuationCriteriaErr

  sBuf = "Since this version of the executable incorporates failure processing, " & _
        "the upgrade will update the On Failure field for each of the steps " & _
        "to 'Continue' to be compatible with the existing behaviour. " & _
        "Proceed?"
  If Not Confirm(Buttons:=vbYesNo, strMessage:=sBuf, strTitle:="Upgrade database") Then
     Exit Sub
  End If

  ' Create a recordset object to retrieve all steps for
  ' the given workspace
  sBuf = " update att_steps a " & _
     " set continuation_criteria = " & CStr(gintOnFailureContinue) & _
     " where archived_flag = [archived] "

  ' Find the highest X-component of the version number
  sBuf = sBuf & " AND cint( mid( version_no, 1, instr( version_no, " & gstrDQ & gstrVerSeparator & gstrDQ & " )
- 1 ) ) = " & _
     " ( select max( cint( mid( version_no, 1, instr( version_no, " & gstrDQ & gstrVerSeparator & gstrDQ & " ) -
1 ) ) ) " & _
     " from att_steps AS d " & _
     " WHERE a.step_id = d.step_id ) "

  ' Find the highest Y-component of the version number for the highest X-component
  sBuf = sBuf & " AND cint( mid( version_no, instr( version_no, " & gstrDQ & gstrVerSeparator & gstrDQ & " ) +
1 ) ) = " & _
     " ( select max( cint( mid( version_no, instr( version_no, " & gstrDQ & gstrVerSeparator & gstrDQ & " ) + 1 ) ) )
" & _
     " from att_steps AS b " & _
     " Where a.step_id = b.step_id " & _
     " AND cint( mid( version_no, 1, instr( version_no, " & gstrDQ & gstrVerSeparator & gstrDQ & " ) - 1 ) ) = " &
_
     " ( select max( cint( mid( version_no, 1, instr( version_no, " & gstrDQ & gstrVerSeparator & gstrDQ & " ) -
1 ) ) ) " & _
```

```
      " from att_steps AS c " & _
      " WHERE a.step_id = c.step_id ) ) "

  ' Create a temporary Querydef object
  Set qyTemp = dbFile.CreateQueryDef(gstrEmptyString, sBuf)
  qyTemp.Parameters("archived").Value = False

  qyTemp.Execute dbFailOnError
  qyTemp.Close

  Exit Sub

UpdateContinuationCriteriaErr:
  Call LogErrors(Errors)
  Err.Raise vbObjectError + errModifyStepFailed, mstrModuleName, _
        LoadResString(errModifyStepFailed)

End Sub

Private Sub UpdateDbDtls(dbFile As Database, sNewVersion As String)

  Dim sSql As String
  Dim cTemp As New cStringSM

  On Error GoTo UpdateDbDtlsErr

  sSql = "update db_details " & _
        " set db_version = " & cTemp.MakeStringFieldValid(sNewVersion)

  dbFile.Execute sSql, dbFailOnError

  Exit Sub

UpdateDbDtlsErr:
  Call LogErrors(Errors)
  Err.Raise vbObjectError + errUpgradeFailed, mstrModuleName, _
        LoadResString(errUpgradeFailed)

End Sub

Private Sub Upgrade10to21(UpgradeWsp As DAO.Workspace, dbFile As Database, sVersion As String)

  Dim sSql As String

  On Error GoTo Upgrade10to21Err

  Call UpdateDbDtls(dbFile, sVersion)

  Call UpdateContinuationCriteria(dbFile)

  Exit Sub

Upgrade10to21Err:
  UpgradeWsp.Rollback
```

```
    Call LogErrors(Errors)
    Err.Raise vbObjectError + errUpgradeFailed, mstrModuleName, _
        LoadResString(errUpgradeFailed)

End Sub
Private Sub Upgrade21to23(UpgradeWsp As DAO.Workspace, dbFile As Database, sVersion As String)

    Dim sBuf As String
    Dim cTempStr As New cStringSM

    On Error GoTo Upgrade21to23Err

    ' Add a parameter type field and a description field to the parameter table
    sBuf = "alter table workspace_parameters " & _
        " add column description TEXT(255) "
    dbFile.Execute sBuf, dbFailOnError

    sBuf = "alter table workspace_parameters " & _
        " add column parameter_type INTEGER "
    dbFile.Execute sBuf, dbFailOnError

    ' Initialize the parameter type on all parameters to indicate generic parameters
    sBuf = "update workspace_parameters " & _
        " set parameter_type = " & CStr(gintParameterGeneric)
    dbFile.Execute sBuf, dbFailOnError

    sBuf = "Release 2.3 onwards, connection string parameters will be " & _
        "displayed in a separate node. After this upgrade, all connection " & _
        "string parameters will appear under the Globals/Connection Strings " & _
        "node in the workspace. "
    Call MsgBox(sBuf, vbOKOnly + vbApplicationModal, "Upgrade database")

    ' Update the parameter type on all parameters that look like db connection strings
    sBuf = "update workspace_parameters " & _
        " set parameter_type = " & CStr(gintParameterConnect) & _
        " where UCase(parameter_value) like '*DRIVER*' " & _
        " or UCase(parameter_value) like '*DSN*'"
    dbFile.Execute sBuf, dbFailOnError

    ' Add an elapsed time field to the run_step_details table - this field is
    ' needed to store the elapsed time in milliseconds.
    sBuf = "alter table run_step_details " & _
        " add column elapsed_time LONG "
    dbFile.Execute sBuf, dbFailOnError

    ' The failure_details field has some data for the case when an ODBC failure
    ' threshold was specified. Since that's no longer relevant, update the failure_details
    ' field for records with failure_criteria = gintFailureODBC to empty.
    ' failure_criteria = gintFailureODBC = 1
    sBuf = "update att_steps " & _
        " set failure_details = " & cTempStr.MakeStringFieldValid(gstrEmptyString) & _
        " where failure_criteria = '1'"
    dbFile.Execute sBuf, dbFailOnError
```

```
  Call UpdateDbDtls(dbFile, sVersion)

  UpgradeWsp.CommitTrans

  On Error GoTo DropColumnErr

  UpgradeWsp.BeginTrans

  ' This ddl cannot be in the same transaction as the failure_details update
  ' But we can do this in a separate transaction since we do not expect this
  ' statement to fail - AND, it doesn't matter if this transaction fails
  ' Drop the failure_criteria column from the att_steps table
  sBuf = "alter table att_steps " & _
         " drop column failure_criteria "
  dbFile.Execute sBuf, dbFailOnError

  Exit Sub

DropColumnErr:
  Call LogErrors(Errors)
  ShowError errDeleteColumnFailed
  Exit Sub

Upgrade21to23Err:
  UpgradeWsp.Rollback
  Call LogErrors(Errors)
  Err.Raise vbObjectError + errUpgradeFailed, mstrModuleName, _
        LoadResString(errUpgradeFailed)

End Sub
Private Sub Upgrade23to24(UpgradeWsp As DAO.Workspace, dbFile As Database, sVersion As String)

  Dim sBuf As String
  Dim lId As Long
  Dim rTemp As DAO.Recordset
  Dim cTempStr As New cStringSM

  On Error GoTo Upgrade23to24Err

  ' Add a new table for connection properties
  sBuf = CreateConnectionsTableScript()
  ' TODO: Not sure of column sizes for row count, tsql_batch_separator and server_language
  dbFile.Execute sBuf, dbFailOnError

  ' Move all connection parameters from the parameter table to the connections tables
  ' Insert default values for the newly added connection properties
  sBuf = "select * from workspace_parameters " & _
         "where parameter_type = " & CStr(gintParameterConnect)
  Set rTemp = dbFile.OpenRecordset(sBuf, dbOpenSnapshot)
  lId = 1
  If rTemp.RecordCount <> 0 Then
     rTemp.MoveFirst

     While Not rTemp.EOF
```

```
        sBuf = "insert into workspace_connections " & _
         "( workspace_id, connection_id, " & _
         "connection_name, connection_value, " & _
         "description, no_count_display, " & _
         "no_execute, parse_query_only, " & _
         "ANSI_quoted_identifiers, ANSI_nulls, " & _
         "show_query_plan, show_stats_time, " & _
         "show_stats_io, parse_odbc_msg_prefixes, " & _
         "row_count, tsql_batch_separator, " & _
         "query_time_out, server_language, " & _
         "character_translation, regional_settings ) " & _
        " values ( " & _
        Str(rTemp!workspace_id) & ", " & Str(lId) & ", " & _
        cTempStr.MakeStringFieldValid("" & rTemp!parameter_name) & ", " & _
        cTempStr.MakeStringFieldValid("" & rTemp!parameter_value) & ", " & _
        cTempStr.MakeStringFieldValid("" & rTemp!Description) & ", " & _
        Str(DEF_NO_COUNT_DISPLAY) & ", " & _
        Str(DEF_NO_EXECUTE) & ", " & Str(DEF_PARSE_QUERY_ONLY) & ", " & _
        Str(DEF_ANSI_QUOTED_IDENTIFIERS) & ", " & Str(DEF_ANSI_NULLS) & ", " & _
        Str(DEF_SHOW_QUERY_PLAN) & ", " & Str(DEF_SHOW_STATS_TIME) & ", " & _
        Str(DEF_SHOW_STATS_IO) & ", " & Str(DEF_PARSE_ODBC_MSG_PREFIXES) & ", " & _
        Str(DEF_ROW_COUNT) & ", " & cTempStr.MakeStringFieldValid(DEF_TSQL_BATCH_SEPARATOR) &
", " & _
        Str(DEF_QUERY_TIME_OUT) & ", " & cTempStr.MakeStringFieldValid(DEF_SERVER_LANGUAGE) &
", " & _
        Str(DEF_CHARACTER_TRANSLATION) & ", " & Str(DEF_REGIONAL_SETTINGS) & _
        " ) "
        dbFile.Execute sBuf, dbFailOnError

        lId = lId + 1
        rTemp.MoveNext
      Wend
  End If
  rTemp.Close

  ' Add an identifier column for the connection_id field
  sBuf = "alter table att_identifiers " & _
        " add column connection_id long "
  dbFile.Execute sBuf, dbFailOnError

  ' Initialize the value of the connection identifier, initialized above
  sBuf = "update att_identifiers " & _
        " set connection_id = " & Str(lId)
  dbFile.Execute sBuf, dbFailOnError

  ' Delete all connection strings from the parameter table
  sBuf = "delete from workspace_parameters " & _
         "where parameter_type = " & CStr(gintParameterConnect)
  dbFile.Execute sBuf, dbFailOnError

  ' Create the built-in parameter, default directory, for each workspace in the db
  Call InsertBuiltInParameter(dbFile, PARAM_DEFAULT_DIR, gstrEmptyString,
PARAM_DEFAULT_DIR_DESC)
```

```
  Call UpdateDbDtls(dbFile, sVersion)

  Exit Sub

Upgrade23to24Err:
  UpgradeWsp.Rollback
  Call LogErrors(Errors)
  Err.Raise vbObjectError + errUpgradeFailed, mstrModuleName, _
        LoadResString(errUpgradeFailed)

End Sub
Private Sub Upgrade243to25(UpgradeWsp As DAO.Workspace, dbFile As Database, sVersion As String)

  Dim sBuf As String
  Dim qy As DAO.QueryDef
  Dim rTemp As DAO.Recordset
  Dim lId As Long
  Dim cTempStr As New cStringSM

  On Error GoTo Upgrade243to25Err

  sBuf = "Release " & gsVersion25 & " onwards, new 'Connections' must be created for all " & _
        "connection strings. " & vbCrLf & vbCrLf & _
        "Connections will appear under the Globals/Connections " & _
        "node in the workspace. " & vbCrLf & _
        "A list of all 'Connections' (instead of 'Connection Strings') " & _
        "in the workspace will be displayed in the 'Connections' field for " & _
        "ODBC steps on the Step definition screen. " & vbCrLf & vbCrLf & _
        "Each Connection can be marked as static or dynamic. " & vbCrLf & _
        "Dynamic connections will be created when a step starts execution and " & _
        "closed once the step completes. " & vbCrLf & _
        "Static connections will be kept open till the run completes." & vbCrLf & vbCrLf & _
        "Currently dynamic 'Connections' have been created for all existing 'Connection Strings' " & _
        "with the suffix " & CONNECTION_STRINGS_TO_NAME_SUFFIX
  Call MsgBox(sBuf, vbOKOnly + vbApplicationModal, "Upgrade database")

  ' Add a new table for the connection name entity
  ' This table has been added in order to satisfy the TPC-H requirement that
  ' all the queries in a stream need to be executed on a single connection.
  sBuf = CreateConnectionDtlsTableScript()
  dbFile.Execute sBuf, dbFailOnError

  ' Add an identifier column for the connection_name_id field
  sBuf = "alter table att_identifiers " & _
        " add column " & FLD_ID_CONN_NAME & " long "
  dbFile.Execute sBuf, dbFailOnError

  Call UpdateDbDtls(dbFile, sVersion)

  ' insert connection_dtl records for each of the connection strings
  sBuf = "select * from " & TBL_CONNECTION_STRINGS
  Set rTemp = dbFile.OpenRecordset(sBuf, dbOpenSnapshot)

  sBuf = "insert into " & TBL_CONNECTION_DTLS & _
```

```
          "( " & FLD_ID_WORKSPACE & _
          ", " & FLD_ID_CONN_NAME & _
          ", " & FLD_CONN_DTL_CONNECTION_NAME & _
          ", " & FLD_CONN_DTL_CONNECTION_STRING & _
          ", " & FLD_CONN_DTL_CONNECTION_TYPE & " ) " & _
        " values ( [w_id], [c_id], [c_name], [c_str], [c_type] ) "
  Set qy = dbFile.CreateQueryDef("", sBuf)

  lId = glMinId
  If rTemp.RecordCount <> 0 Then
     rTemp.MoveFirst

     While Not rTemp.EOF
        qy.Parameters("w_id").Value = rTemp.Fields(FLD_ID_WORKSPACE)
        qy.Parameters("c_id").Value = lId
        qy.Parameters("c_name").Value = rTemp.Fields(FLD_CONN_STR_CONNECTION_NAME) &
CONNECTION_STRINGS_TO_NAME_SUFFIX
        qy.Parameters("c_str").Value = rTemp.Fields(FLD_CONN_STR_CONNECTION_NAME)
        qy.Parameters("c_type").Value = ConnTypeDynamic

        qy.Execute dbFailOnError

        lId = lId + 1
        rTemp.MoveNext
     Wend
  End If
  qy.Close
  rTemp.Close

  ' Initialize the value of the connection_name_id
  sBuf = "update att_identifiers " & _
        " set " & FLD_ID_CONN_NAME & " = " & Str(lId)
  dbFile.Execute sBuf, dbFailOnError

  ' Update the start_directory field in att_steps to point to the newly
  ' created connections
  Call ReadStepsInWorkspace(rTemp, qy, glInvalidId, dbLoad:=dbFile, _
        bSelectArchivedRecords:=False)

  sBuf = "update " & TBL_STEPS & _
     " set " & FLD_STEPS_EXEC_DTL & " = [c_name] " & _
     " where " & FLD_ID_STEP & " = [s_id] " & _
     " and " & FLD_STEPS_VERSION_NO & " = [ver_no] "
  Set qy = dbFile.CreateQueryDef("", sBuf)

  If rTemp.RecordCount <> 0 Then
     rTemp.MoveFirst

     While Not rTemp.EOF
        If rTemp.Fields(FLD_STEPS_EXEC_MECHANISM).Value = gintExecuteODBC Then
           If Not (StringEmpty("" & rTemp.Fields(FLD_STEPS_EXEC_DTL))) Then
              sBuf = rTemp.Fields(FLD_STEPS_EXEC_DTL)
              ' Strip the enclosing "%" characters
              sBuf = Mid(sBuf, 2, Len(sBuf) - 2) & CONNECTION_STRINGS_TO_NAME_SUFFIX
```

```
            qy.Parameters("c_name").Value = sBuf
            qy.Parameters("s_id").Value = rTemp.Fields(FLD_ID_STEP)
            qy.Parameters("ver_no").Value = rTemp.Fields(FLD_STEPS_VERSION_NO)

            qy.Execute dbFailOnError
          End If
        End If
        rTemp.MoveNext
      Wend
  End If

  qy.Close
  rTemp.Close

  Exit Sub

Upgrade243to25Err:
  UpgradeWsp.Rollback
  Call LogErrors(Errors)
  Err.Raise vbObjectError + errUpgradeFailed, mstrModuleName, _
        LoadResString(errUpgradeFailed)

End Sub
Private Sub Upgrade25to251(UpgradeWsp As DAO.Workspace, dbFile As Database, sVersion As String)

  On Error GoTo Upgrade25to251Err

  ' Create the built-in parameters, run_id and output_dir, for each workspace in the db
  Call InsertBuiltInParameter(dbFile, PARAM_RUN_ID, gstrEmptyString, PARAM_RUN_ID_DESC)
  Call InsertBuiltInParameter(dbFile, PARAM_OUTPUT_DIR, gstrEmptyString, PARAM_OUTPUT_DIR_DESC)

  Call UpdateDbDtls(dbFile, sVersion)

  Exit Sub

Upgrade25to251Err:
  UpgradeWsp.Rollback
  Call LogErrors(Errors)
  Err.Raise vbObjectError + errUpgradeFailed, mstrModuleName, _
        LoadResString(errUpgradeFailed)

End Sub

Private Sub Upgrade242to243(UpgradeWsp As DAO.Workspace, dbFile As Database, sVersion As String)

  Dim sBuf As String
  Dim cTempStr As New cStringSM
  Dim iResponse As Integer

  On Error GoTo DeleteHistoryErr

  Call DeleteRunHistory(dbFile)
```

```
  On Error GoTo Upgrade242to243Err

  UpgradeWsp.CommitTrans

  UpgradeWsp.BeginTrans

  ' Add a parameter type field and a description field to the parameter table
  sBuf = "alter table run_step_details " & _
        " add column parent_instance_id LONG "

  dbFile.Execute sBuf, dbFailOnError

  sBuf = "alter table run_step_details " & _
        " add column iterator_value TEXT(255) "

  dbFile.Execute sBuf, dbFailOnError

  Call AlterFieldType(dbFile, TBL_RUN_STEP_DTLS, "start_time", DATA_TYPE_CURRENCY)
  Call AlterFieldType(dbFile, TBL_RUN_STEP_DTLS, "end_time", DATA_TYPE_CURRENCY)
  Call AlterFieldType(dbFile, TBL_RUN_STEP_HDR, "start_time", DATA_TYPE_CURRENCY)
  Call AlterFieldType(dbFile, TBL_RUN_STEP_HDR, "end_time", DATA_TYPE_CURRENCY)

  Call UpdateDbDtls(dbFile, sVersion)

  Exit Sub

DeleteHistoryErr:
  ' This is not a critical error - continue with upgrade
  Call LogErrors(Errors)
  Resume Next

Upgrade242to243Err:
  UpgradeWsp.Rollback
  Call LogErrors(Errors)
  Err.Raise vbObjectError + errUpgradeFailed, mstrModuleName, _
        LoadResString(errUpgradeFailed)

End Sub
'*********************************************************************
' The AlterFieldType Sub procedure requires three string
' parameters. The first string specifies the name of the table
' containing the field to be changed. The second string specifies
' the name of the field to be changed. The third string specifies
' the new data type for the field.
'*********************************************************************

Private Sub AlterFieldType(dbFile As Database, TblName As String, FieldName As String, _
              NewDataType As String)
  Dim qdf As DAO.QueryDef
  Dim sSql As String

  ' Add a temporary field to the table.
  sSql = "ALTER TABLE [" & TblName & _
        "] ADD COLUMN AlterTempField " & NewDataType
```

```
  Set qdf = dbFile.CreateQueryDef("", sSql)
  qdf.Execute

  ' Copy the data from old field into the new field.
  qdf.SQL = "UPDATE DISTINCTROW [" & TblName & "] SET AlterTempField = [" & FieldName & "]"
  qdf.Execute

  ' Delete the old field.
  qdf.SQL = "ALTER TABLE [" & TblName & "] DROP COLUMN [" & FieldName & "]"
  qdf.Execute

  ' Rename the temporary field to the old field's name.
  dbFile.TableDefs("[" & TblName & "]").Fields("AlterTempField").Name = FieldName
  dbFile.TableDefs.Refresh

  ' Clean up.
End Sub
Private Sub Upgrade01to21(UpgradeWsp As DAO.Workspace, dbFile As DAO.Database, sVersion As String)
  Dim sSql As String

  On Error GoTo Upgrade01to21Err

  sSql = "Create table db_details (" & _
        "db_version               Text(50) " & _
  ");"

  dbFile.Execute sSql, dbFailOnError

  sSql = "insert into db_details " & _
        "( db_version ) values ( '" & sVersion & "' ) "

  dbFile.Execute sSql, dbFailOnError

  Call UpdateContinuationCriteria(dbFile)

  Exit Sub

Upgrade01to21Err:
  Call LogErrors(Errors)
  UpgradeWsp.Rollback
  Err.Raise vbObjectError + errUpgradeFailed, mstrModuleName, _
        LoadResString(errUpgradeFailed)

End Sub
Private Function UpgradeDb(UpgradeWsp As DAO.Workspace, dbFile As Database, _
     sVerTo As String, sVerFrom As String) As Boolean

  Dim sMsg As String

  On Error GoTo UpgradeDbErr

  UpgradeDb = False
  If Not ValidUpgrade(sVerTo, sVerFrom) Then Exit Function
```

```
If NoDbChanges(sVerTo, sVerFrom) Then
   UpgradeDb = True
   Exit Function
End If

sMsg = "The database needs to be upgraded from Version " & sVerFrom & _
       " to Version " & sVerTo & "." & vbCrLf & _
       "Proceed?"
If Not Confirm(Buttons:=vbYesNo, strMessage:=sMsg, strTitle:="Upgrade database") Then
   Exit Function
End If

UpgradeWsp.BeginTrans

Select Case sVerFrom
   Case gsVersion25
      Call Upgrade25to251(UpgradeWsp, dbFile, gsVersion251)

   Case gsVersion243
      Call Upgrade243to25(UpgradeWsp, dbFile, gsVersion25)
      Call Upgrade25to251(UpgradeWsp, dbFile, gsVersion251)

   Case gsVersion24, gsVersion241, gsVersion242
      sMsg = "After this upgrade, the run history for previous runs will no longer be available. " & _
             "Continue?"
      If Not Confirm(Buttons:=vbYesNo, strMessage:=sMsg, strTitle:="Upgrade database") Then
         UpgradeWsp.CommitTrans
         Exit Function
      End If
      Call Upgrade242to243(UpgradeWsp, dbFile, gsVersion243)
      Call Upgrade243to25(UpgradeWsp, dbFile, gsVersion25)
      Call Upgrade25to251(UpgradeWsp, dbFile, gsVersion251)

   Case gsVersion23
      Call Upgrade23to24(UpgradeWsp, dbFile, gsVersion24)
      Call Upgrade242to243(UpgradeWsp, dbFile, gsVersion242)
      Call Upgrade243to25(UpgradeWsp, dbFile, gsVersion25)
      Call Upgrade25to251(UpgradeWsp, dbFile, gsVersion251)

   Case gsVersion21
      Call Upgrade21to23(UpgradeWsp, dbFile, gsVersion23)
      Call Upgrade23to24(UpgradeWsp, dbFile, gsVersion24)
      Call Upgrade242to243(UpgradeWsp, dbFile, gsVersion242)
      Call Upgrade243to25(UpgradeWsp, dbFile, gsVersion25)
      Call Upgrade25to251(UpgradeWsp, dbFile, gsVersion251)

   Case gsVersion10
      Call Upgrade10to21(UpgradeWsp, dbFile, gsVersion21)
      Call Upgrade21to23(UpgradeWsp, dbFile, gsVersion23)
      Call Upgrade23to24(UpgradeWsp, dbFile, gsVersion24)
      Call Upgrade242to243(UpgradeWsp, dbFile, gsVersion242)
      Call Upgrade243to25(UpgradeWsp, dbFile, gsVersion25)
      Call Upgrade25to251(UpgradeWsp, dbFile, gsVersion251)
```

```
      Case gsVersion01
         Call Upgrade01to21(UpgradeWsp, dbFile, gsVersion21)
         Call Upgrade21to23(UpgradeWsp, dbFile, gsVersion23)
         Call Upgrade23to24(UpgradeWsp, dbFile, gsVersion24)
         Call Upgrade242to243(UpgradeWsp, dbFile, gsVersion242)
         Call Upgrade243to25(UpgradeWsp, dbFile, gsVersion25)
         Call Upgrade25to251(UpgradeWsp, dbFile, gsVersion251)

   End Select

   UpgradeWsp.CommitTrans

   UpgradeDb = True
   Exit Function

UpgradeDbErr:
   Call LogErrors(Errors)
   ShowError errUpgradeFailed

End Function
Private Function DBVersion(TestDb As Database) As String
   ' Retrieves the database version
   Dim rVersion As Recordset

   On Error GoTo DBVersionErr

   Set rVersion = TestDb.OpenRecordset("Select db_version from db_details ", _
         dbOpenForwardOnly)

   BugAssert rVersion.RecordCount <> 0
   DBVersion = rVersion!db_version

   rVersion.Close
   Exit Function

DBVersionErr:
   If Err.Number = merrDaoTableMissing Then
      DBVersion = gsVersion01
   Else
      LogErrors Errors
      Err.Raise vbObjectError + errUpgradeFailed, mstrModuleName, _
            LoadResString(errUpgradeFailed)
   End If

End Function

Private Function ValidUpgrade(sVerTo As String, sVerFrom As String) As Boolean

   If sVerTo = gsVersion And sVerFrom = gsVersion251 Then
      ValidUpgrade = True
   ElseIf sVerTo = gsVersion And sVerFrom = gsVersion25 Then
      ValidUpgrade = True
   ElseIf sVerTo = gsVersion And sVerFrom = gsVersion243 Then
      ValidUpgrade = True
```

```
  ElseIf sVerTo = gsVersion And sVerFrom = gsVersion242 Then
     ValidUpgrade = True
  ElseIf sVerTo = gsVersion And sVerFrom = gsVersion241 Then
     ValidUpgrade = True
  ElseIf sVerTo = gsVersion And sVerFrom = gsVersion24 Then
     ValidUpgrade = True
  ElseIf sVerTo = gsVersion And sVerFrom = gsVersion23 Then
     ValidUpgrade = True
  ElseIf sVerTo = gsVersion And sVerFrom = gsVersion21 Then
     ValidUpgrade = True
  ElseIf sVerTo = gsVersion And sVerFrom = gsVersion10 Then
     ValidUpgrade = True
  ElseIf sVerTo = gsVersion And sVerFrom = gsVersion01 Then
     ValidUpgrade = True
  Else
     ValidUpgrade = False
  End If

End Function

Attribute VB_Name = "DebugSM"
'  FILE:      DebugSM.bas
'             Microsoft TPC-H Kit Ver. 2.7.0-1005
'             Copyright Microsoft, 2008
'             All Rights Reserved
'
'
'  PURPOSE:    Contains all the functions that carry out error/debug
'             processing for the project.
'  Contact:    Reshma Tharamal (reshmat@microsoft.com)
'
' Most of the functions in this module that manipulate the
' error object do not have an On Error GoTo statement - this
' is because it will clear the passed in error object - let
' the calling functions handle the errors raised by this
' module, if any
Option Explicit

' Used to indicate the source module name when errors
' are raised by this module
Private Const mstrModuleName As String = "DebugSM."

Private mcLogFile As cFileSM
Private mcErrorFile As cFileSM

Private Const FORMAT_MESSAGE_FROM_SYSTEM = &H1000
Private Const FORMAT_MESSAGE_IGNORE_INSERTS = &H200
Private Const pNull = 0

Declare Function FormatMessage Lib "kernel32" Alias "FormatMessageA" (ByVal dwFlags As Long, lpSource As
Any, ByVal dwMessageId As Long, ByVal dwLanguageId As Long, ByVal lpbuffer As String, ByVal nSize As Long,
Arguments As Long) As Long
Public Function Confirm(Optional lngMessageCode As conConfirmMsgCodes, _
     Optional lngTitleCode As conConfirmMsgTitleCodes, _
```

```
    Optional TitleParameter As String, _
    Optional ByVal Buttons As Integer = -1, _
    Optional strMessage As String = gstrEmptyString, _
    Optional strTitle As String = gstrEmptyString) _
    As Boolean
' Displays a confirmation message corresponding to the
' passed in message code. Returns True if the user says
' Ok and False otherwise

Dim intResponse As Integer
Dim intButtonStyle As Integer

On Error GoTo ConfirmErr

Confirm = False

' If the buttons style hasn't been specified, set the
' default style to display OK and Cancel buttons
If Buttons = -1 Then
    intButtonStyle = vbOKCancel
Else
    intButtonStyle = Buttons
End If

' Find the message string for the passed in code
If StringEmpty(strMessage) Then
    strMessage = Trim$(LoadResString(lngMessageCode))
End If

If StringEmpty(strTitle) Then
    strTitle = Trim$(LoadResString(lngTitleCode))
End If

If Not StringEmpty(TitleParameter) Then
    strTitle = strTitle & Chr$(vbKeySpace) & _
          gstrSQ & TitleParameter & gstrSQ
End If

' Display the confirmation message with the Cancel button
' set to the default - assume that we are confirming
' potentially dangerous operations!
intResponse = MsgBox(strMessage, _
       intButtonStyle + vbQuestion + vbApplicationModal, _
       strTitle)

' Translate the user response into a True/False return code
If intButtonStyle = vbOKCancel Then
    If intResponse = vbOK Then
       Confirm = True
    Else
       Confirm = False
    End If
Else
    If intResponse = vbYes Then
```

```
        Confirm = True
      Else
        Confirm = False
      End If
  End If

  Exit Function

ConfirmErr:
  ' Log the error code raised by Visual Basic
  Call LogErrors(Errors)
  On Error GoTo 0
  gstrSource = mstrModuleName & "Confirm"
  Err.Raise vbObjectError + errConfirmFailed, _
        gstrSource, _
        LoadResString(errConfirmFailed)

End Function
Public Sub LogSystemError()
  Dim eErrCode As Long

  eErrCode = GetLastError()
  If eErrCode <> 0 Then
     WriteToFile "System Error: " & eErrCode & vbCrLf & ApiError(eErrCode), _
           blnError:=True
  End If

End Sub
Public Function ApiError(ByVal e As Long) As String

  Dim s As String
  Dim c As Long

  s = String(256, 0)
  c = FormatMessage(FORMAT_MESSAGE_FROM_SYSTEM Or _
        FORMAT_MESSAGE_IGNORE_INSERTS, _
        pNull, e, 0&, s, Len(s), ByVal pNull)
  If c Then ApiError = e & ": " & Left$(s, c)

End Function

' Output flags determine output destination of BugAsserts and messages
#Const afLogfile = 1
#Const afMsgBox = 2
#Const afDebugWin = 4
#Const afAppLog = 8

' Display appropriate error message, and then stop
' program.  These errors should NOT be possible in
' shipping product.
Sub BugAssert(ByVal fExpression As Boolean, _
          Optional sExpression As String)
#If afDebug Then
  If fExpression Then Exit Sub
```

```
  BugMessage "BugAssert failed: " & sExpression
  Stop
#End If
End Sub

Sub BugMessage(sMsg As String)

#If afDebug And afLogfile Then
  ' Since we are writing log messages, the error flag is turned off
  Call WriteToFile(sMsg, False)
#End If
#If afDebug And afMsgBox Then
  MsgBox sMsg
#End If
#If afDebug And afDebugWin Then
  Debug.Print sMsg
#End If
#If afDebug And afAppLog Then
  App.LogEvent sMsg
#End If

End Sub
Public Function ProjectLogFile() As String

  ProjectLogFile = mcLogFile.FileName

End Function
Public Function ProjectErrorFile() As String

  ProjectErrorFile = mcErrorFile.FileName

End Function

Private Sub WriteToFile(sMsg As String, Optional ByVal blnError As Boolean)

  ' Calls procedures to write the passed in message to the log -
  ' The blnError flag is used to indicate that the message
  ' should be logged to the error file - by default the log
  ' file is used

  Dim mcFileObj As cFileSM
  Dim strFileName As String
  Dim strFileHdr As String

  On Error GoTo WriteToFileErr

  If blnError Then
     If mcErrorFile Is Nothing Then
        Set mcErrorFile = New cFileSM
     End If
     Set mcFileObj = mcErrorFile
  Else
     If mcLogFile Is Nothing Then
        Set mcLogFile = New cFileSM
```

```
      End If
      Set mcFileObj = mcLogFile
   End If

   If StringEmpty(mcFileObj.FileName) Then
      If blnError Then
         strFileName = gstrProjectPath & "\" & App.EXEName & ".ERR"
         strFileHdr = "Stepmaster Errors"
      Else
         strFileName = gstrProjectPath & "\" & App.EXEName & ".DBG"
         strFileHdr = "Stepmaster Log"
      End If

      mcFileObj.FileName = strFileName
      mcFileObj.WriteLine strFileHdr
      mcFileObj.WriteLine "Log start time : " & Now
   End If

   mcFileObj.WriteLine sMsg

   Exit Sub

WriteToFileErr:
   ' Display the error code raised by Visual Basic
   Call DisplayErrors(Errors)
   ' An error message would've been displayed by the called
   ' procedures

End Sub
Public Sub WriteMessage(sMsg As String)

   Call WriteToFile(sMsg, True)

End Sub

Sub BugTerm()
#If afDebug And afLogfile Then
   ' Close log file
   mcLogFile.CloseFile
#End If
End Sub

Public Sub ShowError(ByVal ErrorCode As errErrorConstants, _
      Optional ByVal ErrorSource As String = gstrEmptyString, _
      Optional ByVal OptArgs As String = gstrEmptyString, _
      Optional ByVal DoWriteError As Boolean = True)

   If DoWriteError Then
      ' Call a procedure to write the error to a log file
      Call WriteError(ErrorCode, ErrorSource, OptArgs)
   End If

   ' Re-initialize the values of the Error object before
   ' displaying the error to the user
```

```
  Call InitErrObject(ErrorCode, ErrorSource, OptArgs)

  Call DisplayErrors(Errors)

  Err.Clear

End Sub
Public Sub WriteError(ByVal ErrorCode As errErrorConstants, _
      Optional ByVal ErrorSource As String = gstrEmptyString, _
      Optional ByVal OptArgs As String = gstrEmptyString)

  ' Initialize the values of the Error object before
  ' calling the log function
  Call InitErrObject(ErrorCode, ErrorSource, OptArgs)

  Call LogErrors(Errors)

  Err.Clear

End Sub
Private Sub InitErrObject(ByVal ErrorCode As errErrorConstants, _
      Optional ByVal ErrorSource As String = gstrEmptyString, _
      Optional ByVal OptArgs As String = gstrEmptyString)

  Dim lngError As Long

  lngError = IIf(ErrorCode > vbObjectError And ErrorCode < vbObjectError + 65535, _
        ErrorCode - vbObjectError, ErrorCode)
  Err.Number = lngError + vbObjectError
  Err.Description = LoadResString(lngError) & OptArgs
  Err.Source = App.EXEName & ErrorSource

End Sub
Public Sub ShowMessage(ByVal MessageCode As errErrorConstants, _
      Optional ByVal OptArgs As String)

  Dim strMessage As String

  On Error GoTo ShowMessageErr

  strMessage = LoadResString(MessageCode) & OptArgs

  ' Write the error to a log file
  BugMessage strMessage

  MsgBox strMessage, vbOKOnly

  Exit Sub

ShowMessageErr:
  ' Log the error and exit
  Call DisplayErrors(Errors)

End Sub
```

```
Public Sub ShowMessageStr(sMessage As String)

  ' Write the error to a log file
  BugMessage sMessage

  MsgBox sMessage, vbOKOnly

End Sub

Public Sub DisplayErrors(myErrCollection As Errors)
  Dim strError As String
  Dim errLoop As Error
  Dim errCode As Long

  ' Enumerate Errors collection and display properties of
  ' each Error object.
  If Err.Number <> 0 Then
     If Err.Number > vbObjectError And Err.Number < (vbObjectError + 65536) Then
        errCode = Err.Number - vbObjectError
     Else
        errCode = Err.Number
     End If
     strError = "Error # " & Str(errCode) & " was generated by " _
        & Err.Source & Chr(13) & Err.Description
     MsgBox strError, , "Error", Err.HelpFile, Err.HelpContext
  Else
     For Each errLoop In myErrCollection
        With errLoop
           If Err.Number > vbObjectError And Err.Number < (vbObjectError + 65536) Then
              errCode = .Number - vbObjectError
           Else
              errCode = .Number
           End If
           strError = "Error #" & errCode & vbCrLf
           strError = strError & "    " & .Description & vbCrLf
           strError = strError & _
              "    (Source: " & .Source & ")" & vbCrLf
'             strError = strError & _
'                "Press F1 to see topic " & .HelpContext & vbCrLf
'             strError = strError & _
'                "    in the file " & .HelpFile & "."
        End With

        MsgBox strError
     Next
  End If

End Sub
Public Sub LogErrors(myErrCollection As Errors)
  Dim cColErrors As cVectorStr
  Dim strError As String
  Dim errLoop As Error
  Dim errCode As Long
  Dim lngIndex As Long
```

```
  Set cColErrors = New cVectorStr

  ' Enumerate Errors collection and display properties of
  ' each Error object.
  If Err.Number <> 0 Then
     If Err.Number > vbObjectError And Err.Number < (vbObjectError + 65536) Then
        errCode = Err.Number - vbObjectError
     Else
        errCode = Err.Number
     End If
     strError = "Error # " & Str(errCode) & " was generated by " _
        & Err.Source & vbCrLf & Err.Description

     cColErrors.Add strError
  End If

  ' Log all database errors, if any
  For Each errLoop In myErrCollection
     With errLoop
        If Err.Number > vbObjectError And Err.Number < (vbObjectError + 65536) Then
           errCode = .Number - vbObjectError
        Else
           errCode = .Number
        End If
        strError = "Error #" & errCode & vbCrLf
        strError = strError & "     " & .Description & vbCrLf
        strError = strError & _
           "    (Source: " & .Source & ")" & vbCrLf
     End With

     cColErrors.Add strError
  Next

  ' We can have a error handler now that we have stored all
  ' errors away safely! - having an error handler before
  ' enumerating all the errors would have cleared the error
  ' collection
  On Error GoTo LogErrorsErr
  gstrSource = mstrModuleName & "LogErrors"

  For lngIndex = 0 To cColErrors.Count - 1
     strError = cColErrors(lngIndex)
     Debug.Print strError
     Call WriteToFile(strError, True)
  Next lngIndex

  Set cColErrors = Nothing

  Exit Sub

LogErrorsErr:
  ' Display the error code raised by Visual Basic
  DisplayErrors Errors
```

```
   On Error GoTo 0
   ShowError errUnableToWriteError, DoWriteError:=False

End Sub
Attribute VB_Name = "FileCommon"
'  FILE:       FileCommon.bas
'              Microsoft TPC-H Kit Ver. 2.7.0-1005
'              Copyright Microsoft, 2008
'              All Rights Reserved
'
'
'  PURPOSE:    This module contains common functionality to display
'              the File Open dialog.
'  Contact:    Reshma Tharamal (reshmat@microsoft.com)
'
Option Explicit

' Used to indicate the source module name when errors
' are raised by this module
Private Const mstrModuleName As String = "FileCommon."

Private Enum EOpenFile
   OFN_OVERWRITEPROMPT = &H2
   OFN_HIDEREADONLY = &H4
   OFN_FILEMUSTEXIST = &H1000
   OFN_EXPLORER = &H80000
End Enum

' The locations for the different output files are presented to
' the user in a list box. These constants are used while loading the
' data and while reading the data from the list box.
' These constants also represent the different file types that are
' displayed to the user in File Open dialogs
Public Enum gFileTypes
   gintOutputFile = 0
'    gintLogFile = 1
   gintErrorFile
   gintStepTextFile
   gintOutputCompareFile
   gintDBFile
   gintDBFileNew
   gintImportFile
   gintExportFile
End Enum

Public Const gsSqlFileSuffix = ".sql"
Public Const gsCmdFileSuffix = ".cmd"

Public Const gsOutputFileSuffix = ".out"
Public Const gstrLogFileSuffix = ".log"
Public Const gsErrorFileSuffix = ".err"
Public Function BrowseDBFile() As String
   ' Prompts the user for a database file with the workspace information
   ' Call CallFileDialog to display the open file dialog
```

```
   BrowseDBFile = CallFileDialog(gintDBFile)

End Function
Public Function CallFileDialog(intFileType As Integer, _
      Optional ByVal strDefaultFile As String = gstrEmptyString) As String
   ' This function initializes the values of the filter property,
   ' the dialog title and flags for the File Open dialog depending
   ' on the FileType passed in
   ' It then calls ShowFileOpenDialog to set these properties and
   ' display the File Open dialog to the user

   ' All the properties used by the File Open dialog are defined
   ' as constants in this function and passed to ShowFileOpenDialog
   ' as parameters. So if any of the dialog properties need to be
   ' modified, these constants are what need to be changed
   Const s_DLG_TITLE_OPEN = "Open"
   Const s_DLG_TITLE_NEW = "New"
   Const s_DLG_TITLE_IMPORT = "Import From"
   Const s_DLG_TITLE_EXPORT = "Export To"

   Const mlng_FILE_STEP_TEXT_FLAGS = OFN_EXPLORER Or OFN_FILEMUSTEXIST Or
OFN_HIDEREADONLY
   Const mlng_FILE_OUTPUT_COMPARE_FLAGS = mlng_FILE_STEP_TEXT_FLAGS
   Const mlng_FILE_DB_FLAGS = mlng_FILE_STEP_TEXT_FLAGS
   Const mlng_FILE_OUTPUT_FLAGS = OFN_EXPLORER Or OFN_HIDEREADONLY Or
OFN_OVERWRITEPROMPT
   Const mlng_FILE_LOG_FLAGS = mlng_FILE_OUTPUT_FLAGS
   Const mlng_FILE_ERROR_FLAGS = mlng_FILE_OUTPUT_FLAGS
   Const mlng_FILE_DB_NEW_FLAGS = mlng_FILE_OUTPUT_FLAGS

   Const mstr_FILE_ALL_FILTER = "|All Files (*.*)|*.*"
   Const mstr_FILE_STEP_TEXT_FILTER = "Query Files (*" & gsSqlFileSuffix & _
         ")|*" & gsSqlFileSuffix & "|Command Script Files (*" & gsCmdFileSuffix & _
         ")|*" & gsCmdFileSuffix
   Const mstr_FILE_OUTPUT_COMPARE_FILTER = "Text Files (*.txt)|*.txt"
   Const mstr_FILE_OUTPUT_FILTER = "Output Files (*.out)|*.out"
   Const mstr_FILE_LOG_FILTER = "Log Files (*.log)|*.log"
   Const mstr_FILE_ERROR_FILTER = "Error Files (*.err)|*.err"
   Const mstr_FILE_DB_FILTER = "Stepmaster Workspace Files (*" & gsDefDBFileExt & ")|*" & gsDefDBFileExt

   Dim strFileName As String

   On Error GoTo CallFileDialogErr

   Select Case intFileType
      Case gintStepTextFile
         strFileName = ShowFileOpenDialog( _
            mstr_FILE_STEP_TEXT_FILTER & mstr_FILE_ALL_FILTER, _
            s_DLG_TITLE_OPEN, _
            mlng_FILE_STEP_TEXT_FLAGS, _
            strDefaultFile)

      Case gintOutputCompareFile
         strFileName = ShowFileOpenDialog( _
```

```
            mstr_FILE_OUTPUT_COMPARE_FILTER & mstr_FILE_ALL_FILTER, _
            s_DLG_TITLE_OPEN, _
            mlng_FILE_OUTPUT_COMPARE_FLAGS, _
            strDefaultFile)

        Case gintOutputFile
            strFileName = ShowFileOpenDialog( _
                mstr_FILE_OUTPUT_FILTER & mstr_FILE_ALL_FILTER, _
                s_DLG_TITLE_OPEN, _
                mlng_FILE_OUTPUT_FLAGS, _
                strDefaultFile)

'       Case gintLogFile
'           strFileName = ShowFileOpenDialog( _
'               mstr_FILE_LOG_FILTER & mstr_FILE_ALL_FILTER, _
'               s_DLG_TITLE_OPEN, _
'               mlng_FILE_LOG_FLAGS, _
'               strDefaultFile)
'
        Case gintErrorFile
            strFileName = ShowFileOpenDialog( _
                mstr_FILE_ERROR_FILTER & mstr_FILE_ALL_FILTER, _
                s_DLG_TITLE_OPEN, _
                mlng_FILE_ERROR_FLAGS, _
                strDefaultFile)

        Case gintDBFile
            strFileName = ShowFileOpenDialog( _
                mstr_FILE_DB_FILTER & mstr_FILE_ALL_FILTER, _
                s_DLG_TITLE_OPEN, _
                mlng_FILE_DB_FLAGS, _
                strDefaultFile)

        Case gintDBFileNew
            strFileName = ShowFileOpenDialog( _
                mstr_FILE_DB_FILTER & mstr_FILE_ALL_FILTER, _
                s_DLG_TITLE_NEW, _
                mlng_FILE_DB_NEW_FLAGS, _
                strDefaultFile)

        Case gintImportFile
            strFileName = ShowFileOpenDialog( _
                mstr_FILE_DB_FILTER & mstr_FILE_ALL_FILTER, _
                s_DLG_TITLE_IMPORT, _
                mlng_FILE_DB_FLAGS, _
                strDefaultFile)

        Case gintExportFile
            strFileName = ShowFileOpenDialog( _
                mstr_FILE_DB_FILTER & mstr_FILE_ALL_FILTER, _
                s_DLG_TITLE_EXPORT, _
                mlng_FILE_DB_FLAGS, _
                strDefaultFile)
```

```
      Case Else
         BugAssert True, "Incorrect file type passed in."
         ' Default processing will be for the output file
         strFileName = ShowFileOpenDialog( _
            mstr_FILE_OUTPUT_FILTER & mstr_FILE_ALL_FILTER, _
            s_DLG_TITLE_OPEN, _
            mlng_FILE_OUTPUT_FLAGS, _
            strDefaultFile)

   End Select
   CallFileDialog = strFileName

   Exit Function

CallFileDialogErr:
   CallFileDialog = gstrEmptyString
   ' Log the error code raised by Visual Basic
   Call LogErrors(Errors)
   gstrSource = mstrModuleName & "CallFileDialog"
   Call ShowError(errBrowseFailed)

End Function

Attribute VB_Name = "IteratorCommon"
'  FILE:      IteratorCommon.bas
'             Microsoft TPC-H Kit Ver. 2.7.0-1005
'             Copyright Microsoft, 2008
'             All Rights Reserved
'
'
'  PURPOSE:   Contains functionality common across StepMaster and
'             SMRunOnly, pertaining to iterators
'             Specifically, functions to read iterators records
'             in the workspace, load them in an array and so on.
'  Contact:   Reshma Tharamal (reshmat@microsoft.com)
'
Option Explicit

' Used to indicate the source module name when errors
' are raised by this module
Private Const mstrModuleName As String = "IteratorCommon."

Public Const gintMinIteratorSequence As Integer = 0

Public Sub RangeComplete(vntIterators As Variant)
   ' This is a debug procedure
   ' Checks if the from, to and step values are present in
   ' the array

   Dim bReset As Byte
   Dim bShift As Byte
   Dim lngIndex As Long

   ' Set the three lowest order bits to 1
```

```
  bReset = 7

  BugAssert IsArray(vntIterators) And Not IsEmpty(vntIterators), _
        "Iterators not specified!"

  For lngIndex = LBound(vntIterators) To _
        UBound(vntIterators)
     bShift = 1
     bShift = bShift * (2 ^ (vntIterators(lngIndex).IteratorType - 1))

     bReset = bReset Xor bShift
  Next lngIndex

  ' Assert that all the elements are present
  BugAssert bReset = 0, "Range not completely specified!"

End Sub
Public Sub LoadIteratorsForWsp(cStepsCol As cArrSteps, _
     ByVal lngWorkspaceId As Long, rstStepsInWsp As Recordset)
  ' Initializes the step records in with all the iterator
  ' values for each step

  Dim recIterators As Recordset

  On Error GoTo LoadIteratorsForWspErr

#If QUERY_ALL Then
  Dim dtStart As Date

  dtStart = Now
  Set recIterators = ReadWspIterators(lngWorkspaceId)

  Call LoadIteratorsArray(cStepsCol, recIterators)

  recIterators.Close

  BugMessage "QueryAll Read + load took: " & CStr(DateDiff("s", dtStart, Now))

#Else
  Dim dtStart As Date
  Dim qyIt As DAO.QueryDef
  Dim sSql As String

  dtStart = Now
  If rstStepsInWsp.RecordCount = 0 Then
     Exit Sub
  End If

  ' This method has the advantage that if the steps are queried right, everything else follows
  sSql = "Select step_id, version_no, type, iterator_value, " & _
     " sequence_no " & _
     " from iterator_values " & _
     " where step_id = [s_id] " & _
     " and version_no = [ver_no] "
```

```
  ' Order the iterators by sequence within a step
  sSql = sSql & " order by sequence_no "

  Set qyIt = dbsAttTool.CreateQueryDef(gstrEmptyString, sSql)
  rstStepsInWsp.MoveFirst

  While Not rstStepsInWsp.EOF

    qyIt.Parameters("s_id").Value = rstStepsInWsp!step_id
    qyIt.Parameters("ver_no").Value = rstStepsInWsp!version_no

    Set recIterators = qyIt.OpenRecordset(dbOpenSnapshot)

    Call LoadIteratorsArray(cStepsCol, recIterators)
    recIterators.Close

    rstStepsInWsp.MoveNext
  Wend

  qyIt.Close

  BugMessage "Query step at a time Read + load took: " & CStr(DateDiff("s", dtStart, Now))

#End If

  Exit Sub

LoadIteratorsForWspErr:
  LogErrors Errors
  gstrSource = mstrModuleName & "LoadIteratorsForWsp"
  On Error GoTo 0
  Err.Raise vbObjectError + errLoadRsInArrayFailed, _
        gstrSource, _
        LoadResString(errLoadRsInArrayFailed)

End Sub
Private Function ReadWspIterators(ByVal lngWorkspaceId As Long) As Recordset

  ' This function will return a recordset that is populated
  ' with the iterators for all the steps in a given workspace

  Dim recIterators As Recordset
  Dim qyIt As DAO.QueryDef
  Dim strSql As String

  On Error GoTo ReadWspIteratorsErr
  gstrSource = mstrModuleName & "ReadWspIterators"

  strSql = "Select i.step_id, i.version_no, " & _
    " i.type, i.iterator_value, " & _
    " i.sequence_no " & _
    " from iterator_values i, att_steps a " & _
    " where i.step_id = a.step_id " & _
```

```
      " and i.version_no = a.version_no " & _
      " and a.workspace_id = [w_id] " & _
      " and a.archived_flag = [archived] "

  ' Find the highest X-component of the version number
  strSql = strSql & " AND cint( mid( a.version_no, 1, instr( a.version_no, " & gstrDQ & gstrVerSeparator & gstrDQ
& " ) - 1 ) ) = " & _
      " ( select max( cint( mid( version_no, 1, instr( version_no, " & gstrDQ & gstrVerSeparator & gstrDQ & " ) -
1 ) ) ) " & _
      " from att_steps AS d " & _
      " WHERE a.step_id = d.step_id ) "

  ' Find the highest Y-component of the version number for the highest X-component
  strSql = strSql & " AND cint( mid( a.version_no, instr( a.version_no, " & gstrDQ & gstrVerSeparator & gstrDQ &
" ) + 1 ) ) = " & _
      " ( select max( cint( mid( version_no, instr( version_no, " & gstrDQ & gstrVerSeparator & gstrDQ & " ) + 1 ) ) )
" & _
      " from att_steps AS b " & _
      " Where a.step_id = b.step_id " & _
      " AND cint( mid( version_no, 1, instr( version_no, " & gstrDQ & gstrVerSeparator & gstrDQ & " ) - 1 ) ) = " &
_
      " ( select max( cint( mid( version_no, 1, instr( version_no, " & gstrDQ & gstrVerSeparator & gstrDQ & " ) -
1 ) ) ) " & _
      " from att_steps AS c " & _
      " WHERE a.step_id = c.step_id ) ) "


  ' Order the iterators by sequence within a step
  strSql = strSql & " order by i.step_id, i.sequence_no "

  Set qyIt = dbsAttTool.CreateQueryDef(gstrEmptyString, strSql)
  qyIt.Parameters("w_id").Value = lngWorkspaceId
  qyIt.Parameters("archived").Value = False

  Set recIterators = qyIt.OpenRecordset(dbOpenSnapshot)

  qyIt.Close
  Set ReadWspIterators = recIterators

  Exit Function

ReadWspIteratorsErr:
  ' Log the error code raised by Visual Basic
  Call LogErrors(Errors)
  On Error GoTo 0
  Err.Raise vbObjectError + errReadDataFailed, _
        gstrSource, LoadResString(errReadDataFailed)

End Function
Private Sub LoadIteratorsArray(cStepsCol As cArrSteps, _
     recIterators As Recordset)
  ' Initializes the step records with the iterators for
  ' the step
```

```
  Dim cNewIt As cIterator
  Dim cStepRec As cStep
  Dim lngStepId As Long

  On Error GoTo LoadIteratorsArrayErr
  gstrSource = mstrModuleName & "LoadIteratorsArray"

  If recIterators.RecordCount = 0 Then
     Exit Sub
  End If

  recIterators.MoveFirst
  While Not recIterators.EOF
     Set cNewIt = New cIterator

     lngStepId = CLng(ErrorOnNullField(recIterators, "step_id"))
     If Not cStepRec Is Nothing Then
        If cStepRec.StepId <> lngStepId Then
           Set cStepRec = cStepsCol.QueryStep(lngStepId)
        End If
     Else
        Set cStepRec = cStepsCol.QueryStep(lngStepId)
     End If

     ' Initialize iterator values
     cNewIt.IteratorType = CInt(ErrorOnNullField(recIterators, "type"))
     cNewIt.Value = CStr(ErrorOnNullField(recIterators, "iterator_value"))
     cNewIt.SequenceNo = CInt(ErrorOnNullField(recIterators, "sequence_no"))

     ' Add this record to the array of iterators
     cStepRec.LoadIterator cNewIt

     Set cNewIt = Nothing
     recIterators.MoveNext
  Wend

  Exit Sub

LoadIteratorsArrayErr:
  LogErrors Errors
  gstrSource = mstrModuleName & "LoadIteratorsArray"
  On Error GoTo 0
  Err.Raise vbObjectError + errLoadRsInArrayFailed, _
        gstrSource, _
        LoadResString(errLoadRsInArrayFailed)

End Sub


Attribute VB_Name = "MsgConfirm"
'  FILE:      MsgConfirm.bas
'             Microsoft TPC-H Kit Ver. 2.7.0-1005
'             Copyright Microsoft, 2008
'             All Rights Reserved
```

```
'
'
'  PURPOSE:    Contains constants for confirmation messages that
'              will be displayed by StepMaster
'  Contact:    Reshma Tharamal (reshmat@microsoft.com)
'
Option Explicit

' A public enum containing the codes for all the confirmation
' messages that will be used by the project - each of the codes
' has the prefix, con
Public Enum conConfirmMsgCodes
   conWspDelete = 2000
   conSave
   conStopRun
   conSaveConnect
   conSaveDB
End Enum

' A public enum containing the titles for all the confirmation
' messages that will be used by the project - each of the codes
' has the prefix, cont - most confirmation message codes will
' have a corresponding title code in here
Public Enum conConfirmMsgTitleCodes
   contWspDelete = 3000
   contSave
   contStopRun
   contSaveConnect
   contSaveDB
End Enum

Attribute VB_Name = "OpenFiles"
'  FILE:       OpenFiles.bas
'              Microsoft TPC-H Kit Ver. 2.7.0-1005
'              Copyright Microsoft, 2008
'              All Rights Reserved
'
'
'  PURPOSE:    This module holds a list of all files that have been
'              opened by the project. This module is needed since there
'              is no way to share static data between different instances
'              of a class.
'              Many procedure in this module do not do any error handling -
'              this is 'coz it is also used by procedures that log error
'              messages and any error handler will erase the collection
'              of errors!

'  Contact:    Reshma Tharamal (reshmat@microsoft.com)
'
Option Explicit


' Used to indicate the source module name when errors
' are raised by this class
```

```
Private Const mstrModuleName As String = ".OpenFiles."

Private mOpenFiles As cNodeCollections

Private Const mstrTempDir As String = "\Temp\"

' The maximum number of temporary files that we can create in a
' session
Private Const mlngMaxFileIndex As Long = 999999
Private Const mstrFileIndexFormat As String = "000000"
Private Const mstrTempFilePrefix As String = "SM"
Private Const mstrTempFileSuffix As String = ".cmd"

Private Const merrFileNotFound As Long = 76
Private Function GetFileHandle(strFileName) As cFileInfo

  Dim lngIndex As Long
  Dim blnFileOpen As Boolean

  If Not mOpenFiles Is Nothing Then

    blnFileOpen = False
    For lngIndex = 0 To mOpenFiles.Count - 1
      If mOpenFiles(lngIndex).FileName = strFileName Then
        blnFileOpen = True
        Exit For
      End If
    Next lngIndex

    If blnFileOpen Then
      Set GetFileHandle = mOpenFiles(lngIndex)
    Else
      Set GetFileHandle = Nothing
    End If
  Else
    Set GetFileHandle = Nothing
  End If

End Function

Private Function GetTempFileDir() As String

  Dim strTempFileDir As String

  On Error GoTo GetTempFileDirErr

  strTempFileDir = gstrProjectPath & mstrTempDir

  If StringEmpty(Dir$(strTempFileDir, vbDirectory)) Then
    MkDir strTempFileDir
  End If

  GetTempFileDir = strTempFileDir
```

```
  Exit Function

GetTempFileDirErr:
  ' Log the error code raised by Visual Basic
  Call LogErrors(Errors)
  gstrSource = mstrModuleName & "GetTempFileDir"
  On Error GoTo 0
  Err.Raise vbObjectError + errProgramError, gstrSource, _
        LoadResString(errProgramError)

End Function
Public Function MakePathValid(strFileName As String) As String
  ' Checks if the passed in file path is valid

  Dim strFileDir As String
  Dim strTempDir As String
  Dim strTempFile As String
  Dim intPos As Integer
  Dim intStart As Integer

  On Error GoTo MakePathValidErr
  gstrSource = mstrModuleName & "MakePathValid"

  strTempFile = strFileName
  intPos = InstrR(strFileName, gstrFileSeparator)

  If intPos > 0 Then
     strFileDir = Left$(strTempFile, intPos - 1)
     If StringEmpty(Dir$(strFileDir, vbDirectory)) Then
        ' Loop through the entire path starting at the root
        ' since Mkdir can create only one level of sub-directory
        ' at a time
        intStart = InStr(strFileDir, gstrFileSeparator)

        Do While strTempDir <> strFileDir

           If intStart > 0 Then
              strTempDir = Left$(strFileDir, intStart - 1)
           Else
              strTempDir = strFileDir
           End If

           If StringEmpty(Dir$(strTempDir, vbDirectory)) Then
              ' If the specified directory doesn't exist, try to
              ' create it.
              MkDir strTempDir
           Else
              ' The directory exists - go to it's sub-directory
           End If
           intStart = InStr(intStart + 1, strFileDir, gstrFileSeparator)
        Loop

        ' Sanity check
        If StringEmpty(Dir$(strFileDir, vbDirectory)) Then
```

```
            ' We were unable to create the file directory
            ShowError errCreateDirectoryFailed, gstrSource, _
                  strFileDir, DoWriteError:=False
            MakePathValid = gstrEmptyString
         Else
            MakePathValid = strTempFile
         End If
      Else
         ' The specified directory exists - we should be able
         ' to create the output file in it
         MakePathValid = strTempFile
      End If
   Else
      ' The user has only specified a filename - VB will try
      ' to create it in the current directory
      MakePathValid = strTempFile
   End If

   Exit Function

MakePathValidErr:
   ' Log the error code raised by Visual Basic
   Call LogErrors(Errors)
   gstrSource = mstrModuleName & "MakePathValid"
   ' Log the filename for debug
   Call WriteError(errInvalidFile, gstrSource, strTempFile)
   On Error GoTo 0
   Err.Raise vbObjectError + errProgramError, gstrSource, _
         LoadResString(errProgramError)

End Function
Public Function OpenFileSM(strFileName As String) As Integer
   Dim intHFile As Integer
   Dim NewFileInfo As cFileInfo

   On Error GoTo OpenFileSMErr
   gstrSource = mstrModuleName & "OpenFileSM"

   If StringEmpty(strFileName) Then
      On Error GoTo 0
      Err.Raise vbObjectError + errInvalidFile, gstrSource, _
            LoadResString(errInvalidFile)
   End If

   If mOpenFiles Is Nothing Then
      Set mOpenFiles = New cNodeCollections
   End If

   Set NewFileInfo = GetFileHandle(strFileName)

   If NewFileInfo Is Nothing Then
      ' The file has not been opened yet

      ' If the filename has not been initialized, do not
```

```
      ' attempt to open it
      strFileName = MakePathValid(strFileName)

      If strFileName <> gstrEmptyString Then
         intHFile = FreeFile
         Open strFileName For Output Shared As intHFile

         Set NewFileInfo = New cFileInfo
         NewFileInfo.FileHandle = intHFile
         NewFileInfo.FileName = strFileName
         mOpenFiles.Load NewFileInfo
      Else
         ' Either the directory was invalid or s'thing failed
         ' Display the error to the user instead of trying
         ' to log to the file
         ShowError errInvalidFile, gstrSource, strFileName, _
               DoWriteError:=False
         intHFile = 0
      End If
   Else
      intHFile = NewFileInfo.FileHandle
   End If

   OpenFileSM = intHFile

   Exit Function

OpenFileSMErr:
   ' Log the error code raised by Visual Basic
   Call LogErrors(Errors)
   ' The Open command failed for some reason - write an error
   ' and let the calling function handle the error
   ShowError errInvalidFile, gstrSource, strFileName, _
         DoWriteError:=False
   OpenFileSM = 0

End Function
Public Function CreateTempFile() As String

   Dim strTempFileDir As String
   Dim strTempFileName As String

   Static lngLastFileIndex As Long

   On Error GoTo CreateTempFileErr

   strTempFileDir = GetTempFileDir()

   Do
      If lngLastFileIndex = mlngMaxFileIndex Then
         On Error GoTo 0
         Err.Raise vbObjectError + errMaxTempFiles, gstrSource, _
               LoadResString(errMaxTempFiles)
      End If
```

```
      lngLastFileIndex = lngLastFileIndex + 1
      strTempFileName = mstrTempFilePrefix & _
            Format$(lngLastFileIndex, mstrFileIndexFormat) & _
            mstrTempFileSuffix

      If Not StringEmpty(Dir$(strTempFileDir & strTempFileName)) Then
         ' Remove any files left over from a previous run,
         ' if they still exist
         Kill strTempFileDir & strTempFileName
      End If

   ' Looping in case the file delete doesn't go through for
   ' some reason
   Loop While Not StringEmpty(Dir$(strTempFileDir & strTempFileName))

   CreateTempFile = GetShortName(strTempFileDir)
   CreateTempFile = CreateTempFile & strTempFileName

   Exit Function

CreateTempFileErr:
   ' Log the error code raised by Visual Basic
   Call LogErrors(Errors)
   gstrSource = gstrSource & "CreateTempFile"
   On Error GoTo 0
   Err.Raise vbObjectError + errProgramError, gstrSource, _
         LoadResString(errProgramError)

End Function
Public Sub CloseFileSM(strFileName As String)
   Dim FileToClose As cFileInfo

   If Not mOpenFiles Is Nothing Then

      ' Get the handle to the open file, if it exists
      Set FileToClose = GetFileHandle(strFileName)

      If Not FileToClose Is Nothing Then
         Close FileToClose.FileHandle

         ' Remove the file info from the collection of open files
         mOpenFiles.Unload FileToClose.Position
      End If
   End If

End Sub
Public Sub CloseOpenFiles()
   Dim lIndex As Long

   If Not mOpenFiles Is Nothing Then
      For lIndex = mOpenFiles.Count - 1 To 0
         CloseFileSM (mOpenFiles(lIndex).FileName)
      Next lIndex
```

```
  End If

End Sub

Attribute VB_Name = "ParameterCommon"
'  FILE:      ParameterCommon.bas
'             Microsoft TPC-H Kit Ver. 2.7.0-1005
'             Copyright Microsoft, 2008
'             All Rights Reserved
'
'
'  PURPOSE:   Contains functionality common across StepMaster and
'             SMRunOnly, pertaining to parameters
'             Specifically, functions to load parameter records
'             in an array.
'  Contact:   Reshma Tharamal (reshmat@microsoft.com)
'
Option Explicit

' Used to indicate the source module name when errors
' are raised by this module
Private Const mstrModuleName As String = "ParameterCommon."

Public Sub LoadRecordsetInParameterArray(rstWorkSpaceParameters As Recordset, _
  cParamCol As cArrParameters)

  Dim cNewParameter As cParameter

  On Error GoTo LoadRecordsetInParameterArrayErr

  If rstWorkSpaceParameters.RecordCount = 0 Then
    Exit Sub
  End If

  rstWorkSpaceParameters.MoveFirst
  While Not rstWorkSpaceParameters.EOF

    Set cNewParameter = New cParameter

    ' Initialize parameter values
    cNewParameter.ParameterId = rstWorkSpaceParameters.Fields(0)

    ' Call a procedure to raise an error if mandatory fields are
    ' null.
    cNewParameter.ParameterName = CStr( _
        ErrorOnNullField(rstWorkSpaceParameters, "parameter_name"))
    cNewParameter.ParameterValue = CheckForNullField( _
        rstWorkSpaceParameters, "parameter_value")
    cNewParameter.WorkspaceId = CStr( _
        ErrorOnNullField(rstWorkSpaceParameters, FLD_ID_WORKSPACE))
    cNewParameter.ParameterType = CStr( _
        ErrorOnNullField(rstWorkSpaceParameters, "parameter_type"))
    cNewParameter.Description = CheckForNullField( _
        rstWorkSpaceParameters, "description")
```

```
      cParamCol.Load cNewParameter

      Set cNewParameter = Nothing
      rstWorkSpaceParameters.MoveNext
    Wend

    Exit Sub

LoadRecordsetInParameterArrayErr:
    LogErrors Errors
    gstrSource = mstrModuleName & "LoadRecordsetInParameterArray"
    On Error GoTo 0
    Err.Raise vbObjectError + errLoadRsInArrayFailed, gstrSource, _
          LoadResString(errLoadRsInArrayFailed)
End Sub
Attribute VB_Name = "Public"
'  FILE:       Public.bas
'              Microsoft TPC-H Kit Ver. 2.7.0-1005
'              Copyright Microsoft, 2008
'              All Rights Reserved
'
'
'  PURPOSE:    This module contains all the public constants for this project
'  Contact:    Reshma Tharamal (reshmat@microsoft.com)
'
Option Explicit

Public Const gsVersion01 As String = "0.1"
Public Const gsVersion10 As String = "1.0"
Public Const gsVersion21 As String = "2.1"
Public Const gsVersion23 As String = "2.3"
Public Const gsVersion24 As String = "2.4"
Public Const gsVersion241 As String = "2.4.1"
Public Const gsVersion242 As String = "2.4.2"
Public Const gsVersion243 As String = "2.4.3"
Public Const gsVersion25 As String = "2.5"
Public Const gsVersion251 As String = "2.5.1"
Public Const gsVersion253 As String = "2.5.3"
Public Const gsVersion254 As String = "2.5.4"
Public Const gsVersion255 As String = "2.5.5"
Public Const gsVersion270 As String = "2.7.0-1005"
Public Const gsVersion As String = gsVersion270
Public Const gsCopyRight As String = "2008"

' The same form is used for the creation of new nodes and
' updates to existing nodes (where each node can be a parameter,
' global step, etc.) A tag is set on each flag is used to indicate
' whether it is being called in the insert or update mode. The
' constants for these modes are defined below
Public Const gstrInsertMode = "Insert"
Public Const gstrUpdateMode = "Update"
Public Const gstrPropertiesMode = "View"
```

```
Public Const gstrEmptyString = ""
Public Const gstrSQ = "'"
Public Const gstrDQ = """"
Public Const gstrVerSeparator = "."
Public Const gstrBlank = " "

' Constants used to indicate type of node being processed
' The constants for the different objects correspond to the
' indexes in the menu control arrays (for both the main and popup
' menus) that are used to create new objects. That way we can
' use the index passed in by the click event to determine the
' type of node being processed
Public Const gintWorkspace = 1

' Decided to leave it here after some debate over whether it
' actually belongs in the cStep class definition
Public Enum gintStepType
  gintGlobalStep = 3
  gintManagerStep
  gintWorkerStep
End Enum

Public Const gintRunManager = 6
Public Const gintRunWorker = 7

Public Enum gintParameterNodeType
  gintParameter = 8
  gintNodeParamConnection
  gintNodeParamExtension
  gintNodeParamBuiltIn
End Enum

' Leave some constants free for newer types of parameters (?)
Public Const gintConnectionDtl = 15

Public Enum gintLabelNodeType
  gintGlobalsLabel = 21
  gintParameterLabel
  gintParamConnectionLabel
  gintParamExtensionLabel
  gintParamBuiltInLabel
  gintConnDtlLabel
  gintGlobalStepLabel
  gintStepLabel
End Enum

Public Enum ConnectionType
  ConnTypeStatic = 1
  ConnTypeDynamic
End Enum

Public Const giDefaultConnType As Integer = ConnTypeStatic

' The constants defined below are used to identify the different
```

```
' tabs. If any more step properties and thereby tabs are added
' to the tabbed dialog on the Step Properties form, they should
' be defined here and accessed in the code only using these
' pre-defined constants
' Note: These constants will mainly be used by the functions that
' initialize, customize and display the Step Properties form
Public Const gintDefinition = 0
Public Const gintExecution = 1
Public Const gintMgrDefinition = 2
Public Const gintPreExecutionSteps = 3
Public Const gintPostExecutionSteps = 4
Public Const gintFileLocations = 5

' These constants correspond to the index values in the imagelist
' associated with the tree view control. The imagelist contains
' the icons that will be displayed for each node.
Public Enum TreeImages
   gintImageWorkspaceClosed = 1
   gintImageWorkspaceOpen
   gintImageLabelClosed
   gintImageLabelOpen
   gintImageManagerClosedDis
   gintImageManagerClosedEn
   gintImageManagerOpenDis
   gintImageManagerOpenEn
   gintImageWorkerDis
   gintImageWorkerEn
   gintImageGlobalClosed
   gintImageGlobalOpen
   gintImageParameter
   gintImageRun
   gintImagePending
   gintImageStop
   gintImageDisabled
   gintImageAborted
   gintImageFailed
End Enum

' Public variable used to indicate the name of the function
' that raises an error
Public gstrSource As String

' Public instances of the different collections
Public gcParameters As cArrParameters
Public gcSteps As cArrSteps
Public gcConstraints As cArrConstraints
Public gcConnections As cConnections
Public gcConnDtls As cConnDtls

' Public constants for the index values of the different toolbar
' options. Will be used while dynamically enabling/disabling
' these options.
Public Const tbNew = 1
Public Const tbOpen = 2
```

```
Public Const tbSave = 3

Public Const tbCut = 5
Public Const tbCopy = 6
Public Const tbPaste = 7
Public Const tbDelete = 8

Public Const tbProperties = 10
Public Const tbRun = 11
Public Const tbStop = 12

' The initial version #
Public Const gstrMinVersion As String = "0.0"
Public Const gstrGlobalParallelism As String = "0"
Public Const gintMinParallelism As Integer = 1
'*************************************************
'Public Const gintMaxParallelism As Integer = 100
'*************************************************
Public Const gintMaxParallelism As Integer = 256

' Constant for the minimum identifier, used for all identifier, viz.
' step, workspace, etc.
Public Const glMinId As Long = 1
Public Const glInvalidId As Long = -1

' A parameter that has a special meaning to Stepmaster
' The system time will be substituted wherever it occurs
' (typically as a part of the error, log ... file names
Public Const gstrTimeStamp As String = "TIMESTAMP"
Public Const gstrEnvVarSeparator = "%"
Public Const gstrFileSeparator = "\"
Public Const gstrUnderscore = "_"

' Constants used by date and time formatting functions
Public Const gsTimeSeparator = ":"
Public Const gsDateSeparator = "-"
Public Const gsMsSeparator = "."
Public Const gsDtFormat = "00"
Public Const gsYearFormat = "0000"
Public Const gsTmFormat = "00"
Public Const gsMSecondFormat = "000"

' Default nothing value for a date variable
Public Const gdtmEmpty As Currency = 0

Public Const FMT_WSP_LOG_FILE As String = "yyyymmdd-hhnnss"

Public gsContCriteria() As String
' Note: Update the initialization of gsExecutionStatus in Initialize() if the
' InstanceStatus values are modified - also the boundary checks
Public gsExecutionStatus() As String

Public Const gsConnTypeStatic As String = "Static"
Public Const gsConnTypeDynamic As String = "Dynamic"
```

```
#If RUN_ONLY Then
Public Const gsCaptionRunWsp As String = "Run Workspace"
#End If

' Valid operations on a cNode object
Public Enum Operation
   QueryOp = 1
   InsertOp = 2
   UpdateOp = 3
   DeleteOp = 4
End Enum

Attribute VB_Name = "RunCommon"
'  FILE:      RunCommon.bas
'             Microsoft TPC-H Kit Ver. 2.7.0-1005
'             Copyright Microsoft, 2008
'             All Rights Reserved
'
'
'  PURPOSE:    Contains common functions that are used during the execution
'             of a workspace.
'  Contact:    Reshma Tharamal (reshmat@microsoft.com)
'
Option Explicit

' Used to indicate the source module name when errors
' are raised by this class
Private Const mstrModuleName As String = ".RunCommon."


Public Function GetInstanceItValue(cInstanceRec As cInstance) As String

   ' Returns the iterator value for the instance, if an
   ' iterator has been defined for it
   Dim cStepIt As cRunColIt
   Dim cRunIterator As cRunItNode

   On Error GoTo GetInstanceItValueErr

   ' Since we create a dummy instance for Disabled and Pending steps,
   ' doesn't make sense to look at their iterators
   If cInstanceRec.Status <> gintDisabled And cInstanceRec.Status <> gintPending Then
      Set cStepIt = cInstanceRec.Iterators

      If Not StringEmpty(cInstanceRec.Step.IteratorName) Then
         If cStepIt.Count > 0 Then
            Set cRunIterator = cStepIt(0)
            BugAssert cRunIterator.IteratorName = cInstanceRec.Step.IteratorName, _
                  "The first iterator in the collection is the " & _
                  "one that has been defined for the step."
            If cRunIterator.IteratorName = cInstanceRec.Step.IteratorName Then
               GetInstanceItValue = cRunIterator.Value
            Else
```

```
            GetInstanceItValue = gstrEmptyString
          End If
        Else
          GetInstanceItValue = gstrEmptyString
        End If
      Else
        GetInstanceItValue = gstrEmptyString
      End If
    Else
      GetInstanceItValue = gstrEmptyString
    End If

    Exit Function

GetInstanceItValueErr:
    ' Log the error code raised by Visual Basic
    Call LogErrors(Errors)
    On Error GoTo 0
    gstrSource = mstrModuleName & "GetInstanceItValue"
    Err.Raise vbObjectError + errProgramError, gstrSource, _
          LoadResString(errProgramError)

End Function


Attribute VB_Name = "RunInstHelper"
'  FILE:      RunInstHelper.bas
'             Microsoft TPC-H Kit Ver. 2.7.0-1005
'             Copyright Microsoft, 2008
'             All Rights Reserved
'
'
'  PURPOSE:    This module contains helper procedures that are called by
'             cRunInst.cls
'  Contact:    Reshma Tharamal (reshmat@microsoft.com)
'
Option Explicit

' Used to indicate the source module name when errors
' are raised by this class
Private Const mstrModuleName As String = "RunInstHelper."

' Should be equal to the number of steps defined in cRunInst.cls
Public Const glngNumConcurrentProcesses As Long = 99
Public Const gintBitsPerByte = 8
Public Function AnyStepRunning(cFreeSteps As cVectorLng, arrFree() As Byte) As Boolean

    Dim lngIndex As Long
    Dim intPosInByte As Integer
    Dim lngTemp As Long

    ' Check if there are any running instances to wait for
    If cFreeSteps.Count <> glngNumConcurrentProcesses Then
```

```
      ' For every free step, reset the corresponding element
      ' in the byte array to 0
      For lngIndex = 0 To cFreeSteps.Count - 1

         lngTemp = cFreeSteps(lngIndex) \ gintBitsPerByte
         intPosInByte = cFreeSteps(lngIndex) Mod gintBitsPerByte

         arrFree(lngTemp) = arrFree(lngTemp) Xor 2 ^ intPosInByte
      Next lngIndex

      AnyStepRunning = False

      ' Check if we have a non-zero bit in the byte array
      For lngIndex = LBound(arrFree) To UBound(arrFree) Step 1
         If arrFree(lngIndex) <> 0 Then
            ' We are waiting for a step to complete
            AnyStepRunning = True
            Exit For
         End If
      Next lngIndex

   Else
      AnyStepRunning = False
   End If

End Function


Public Function OrderConstraints(vntTempCons() As Variant, _
      intConsType As ConstraintType) As Variant
   ' Returns a variant containing all the constraint records in the order
   ' in which they should be executed

   Dim vntTemp As Variant
   Dim lngOuter As Long
   Dim lngInner As Long
   Dim cTempConstraint As cConstraint
   Dim cConstraints() As cConstraint
   Dim lngConsCount As Long
   Dim lngLbound As Long
   Dim lngUbound As Long
   Dim lngStep As Long

   On Error GoTo OrderConstraintsErr

   If intConsType = gintPreStep Then
      ' Since we are travelling up and we need to execute the constraints
      ' for the top-level steps first, reverse the order that they
      ' have been stored in the array
      lngLbound = UBound(vntTempCons)
      lngUbound = LBound(vntTempCons)
      lngStep = -1
   Else
      lngLbound = LBound(vntTempCons)
```

```
    lngUbound = UBound(vntTempCons)
    lngStep = 1
  End If

  lngConsCount = 0

  For lngOuter = lngLbound To lngUbound Step lngStep
    vntTemp = vntTempCons(lngOuter)

    If Not IsEmpty(vntTemp) Then
      ' Each of the elements is an array
      For lngInner = LBound(vntTemp) To UBound(vntTemp) Step 1
        If Not IsEmpty(vntTemp(lngInner)) Then
          Set cTempConstraint = vntTemp(lngInner)

          If Not cTempConstraint Is Nothing Then
            ReDim Preserve cConstraints(lngConsCount)
            Set cConstraints(lngConsCount) = cTempConstraint
            lngConsCount = lngConsCount + 1
          End If
        End If
      Next lngInner
    End If
  Next lngOuter

  ' Set the return value of the function to the array of
  ' constraints that has been built above
  If lngConsCount = 0 Then
    OrderConstraints = Empty
  Else
    OrderConstraints = cConstraints()
  End If

  Exit Function

OrderConstraintsErr:
  ' Log the error code raised by Visual Basic
  Call LogErrors(Errors)
  On Error GoTo 0
  Err.Raise vbObjectError + errExecInstanceFailed, _
      mstrModuleName, LoadResString(errExecInstanceFailed)

End Function
Attribute VB_Name = "ShellSM"
'  FILE:      ShellSM.bas
'             Microsoft TPC-H Kit Ver. 2.7.0-1005
'             Copyright Microsoft, 2008
'             All Rights Reserved
'
'
'  PURPOSE:   This module contains a function that creates a process and
'             waits for it to complete.
'  Contact:   Reshma Tharamal (reshmat@microsoft.com)
'
```

```
Option Explicit

Public Function SyncShell(CommandLine As String, Optional Timeout As Long, _
  Optional WaitForInputIdle As Boolean) As Boolean

  Dim proc As PROCESS_INFORMATION
  Dim Start As STARTUPINFO
  Dim ret As Long
  Dim nMilliseconds As Long

  BugMessage "Executing: " & CommandLine
  If Timeout > 0 Then
    nMilliseconds = Timeout
  Else
    nMilliseconds = INFINITE
  End If

  'Initialize the STARTUPINFO structure:
  Start.cb = Len(Start)
  Start.dwFlags = STARTF_USESHOWWINDOW
  Start.wShowWindow = SW_SHOWMINNOACTIVE

  'Start the shelled application:
  CreateProcessA 0&, CommandLine, 0&, 0&, 1&, _
    NORMAL_PRIORITY_CLASS, 0&, 0&, Start, proc

  If WaitForInputIdle Then
    'Wait for the shelled application to finish setting up its UI:
    ret = InputIdle(proc.hProcess, nMilliseconds)
  Else
    'Wait for the shelled application to terminate:
    ret = WaitForSingleObject(proc.hProcess, nMilliseconds)
  End If

  CloseHandle proc.hProcess

  'Return True if the application finished. Otherwise it timed out or erred.
  SyncShell = (ret = WAIT_OBJECT_0)
End Function

Attribute VB_Name = "SMErr"
'  FILE:      SMErr.bas
'             Microsoft TPC-H Kit Ver. 2.7.0-1005
'             Copyright Microsoft, 2008
'             All Rights Reserved
'
'
'  PURPOSE:    This module contains error code for all the errors that are
'             raised by StepMaster.
'  Contact:    Reshma Tharamal (reshmat@microsoft.com)
'
Option Explicit

' A public enum containing the codes for all the error
```

```
' messages that will be displayed by the project - each
' of the codes has the prefix, err
Public Enum errErrorConstants
   errParameterIdInvalid = 1000
   errParameterNameMandatory
   errParameterInsertFailed
   errStepLabelOrTextOrFileRequired
   errMandatoryNodeTextMissing
   errParameterUpdateFailed
   errDupConnDtlName
   errDummy14
   errContCriteriaMandatory
   errContCriteriaNullForGlobal
   errContCriteriaInvalid = 1010
   errParamSeparatorMissing
   errStepTextOrTextFileMandatory
   errStepTextOrFile
   errEnabledFlagFalseForGlobal
   errEnabledFlagLetFailed
   errDegParallelismNullForGlobal
   errInvalidDegParallelism
   errExecutionMechanismInvalid
   errExecutionMechanismLetFailed
   errStepLevelNull = 1020
   errStepLevelZeroForGlobal
   errStepLevelLetFailed
   errRowCountNumeric
   errConnNameInvalid
   errTimeoutNumeric
   errResetConnPropertiesFailed
   errFailureThresholdNumeric
   errConnectionUpdateFailed
   errGlobalRunMethodMandatory
   errGlobalRunMethodNull = 1030
   errGlobalRunMethodInvalid
   errGlobalRunMethodLetFailed
   errNoTrueOption
   errGetOptionFailed
   errSetEnabled
   errStepLabelTextAndFileNull
   errInvalidNodeType
   errSetOptionFailed
   errQueryParameterFailed
   errParamNotFound = 1040
   errQueryStepFailed
   errStepNotFound
   errReadFromScreenFailed
   errCopyPropertiesToFormFailed
   errMandatoryFieldNull
   errUnableToCheckNull
   errUpgradeFailed
   errFindStepSequenceFailed
   errFindParentStepIdFailed
   errCircularReference = 1050
```

errAddStepFailed
errModifyStepFailed
errDeleteColumnFailed
errFindPositionFailed
errDeleteStepFailed
errRunExistsForStepFailed
errCreateNewParentFailed
errInsertNewStepVersionFailed
errCreateNewStepFailed
errDuplicateParameterName = 1060
errCheckDupParameterNameFailed
errConstraintTypeInvalid
errConstraintTypeLetFailed
errAddConstraintFailed
errWorkspaceIdMandatory
errInvalidWorkspaceData
errGetWorkspaceDetailsFailed
errNoWorkspaceLoaded
errWorkspaceAlreadyOpen
errDuplicateWorkspaceName = 1070
errWorkspaceNameMandatory
errWorkspaceNameSetFailed
errWorkspaceIdInvalid
errWorkspaceIdSetFailed
errWorkspaceInsertFailed
errWorkspaceDeleteFailed
errWorkspaceUpdateFailed
errInvalidFile
errCheckWorkspaceOpenFailed
errWriteFailed = 1080
errDeleteParameterRecordFailed
errUnableToLogOutput
errDeleteDBRecordFailed
errRunExistsForWorkspaceFailed
errClearHistoryFailed
errCreateDBFailed
errImportWspFailed
errStepModifyFailed
errStepDeleteFailed
errDummy3 = 1090
errUnableToGetWorkspace
errInvalidNode
errUnableToRemoveSubtree
errSetFileNameFailed
errStepTypeInvalid
errObjectMandatory
errBuiltInUpdateOnly
errInvalidStep
errTypeOfStepFailed
errGetParentKeyFailed = 1100
errLabelTextAndFileCheckFailed
errStepTextAndFileNull
errTextOrFileCheckFailed
errParentStepManager

errDeleteSubStepsFailed
errWorkspaceNameDuplicateFailed
errNewConstraintVersionFailed
errDeleteStepConstraintsFailed
errOldVersionMandatory
errLoadConstraintsInListFailed = 1110
errLoadGlobalStepsFailed
errDeleteConstraintFailed
errUpdateConstraintFailed
errConstraintIdInvalid
errConstraintIdSetFailed
errGlobalStepIdInvalid
errGlobalStepIdSetFailed
errUpdateVersionFailed
errQueryAdjacentConsFailed
errConstraintNotFound = 1120
errQueryConstraintFailed
errSetDBBeforeLoad
errLoadDataFailed
errLoadRsInArrayFailed
errConstraintsForStepFailed
errPreConstraintsForStepFailed
errPostConstraintsForStepFailed
errExecuteConstraintMethodFailed
errIdOrKeyMandatory
errInListFailed = 1130
errUnableToWriteChanges
errQuickSortFailed
errCheckParentValidFailed
errLogErrorFailed
errCopyListFailed
errConnected
errVersionMismatch
errStepNodeFailed
errWorkspaceSelectedFailed
errIdentifierSelectedFailed = 1140
errCheckForNullFieldFailed
errInstanceInUse
errSetVisiblePropertyFailed
errExportWspFailed
errMakeKeyValidFailed
errDummy16
errRunApplicationFailed
errStepLabelUnique
errDeleteSingleFile
errMakeIdentifierValidFailed = 1150
errTypeOfNodeFailed
errConstraintCommandFailed
errOpenDbFailed
errInsertNewConstraintsFailed
errLoadPostExecutionStepsFailed
errLoadPreExecutionStepsFailed
errCreateNewNodeFailed
errDeleteNodeFailed

errDisplayPopupFailed
errDisplayPropertiesFailed = 1160
errUnableToCreateNewObject
errDiffFailed
errLoadWorkspaceFailed
errTerminateProcessFailed
errCompareFailed
errCreateConnectionFailed
errShowFormFailed
errAbortFailed
errDeleteParameterFailed
errUpdateViewFailed = 1170
errParameterNewFailed
errCopyNodeFailed
errCutNodeFailed
errCheckObjectValidFailed
errDeleteViewNodeFailed
errMainFailed
errNewStepFailed
errProcessStepModifyFailed
errCustomizeStepFormFailed
errInitializeStepFormFailed = 1180
errInsertStepFailed
errIncVersionYFailed
errIncVersionXFailed
errShowCreateStepFormFailed
errShowStepFormFailed
errStepNewFailed
errUnableToApplyChanges
errUnableToCommitChanges
errGetStepNodeTextFailed
errSelectGlobalRunMethodFailed = 1190
errConnectionNameMandatory
errUpdateStepFailed
errBrowseFailed
errDummy4
errDummy1
errDummy2
errDummy
errUnableToPreviewFile
errCopyWorkspaceFailed
errCopyParameterFailed = 1200
errGetStepTypeAndPositionFailed
errCopyStepFailed
errMandatoryParameterMissing
errDeleteWorkspaceRecordsFailed
errCreateDirectoryFailed
errConfirmDeleteOrMoveFailed
errCreateWorkspaceFailed
errTypeOfObjectFailed
errCreateNodeFailed
errCreateParameterFailed = 1210
errInsertParameterFailed
errCreateStepFailed

errNoConstraintsCreated
errCopyFailed
errCloneFailed
errCloneGlobalFailed
errCloneWorkerFailed
errCloneManagerFailed
errLetStepTypeFailed
errUnableToCloseWorkspace = 1220
errUnableToModifyWorkspace
errUnableToCreateWorkspace
errAddArrayElementFailed
errUpdateSequenceFailed
errCannotCopySubSteps
errSubStepsFailed
errModifyInArrayFailed
errUpdateParentVersionFailed
errGetNodeTextFailed
errAddToArrayFailed = 1230
errDeleteFromArrayFailed
errQueryIndexFailed
errCreateNewConstraintVersionFailed
errGetRootNodeFailed
errPopulateWspDetailsFailed
errLoadRsInTreeFailed
errAddNodeToTreeFailed
errMaxTempFiles
errMoveFailed
errRootNodeKeyInvalid = 1240
errNextNodeFailed
errBranchWillMove
errMoveBranchInvalid
errCreateIdRecordsetFailed
errIdentifierColumnFailed
errGetIdentifierFailed
errGetStepTypeFailed
errUpdateConstraintSeqFailed
errDelParamsInWspFailed
errDuplicateConnectionName = 1250
errOpenWorkspaceFailed
errShowWorkspaceNewFailed
errShowWorkspaceModifyFailed
errPopulateListFailed
errExploreNodeFailed
errInitializeListNodeFailed
errMakeListColumnsFailed
errRefreshViewFailed
errExploreFailed
errCollapseNodeFailed = 1260
errUnableToProcessListViewClick
errSetEnabledForStepFailed
errDisplayStepFormFailed
errSetEnabledPropertyFailed
errInvalidDB
errDeleteConnectionFailed

errInvalidOperation
errLetOperationFailed
errIdGetFailed
errCommitFailed = 1270
errSaveParametersInWspFailed
errDeleteArrayElementFailed
errSaveWorkspaceFailed
errInitializeFailed
errLoadInArrayFailed
errSaveStepsInWspFailed
errCommitStepFailed
errStepIdGetFailed
errUnloadFromArrayFailed
errValidateFailed = 1280
errTextEnteredFailed
errStepLabelMandatory
errTextAndFileNullForManager
errFailureDetailsNullForMgr
errSetTabOrderFailed
errSaveWspConstraintsFailed
errCommitConstraintFailed
errUnloadStepConstraintsFailed
errUnableToModifyMenu
errConfirmFailed = 1290
errInitSubItemsFailed
errUpdateListNodeFailed
errAddNodeFailed
errLoadListNodeFailed
errAddListNodeFailed
errExecutionFailed
errSetListViewStyleFailed
errSetCheckedFailed
errGetCheckedFailed
errUnableToProcessListViewDblClick = 1300
errDefaultPosition
errShellFailed
errOpenFileFailed
errSetTBar97Failed
errConnectFailed
errApiFailed
errRegEntryInvalid
errParseStringFailed
errConstraintsForWspFailed
errPostConstraintsForWspFailed = 1310
errPreConstraintsForWspFailed
errLoadWspPostExecStepsFailed
errLoadWspPreExecStepsFailed
errLoadConstraintsOnFormFailed
errQueryFailed
errPasteNodeFailed
errShowAllWorkspacesFailed
errMakeFieldValidFailed
errInitializeTree
errRootNodeFailed = 1320

errDirectionInvalid
errUnableToDetListProperty
errUnableToGetListData
errItemNotFound
errItemDoesNotExist
errParamNameInvalid
errGetParamValueFailed
errSubValuesFailed
errStringOpFailed
errReadWorkspaceDataFailed = 1330
errUpdateRunDataFailed
errProgramError
errUnableToOpenFile
errLoadRunDataFailed
errExecuteODBCCommandFailed
errRunWorkspaceFailed
errExecuteStepFailed
errUnableToWriteError
errRunStepFailed
errSaveChanges = 1340
errDragDropFailed
errInvalidParameter
errAssignParametersFailed
errLoadLabelsInTreeFailed
errInstrRFailed
errInsertIteratorFailed
errDeleteIteratorFailed
errTypeInvalid
errLoadFailed
errDeleteFailed = 1350
errModifyFailed
errIteratorsFailed
errInsertFailed
errUpdateFailed
errDuplicateIterator
errSaveFailed
errReadDataFailed
errUnloadFailed
errAddFailed
errExecuteBranchFailed = 1360
errRangeNumeric
errRangeInvalid
errNextStepFailed
errUpdateDisplayFailed
errDateToStringFailed
errGetElapsedTimeFailed
errMaxProcessesExceeded
errInvalidProperty
errInvalidChild
errCreateInstanceFailed = 1370
errInvalidForWorker
errInstanceOpFailed
errNavInstancesFailed
errIterateFailed

```
  errExecInstanceFailed
  errDupIterator
End Enum
Attribute VB_Name = "SortSM"
'  FILE:      SortSM.bas
'             Microsoft TPC-H Kit Ver. 2.7.0-1005
'             Copyright Microsoft, 2008
'             All Rights Reserved
'
'
'  PURPOSE:    This module contains an implementation of QuickSort.
'  Contact:    Reshma Tharamal (reshmat@microsoft.com)
'
Option Explicit

' Comment out for case-sensitive sorts
Option Compare Text

' Used to indicate the source module name when errors
' are raised by this module
Private Const mstrModuleName As String = "SortSM."

Private Function Compare(ByVal vntToCompare1 As Variant, _
      ByVal vntToCompare2 As Variant) As Integer

  On Error GoTo CompareErr

  Compare = 0

  If vntToCompare1.SequenceNo < vntToCompare2.SequenceNo Then
     Compare = -1
  ElseIf vntToCompare1.SequenceNo > vntToCompare2.SequenceNo Then
     Compare = 1
  End If

  Exit Function

CompareErr:
  ' Log the error code raised by Visual Basic
  Call LogErrors(Errors)
  On Error GoTo 0
  Err.Raise vbObjectError + errCompareFailed, _
        gstrSource, _
        LoadResString(errCompareFailed)

End Function

Private Sub Swap(ByRef vntToSwap1 As Variant, _
      ByRef vntToSwap2 As Variant)

  Dim vntTemp As Variant

  On Error GoTo SwapErr
```

```
  If IsObject(vntToSwap1) And IsObject(vntToSwap2) Then
     Set vntTemp = vntToSwap1
     Set vntToSwap1 = vntToSwap2
     Set vntToSwap2 = vntTemp
  Else
     vntTemp = vntToSwap1
     vntToSwap1 = vntToSwap2
     vntToSwap2 = vntTemp
  End If

  Exit Sub

SwapErr:
  ' Log the error code raised by Visual Basic
  Call LogErrors(Errors)
  On Error GoTo 0
  Err.Raise vbObjectError + errQuickSortFailed, mstrModuleName & "Swap", _
     LoadResString(errQuickSortFailed)

End Sub

Public Sub QuickSort(vntArray As Variant, _
     Optional ByVal intLBound As Integer, _
     Optional ByVal intUBound As Integer)
  ' Sorts a variant array using Quicksort

  Dim i As Integer
  Dim j As Integer
  Dim vntMid As Variant

  On Error GoTo QuickSortErr

  If IsEmpty(vntArray) Or _
        Not IsArray(vntArray) Then
     Exit Sub
  End If

  ' Set default boundary values for first time through
  If intLBound = 0 And intUBound = 0 Then
     intLBound = LBound(vntArray)
     intUBound = UBound(vntArray)
  End If

  ' BugMessage "Sorting elements " & Str(intLBound) & " and " & Str(intUBound)

  If intLBound > intUBound Then
     Exit Sub
  End If

  ' Only two elements in this subdivision; exchange if they
  ' are out of order and end recursive calls
  If (intUBound - intLBound) = 1 Then
     If Compare(vntArray(intLBound), vntArray(intUBound)) > 0 Then
        Call Swap(vntArray(intLBound), vntArray(intUBound))
```

```
      End If
      Exit Sub
    End If

    ' Set the pivot point
    Set vntMid = vntArray(intUBound)
    i = intLBound
    j = intUBound

    Do
      ' Move in from both sides towards pivot element
      Do While (i < j) And Compare(vntArray(i), vntMid) <= 0
        i = i + 1
      Loop

      Do While (j > i) And Compare(vntArray(j), vntMid) >= 0
        j = j - 1
      Loop

      If i < j Then
        Call Swap(vntArray(i), vntArray(j))
      End If
    Loop While i < j

    ' Since i has been adjusted, swap element i with element,
    ' intUBound
    Call Swap(vntArray(i), vntArray(intUBound))

    ' Recursively call sort array - pass smaller subdivision
    ' first to conserve stack space
    If (i - intLBound) < (intUBound - 1) Then
      ' Recursively sort with adjusted values for upper and
      ' lower bounds
      Call QuickSort(vntArray, intLBound, i - 1)
      Call QuickSort(vntArray, i + 1, intUBound)
    Else
      Call QuickSort(vntArray, i + 1, intUBound)
      Call QuickSort(vntArray, intLBound, i - 1)
    End If
    Exit Sub

QuickSortErr:
    Call LogErrors(Errors)
    On Error GoTo 0
    Err.Raise vbObjectError + errQuickSortFailed, mstrModuleName & "QuickSort", _
      LoadResString(errQuickSortFailed)

End Sub
Attribute VB_Name = "Startup"
'  FILE:      Startup.bas
'             Microsoft TPC-H Kit Ver. 2.7.0-1005
'             Copyright Microsoft, 2008
'             All Rights Reserved
'
```

```
'
'  PURPOSE:    This module contains startup and cleanup functions for the project.
'  Contact:    Reshma Tharamal (reshmat@microsoft.com)
'
Option Explicit

Public Const LISTVIEW_BUTTON = 14

Public gstrProjectPath As String

' Used to indicate the source module name when errors
' are raised by this module
Private Const mstrModuleName As String = "Startup."

Private Sub Initialize()

   On Error GoTo InitializeErr

   ReDim gsContCriteria(gintOnFailureAbort To gintOnFailureAsk) As String
   gsContCriteria(gintOnFailureAbort) = "Abort"
   gsContCriteria(gintOnFailureContinue) = "Continue"
   gsContCriteria(gintOnFailureCompleteSiblings) = "Execute sibling steps and stop"
   gsContCriteria(gintOnFailureAbortSiblings) = "Abort sibling steps and execute next parent"
   gsContCriteria(gintOnFailureSkipSiblings) = "Skip sibling steps and execute next parent"
   gsContCriteria(gintOnFailureAsk) = "Ask"

   ReDim gsExecutionStatus(gintDisabled To gintAborted) As String
   gsExecutionStatus(gintDisabled) = "Disabled"
   gsExecutionStatus(gintPending) = "Pending"
   gsExecutionStatus(gintRunning) = "Running"
   gsExecutionStatus(gintComplete) = "Complete"
   gsExecutionStatus(gintFailed) = "Failed"
   gsExecutionStatus(gintAborted) = "Stopped"

#If Not RUN_ONLY Then
   ' Call a procedure to change the style of the toolbar
   ' on the Step Properties form
   Call SetTBar97(frmSteps.tblConstraintCommands)

#End If

   Call InitRunEngine

   Exit Sub

InitializeErr:
   ' Log the error code raised by Visual Basic
   Call LogErrors(Errors)
   gstrSource = mstrModuleName & "Initialize"
   Call ShowError(errInitializeFailed)

End Sub
Sub Main()
```

```
  On Error GoTo MainErr

  ' Mousepointer should indicate busy
  Call ShowBusy

  ' Display the Splash screen while we carry out some initialization
  frmSplash.Show
  frmSplash.Refresh

  gstrProjectPath = App.Path

  ' Open the database
  If OpenDBFile() = False Then
     Unload frmSplash
     Exit Sub
  End If

#If Not RUN_ONLY Then
  Load frmMain

  ' Enable the Stop Run menu options only when a workspace is
  ' actually running
  Call EnableStop(False)

  ' Clear all application extension menu items
  Call ClearToolsMenu
#End If

  Call Initialize

  ' Mousepointer - ready to accept user input
  Call ShowFree

  ' Unload the Splash screen and display the main form
  Unload frmSplash

#If RUN_ONLY Then
  frmWorkspaceOpen.Caption = gsCaptionRunWsp

  Call ShowWorkspacesInDb(dbsAttTool)
#Else
  frmMain.Show
#End If

  Exit Sub

MainErr:
  ' Log the error code raised by Visual Basic
  Call LogErrors(Errors)
  Call ShowFree
  Call ShowError(errMainFailed)

End Sub
Private Function OpenDBFile() As Boolean
```

```
  Dim sDb As String

  On Error GoTo OpenDBFileErr

#If RUN_ONLY Then
  ' Always use the registry setting for the run_only mode
  sDb = DefaultDBFile()
#Else
  ' Check if the user has specified the workspace defn. file to open on the command line
  ' Else, use the registry setting
  sDb = IIf(StringEmpty(Command), DefaultDBFile(), Command)

  If Len(sDb) > 0 Then
     ' Trim off the enclosing double-quotes if any
     If Mid(sDb, 1, 1) = gstrDQ Then
        If Len(sDb) > 1 Then
           sDb = Mid(sDb, 2)
        Else
           sDb = gstrEmptyString
        End If
     End If
  End If

  If Len(sDb) > 0 Then
     If Mid(sDb, Len(sDb), 1) = gstrDQ Then
        If Len(sDb) > 1 Then
           sDb = Mid(sDb, 1, Len(sDb) - 1)
        Else
           sDb = gstrEmptyString
        End If
     End If
  End If
#End If

  ' Open the database
  OpenDBFile = SMOpenDatabase(sDb)

  Exit Function

OpenDBFileErr:
  Call LogErrors(Errors)
  OpenDBFile = False

End Function
Public Sub Cleanup()

  On Error GoTo CleanupErr

  ' Set the mousepointer to indicate Busy
  Call ShowBusy

#If Not RUN_ONLY Then
  ' Close all open workspaces - will also prompt for unsaved
  ' changes
```

```
  Call CloseOpenWorkspaces
#End If

  ' Close all open files
  Call CloseOpenFiles

  ' Reset the mousepointer
  Call ShowFree

  Exit Sub

CleanupErr:
  ' Log the error code raised by Visual Basic
  Call LogErrors(Errors)
  Resume Next

End Sub
Attribute VB_Name = "StepCommon"
'  FILE:      StepCommon.bas
'             Microsoft TPC-H Kit Ver. 2.7.0-1005
'             Copyright Microsoft, 2008
'             All Rights Reserved
'
'
'  PURPOSE:    Contains functionality common across StepMaster and
'             SMRunOnly, pertaining to steps
'             Specifically, functions to load iterators records
'             in an array, determine the type of step, etc.
'  Contact:    Reshma Tharamal (reshmat@microsoft.com)
'
Option Explicit

' Used to indicate the source module name when errors
' are raised by this module
Private Const mstrModuleName As String = "StepCommon."

' Step property constants
Private Const mintMinFailureThreshold As Integer = 1
Public Const gintMinSequenceNo As Integer = 1
Public Const gintMinLevel As Integer = 0
Public Function ValidateParallelism(sParallelism As String, lWorkspace As Long, _
      Optional ParamsInWsp As cArrParameters = Nothing) As String
  ' Returns the degree of parallelism for the step if the user input is valid
  Dim sTemp As String

  On Error GoTo ValidateParallelismErr
  gstrSource = mstrModuleName & "ValidateParallelism"

  sTemp = SubstituteParameters(Trim$(sParallelism), lWorkspace, WspParameters:=ParamsInWsp)

  If Not IsNumeric(sTemp) Then
     ShowError errInvalidDegParallelism
     On Error GoTo 0
     Err.Raise vbObjectError + errInvalidDegParallelism, gstrSource, _
```

```
            LoadResString(errInvalidDegParallelism)
    Else
        If (CInt(sTemp) < gintMinParallelism) Or (CInt(sTemp) > gintMaxParallelism) Then
            ShowError errInvalidDegParallelism
            On Error GoTo 0
            Err.Raise vbObjectError + errInvalidDegParallelism, gstrSource, _
                LoadResString(errInvalidDegParallelism)
        Else
            ValidateParallelism = Trim$(sParallelism)
        End If
    End If

    Exit Function

ValidateParallelismErr:
    ' Log the error code raised by Visual Basic
    gstrSource = mstrModuleName & "ValidateParallelism"
    If Err.Number = vbObjectError + errSubValuesFailed Then
        ShowError errInvalidDegParallelism
    End If

    Call LogErrors(Errors)
    On Error GoTo 0
    Err.Raise vbObjectError + errInvalidDegParallelism, gstrSource, _
        LoadResString(errInvalidDegParallelism)

End Function

Public Function IsGlobal( _
        Optional ByVal StepClass As cStep = Nothing, _
        Optional ByVal StepRecord As Recordset = Nothing, _
        Optional ByVal StepKey As String = gstrEmptyString, _
        Optional ByVal StepId As Long = 0, _
        Optional StepForm As Form = Nothing) As Boolean

    ' This function contains all the possible checks for whether
    ' a step is global - The check that will be made depends on
    ' the parameter passed in

    Dim cStepRecord As cStep

    If Not StepClass Is Nothing Then
        IsGlobal = StepClass.GlobalFlag
        Exit Function
    End If

    If Not StepRecord Is Nothing Then
        IsGlobal = StepRecord![global_flag]
        Exit Function
    End If

    If Not StringEmpty(StepKey) Then
        IsGlobal = InStr(StepKey, gstrGlobalStepPrefix) > 0
        Exit Function
```

```
  End If

  If StepId <> 0 Then
     Set cStepRecord = gcSteps.QueryStep(StepId)
     IsGlobal = cStepRecord.GlobalFlag
     Set cStepRecord = Nothing
     Exit Function
  End If

  If Not StepForm Is Nothing Then
     IsGlobal = (StepForm.lblStepType.Caption = Str(gintGlobalStep))
     Exit Function
  End If

  ' Not a single object was passed in! - raise an error
  On Error GoTo 0
  Err.Raise vbObjectError + errObjectMandatory, _
        mstrModuleName & "IsGlobal", _
        LoadResString(errObjectMandatory)

End Function
Public Function TypeOfStep(Optional ByVal StepClass As cStep = Nothing, _
     Optional ByVal StepRecord As Recordset = Nothing, _
     Optional ByVal StepKey As String = gstrEmptyString, _
     Optional ByVal StepId As Long = 0, _
     Optional StepForm As Form = Nothing) As Integer
  ' Calls functions to determine the type of step
  ' The check that will be made depends on the parameter passed in

  On Error GoTo TypeOfStepErr

  ' Make the check whether a step is global first - both
  ' worker and global steps have the step text or file name
  ' not null - but only the global step will have the global
  ' flag set
  If IsGlobal(StepClass, StepRecord, StepKey, StepId, StepForm) Then
     TypeOfStep = gintGlobalStep
  ElseIf IsManager(StepClass, StepRecord, StepKey, StepId, StepForm) Then
     TypeOfStep = gintManagerStep
  ElseIf IsWorker(StepClass, StepRecord, StepKey, StepId, StepForm) Then
     TypeOfStep = gintWorkerStep
  Else
     On Error GoTo 0
     Err.Raise vbObjectError + errInvalidStep, _
           mstrModuleName & "TypeOfStep", _
           LoadResString(errInvalidStep)
  End If

  Exit Function

TypeOfStepErr:
  ' Log the error code raised by Visual Basic
  Call LogErrors(Errors)
  On Error GoTo 0
```

```
  Err.Raise vbObjectError + errTypeOfStepFailed, _
        mstrModuleName & "TypeOfStep", _
        LoadResString(errTypeOfStepFailed)

End Function

Public Function IsStep(intNodeType As Integer) As Boolean
  ' Returns true if the node type corresponds to a global, manager
  ' or worker step
  IsStep = (intNodeType = gintGlobalStep) Or (intNodeType = gintManagerStep) Or _
     (intNodeType = gintWorkerStep)

End Function

Public Function IsManager(Optional ByVal StepClass As cStep = Nothing, _
      Optional ByVal StepRecord As Recordset = Nothing, _
      Optional ByVal StepKey As String = gstrEmptyString, _
      Optional ByVal StepId As Long = 0, _
      Optional StepForm As Form = Nothing) As Boolean

  ' This function contains all the possible checks for whether
  ' a step is a manager step - The check that will be made depends
  ' on the parameter passed in

  Dim cStepRecord As cStep

  If Not StepClass Is Nothing Then
     IsManager = (StepClass.StepType = gintManagerStep)
     Exit Function
  End If

  If Not StepRecord Is Nothing Then
     IsManager = (IsNull(StepRecord![step_text]) And IsNull(StepRecord![step_file_name]))
     Exit Function
  End If

  If Not StringEmpty(StepKey) Then
     IsManager = (InStr(StepKey, gstrManagerStepPrefix) > 0)
     Exit Function
  End If

  If StepId <> 0 Then
     Set cStepRecord = gcSteps.QueryStep(StepId)
     IsManager = (cStepRecord.StepType = gintManagerStep)
     Set cStepRecord = Nothing
     Exit Function
  End If

  If Not StepForm Is Nothing Then
     IsManager = (StepForm.lblStepType.Caption = Str(gintManagerStep))
     Exit Function
  End If

  ' Not a single object was passed in! - raise an error
```

```
  On Error GoTo 0
  Err.Raise vbObjectError + errObjectMandatory, _
        "Step.IsManager", _
        LoadResString(errObjectMandatory)

End Function
Public Function IsWorker( _
      Optional ByVal StepClass As cStep = Nothing, _
      Optional ByVal StepRecord As Recordset = Nothing, _
      Optional ByVal StepKey As String = gstrEmptyString, _
      Optional ByVal StepId As Long = 0, _
      Optional StepForm As Form = Nothing) As Boolean

  ' This function contains all the possible checks for whether
  ' a step is a Worker step - The check that will be made depends
  ' on the parameter passed in

  Dim cStepRecord As cStep

  If Not StepClass Is Nothing Then
     IsWorker = (StepClass.StepType = gintWorkerStep)
     Exit Function
  End If

  If Not StepRecord Is Nothing Then
     IsWorker = (Not StepRecord![global_flag] And _
           (Not IsNull(StepRecord![step_text]) Or Not IsNull(StepRecord![step_file_name])))
     Exit Function
  End If

  If Not StringEmpty(StepKey) Then
     IsWorker = InStr(StepKey, gstrWorkerStepPrefix) > 0
     Exit Function
  End If

  If StepId <> 0 Then
     Set cStepRecord = gcSteps.QueryStep(StepId)
     IsWorker = (cStepRecord.StepType = gintWorkerStep)
     Set cStepRecord = Nothing
     Exit Function
  End If

  If Not StepForm Is Nothing Then
     IsWorker = (StepForm.lblStepType.Caption = Str(gintWorkerStep))
     Exit Function
  End If

  ' Not a single object was passed in! - raise an error
  On Error GoTo 0
  Err.Raise vbObjectError + errObjectMandatory, _
        "Step.IsWorker", _
        LoadResString(errObjectMandatory)

End Function
```

```
Public Function GetStepNodeText(ByVal cStepNode As cStep) As String

  On Error GoTo GetStepNodeTextErr

  ' Returns the string that will be displayed as the text
  ' in the tree view node to the user
  If StringEmpty(cStepNode.StepLabel) Then

    If StringEmpty(cStepNode.StepTextFile) Then

      If StringEmpty(cStepNode.StepText) Then
        ' This should never happen
        On Error GoTo 0
        Err.Raise vbObjectError + errStepLabelTextAndFileNull, _
          gstrSource, _
          LoadResString(errStepLabelTextAndFileNull)
      Else
        GetStepNodeText = cStepNode.StepText
      End If
    Else
      GetStepNodeText = cStepNode.StepTextFile
    End If
  Else
    GetStepNodeText = cStepNode.StepLabel
  End If

  Exit Function

GetStepNodeTextErr:
  ' Log the error code raised by Visual Basic
  Call LogErrors(Errors)
  On Error GoTo 0
  Err.Raise vbObjectError + errGetStepNodeTextFailed, _
      gstrSource, _
      LoadResString(errGetStepNodeTextFailed)

End Function

Public Function LoadRecordsetInStepsArray(rstSteps As Recordset, _
  cStepCol As cArrSteps) As Boolean

  Dim cNewStep As cStep
  Dim cNewGlobal As cGlobalStep
  Dim cNewManager As cManager
  Dim cNewWorker As cWorker

  On Error GoTo LoadRecordsetInStepsArrayErr

  If rstSteps.RecordCount = 0 Then
    Exit Function
  End If

  rstSteps.MoveFirst
  While Not rstSteps.EOF
```

```
' For fields that should not be null, a procedure is first
' called to raise an error if the field is null

Set cNewStep = New cStep

cNewStep.StepType = TypeOfStep(StepRecord:=rstSteps)

If cNewStep.StepType = gintGlobalStep Then
   Set cNewGlobal = New cGlobalStep
   Set cNewStep = cNewGlobal
ElseIf cNewStep.StepType = gintManagerStep Then
   Set cNewManager = New cManager
   Set cNewStep = cNewManager
Else
   Set cNewWorker = New cWorker
   Set cNewStep = cNewWorker
End If

' Initialize the global flag first, since subsequent
' validations might depend on whether the step is global
cNewStep.GlobalFlag = CBool(ErrorOnNullField(rstSteps, "global_flag"))

' Initialize step values
cNewStep.StepId = CLng(ErrorOnNullField(rstSteps, "step_id"))
cNewStep.VersionNo = CStr(ErrorOnNullField(rstSteps, "version_no"))

cNewStep.StepLabel = CheckForNullField(rstSteps, "step_label")
cNewStep.StepTextFile = CheckForNullField(rstSteps, "step_file_name")
cNewStep.StepText = CheckForNullField(rstSteps, "step_text")
cNewStep.StartDir = CheckForNullField(rstSteps, "start_directory")

cNewStep.WorkspaceId = CLng(ErrorOnNullField(rstSteps, FLD_ID_WORKSPACE))
cNewStep.ParentStepId = CLng(ErrorOnNullField(rstSteps, "parent_step_id"))
cNewStep.ParentVersionNo = CStr(ErrorOnNullField(rstSteps, "parent_version_no"))

cNewStep.SequenceNo = CInt(ErrorOnNullField(rstSteps, "sequence_no"))
cNewStep.StepLevel = CInt(ErrorOnNullField(rstSteps, "step_level"))
cNewStep.EnabledFlag = CBool(ErrorOnNullField(rstSteps, "enabled_flag"))

' Initialize the execution details for the step
cNewStep.DegreeParallelism = CheckForNullField(rstSteps, "degree_parallelism")
cNewStep.ExecutionMechanism = CInt(ErrorOnNullField(rstSteps, "execution_mechanism"))
cNewStep.FailureDetails = CheckForNullField(rstSteps, "failure_details")
cNewStep.ContinuationCriteria = CInt(ErrorOnNullField(rstSteps, "continuation_criteria"))

' Initialize the output file locations for the step
cNewStep.OutputFile = CheckForNullField(rstSteps, "output_file_name")
' cNewStep.LogFile = CheckForNullField(rstSteps, "log_file_name")
cNewStep.ErrorFile = CheckForNullField(rstSteps, "error_file_name")

' Initialize the iterator name for the step, if any
cNewStep.IteratorName = CheckForNullField(rstSteps, "iterator_name")

' Add this record to the array of steps
```

```
      cStepCol.Load cNewStep

      Set cNewStep = Nothing
      rstSteps.MoveNext
    Wend

    Exit Function

LoadRecordsetInStepsArrayErr:

    LogErrors Errors
    gstrSource = mstrModuleName & "LoadRecordsetInStepsArray"
    On Error GoTo 0
    Err.Raise vbObjectError + errLoadRsInArrayFailed, gstrSource, _
          LoadResString(errLoadRsInArrayFailed)

End Function


Attribute VB_Name = "TimerSM"
'  FILE:      TimerSM.bas
'             Microsoft TPC-H Kit Ver. 2.7.0-1005
'             Copyright Microsoft, 2008
'             All Rights Reserved
'
'
'  PURPOSE:    This module contains wrapper functions for Timer APIs.
'  Contact:    Reshma Tharamal (reshmat@microsoft.com)
'

Option Explicit

Private Declare Function SetTimer Lib "user32" (ByVal hWnd As Long, _
    ByVal nIDEvent As Long, ByVal uElapse As Long, ByVal lpTimerFunc As Long) _
    As Long
Private Declare Function KillTimer Lib "user32" (ByVal hWnd As Long, _
    ByVal nIDEvent As Long) As Long
Private Declare Sub CopyMemory Lib "kernel32" Alias "RtlMoveMemory" ( _
    pDest As Any, pSource As Any, ByVal ByteLen As Long)

Public gcTimerObjects As Collection

Private Sub TimerProc(ByVal lHwnd As Long, ByVal lMsg As Long, _
    ByVal lTimerID As Long, ByVal lTime As Long)

    Dim nPtr As Long
    Dim oTimerObject As cTimerSM

    'Create a Timer object from the pointer
    nPtr = gcTimerObjects.Item(Str$(lTimerID))
    CopyMemory oTimerObject, nPtr, 4
    'Call a method which will fire the Timer event
    oTimerObject.Tick
    'Get rid of the Timer object so that VB will not try to release it
```

```
  CopyMemory oTimerObject, 0&, 4
End Sub

Public Function StartTimer(lInterval As Long) As Long
  StartTimer = SetTimer(0, 0, lInterval, AddressOf TimerProc)
End Function

Public Sub StopTimer(lTimerID As Long)
  KillTimer 0, lTimerID
End Sub

Public Sub SetInterval(lInterval As Long, lTimerID As Long)
  SetTimer 0, lTimerID, lInterval, AddressOf TimerProc
End Sub
Attribute VB_Name = "ToolsCommon"
'  FILE:      ToolsCommon.bas
'             Microsoft TPC-H Kit Ver. 2.7.0-1005
'             Copyright Microsoft, 2008
'             All Rights Reserved
'
'
'  PURPOSE:    Contains functions to remove run history and initialize
'             table creation scripts
'  Contact:    Reshma Tharamal (reshmat@microsoft.com)
'
Option Explicit

Public sCreateTables() As String

Public Const gsExtSeparator As String = "."

Public Sub DeleteRunHistory(dbFile As DAO.Database)
  ' Delete all run history records from the database, viz. the records in
  ' run_header, run_step_details and run_parameters

  Dim sDelete As String

  On Error GoTo DeleteRunHistoryErr

  sDelete = "delete from run_header "
  dbFile.Execute sDelete, dbFailOnError

  sDelete = "delete from run_step_details "
  dbFile.Execute sDelete, dbFailOnError

  sDelete = "delete from run_parameters "
  dbFile.Execute sDelete, dbFailOnError

  sDelete = "update att_identifiers " & _
      " set run_id = " & CStr(glMinId)
  dbFile.Execute sDelete, dbFailOnError

  Exit Sub
```

```
DeleteRunHistoryErr:
  LogErrors Errors
  Err.Raise vbObjectError + errDeleteDBRecordFailed, "DeleteRunHistory", _
        LoadResString(errDeleteDBRecordFailed)

End Sub

Public Function CreateConnectionsTableScript() As String
  ' Returns the table creation script for the workspace_connections table

  Call InitCreateSQLArray
  CreateConnectionsTableScript = sCreateTables(10)
  ReDim sCreateTables(0)

End Function
Public Function CreateConnectionDtlsTableScript() As String
  ' Returns the table creation script for the connection_dtls table

  Call InitCreateSQLArray
  CreateConnectionDtlsTableScript = sCreateTables(11)
  ReDim sCreateTables(0)

End Function

Public Sub InitCreateSQLArray()

ReDim sCreateTables(0 To 11)

sCreateTables(0) = "Create table att_identifiers (" & _
      "workspace_id            Long, " & _
      "parameter_id            Long, " & _
      "step_id                 Long, " & _
      "constraint_id           Long, " & _
      "run_id                  Long, " & _
      "connection_id           Long " & _
      ", " & FLD_ID_CONN_NAME & gstrBlank & DATA_TYPE_LONG & _
");"

sCreateTables(1) = "Create table att_steps (step_id   Long, " & _
      "version_no              Text(255), " & _
      "step_label              Text(255), " & _
      "step_file_name          Text(255), " & _
      "step_text               Memo, " & _
      "start_directory         Text(255), " & _
      "workspace_id            Long, " & _
      "parent_step_id          Long, " & _
      "parent_version_no       Text(255), " & _
      "step_level              Long, " & _
      "sequence_no             Integer, " & _
      "enabled_flag            Bit, " & _
      "degree_parallelism      Text(255), " & _
      "execution_mechanism     Text(50), " & _
      "failure_details         Text(255), " & _
      "continuation_criteria   Text(50), " & _
```

```
        "global_flag              Long, " & _
        "archived_flag             Bit, " & _
        "output_file_name          Text(255), " & _
        "error_file_name           Text(255), " & _
        "iterator_name             Text(255), " & _
        "CONSTRAINT pk_steps PRIMARY KEY (step_id, version_no) " & _
");"

'        "log_file_name             Text(255), " & _

sCreateTables(2) = "Create table att_workspaces (" & _
        "workspace_id              Long, " & _
        "workspace_name            Text(255), " & _
        "archived_flag             Bit, " & _
        "CONSTRAINT pk_workspaces PRIMARY KEY (workspace_id) " & _
");"

sCreateTables(3) = "Create table iterator_values (" & _
        "step_id                   Long, " & _
        "version_no                Text(255), " & _
        "type                      Integer, " & _
        "iterator_value            Text(255), " & _
        "sequence_no               Integer " & _
");"

sCreateTables(4) = "Create table run_header (" & _
        "run_id                    Long, " & _
        "workspace_id              Long, " & _
        "start_time                Currency, " & _
        "end_time                  Currency, " & _
        "CONSTRAINT pk_run_header PRIMARY KEY (run_id) " & _
");"

sCreateTables(5) = "Create table run_parameters (" & _
        "run_id                    Long, " & _
        "parameter_name            Text(255), " & _
        "parameter_value           Text(255) " & _
");"

sCreateTables(6) = "Create table run_step_details (" & _
        "run_id                    Long, " & _
        "step_id                   Long, " & _
        "version_no                Text(255), " & _
        "instance_id               Long, " & _
        "parent_instance_id        Long, " & _
        "command                   Memo, " & _
        "iterator_value            Text(255), " & _
        "start_time                Currency, " & _
        "end_time                  Currency, " & _
        "elapsed_time              Long " & _
");"

sCreateTables(7) = "Create table step_constraints (" & _
        "constraint_id             Long, " & _
```

```
        "step_id                Long, " & _
        "version_no             Text(255), " & _
        "constraint_type        Integer, " & _
        "global_step_id         Long, " & _
        "global_version_no      Text(255), " & _
        "sequence_no            Integer " & _
");"

sCreateTables(8) = "Create table workspace_parameters (" & _
        "workspace_id           Long, " & _
        "parameter_id           Long, " & _
        "parameter_name         Text(255), " & _
        "parameter_value        Text(255), " & _
        "description            Text(255), " & _
        "parameter_type         Integer, " & _
        "CONSTRAINT pk_parameters PRIMARY KEY (parameter_id) " & _
");"

sCreateTables(9) = "Create table db_details (" & _
        "db_version             Text(50) " & _
");"

sCreateTables(10) = "Create table " & TBL_CONNECTION_STRINGS & " (" & _
        "workspace_id           Long, " & _
        "connection_id          Long, " & _
        "connection_name        Text(255), " & _
        "connection_value       Text(255), " & _
        "description            Text(255), " & _
        "no_count_display       Bit, " & _
        "no_execute             Bit, " & _
        "parse_query_only       Bit, " & _
        "ANSI_quoted_identifiers  Bit, " & _
        "ANSI_nulls             Bit, " & _
        "show_query_plan        Bit, " & _
        "show_stats_time        Bit, " & _
        "show_stats_io          Bit, " & _
        "parse_odbc_msg_prefixes  Bit, " & _
        "row_count              long, " & _
        "tsql_batch_separator   Text(255), " & _
        "query_time_out         long, " & _
        "server_language        Text(255), " & _
        "character_translation  Bit, " & _
        "regional_settings      Bit, " & _
        "CONSTRAINT pk_connections PRIMARY KEY (connection_id) " & _
");"

' This table has been added in order to satisfy the TPC-H requirement that
' all the queries in a stream need to be executed on a single connection.
' Specify a connection for each odbc step. If the connection is of type,
' static, it should be kept open till the step execution is complete.
sCreateTables(11) = "Create table " & TBL_CONNECTION_DTLS & " (" & _
        FLD_ID_WORKSPACE & gstrBlank & DATA_TYPE_LONG & ", " & _
        FLD_ID_CONN_NAME & gstrBlank & DATA_TYPE_LONG & ", " & _
        FLD_CONN_DTL_CONNECTION_NAME & gstrBlank & DATA_TYPE_TEXT255 & ", " & _
```

```
      FLD_CONN_DTL_CONNECTION_STRING & gstrBlank & DATA_TYPE_TEXT255 & ", " & _
      FLD_CONN_DTL_CONNECTION_TYPE & gstrBlank & DATA_TYPE_INTEGER & ", " & _
      "CONSTRAINT pk_connection_name PRIMARY KEY (" & FLD_ID_CONN_NAME & ") " & _
");"

End Sub
Attribute VB_Name = "WindowsApiCommon"
'  FILE:      WindowsApiCommon.bas
'             Microsoft TPC-H Kit Ver. 2.7.0-1005
'             Copyright Microsoft, 2008
'             All Rights Reserved
'
'
'  PURPOSE:    This module contains functions that are wrappers around the
'              Windows API and are used by both StepMaster and SMRunOnly.
'  Contact:    Reshma Tharamal (reshmat@microsoft.com)
'
Option Explicit

' Used to indicate the source module name when errors
' are raised by this module
Private Const mstrModuleName As String = "WindowsApiCommon."

Public Type PROCESS_INFORMATION
  hProcess    As Long
  hThread     As Long
  dwProcessID As Long
  dwThreadID  As Long
End Type

' Used by GetShortName to return the short file name for a given file
Private Declare Function GetShortPathName Lib "kernel32" _
    Alias "GetShortPathNameA" (ByVal lpszLongPath As String, _
    ByVal lpszShortPath As String, ByVal cchBuffer As Long) As Long

Public Declare Function GetExitCodeProcess Lib "kernel32" ( _
  ByVal hProcess As Long, lpExitCode As Long) As Long
Public Declare Function TerminateProcess Lib "kernel32" ( _
     hProcess As Long, uExitCode As Long) As Long
Public Declare Function CloseHandle Lib "kernel32" ( _
  ByVal hObject As Long) As Long

Public Const NORMAL_PRIORITY_CLASS      As Long = &H20&
Public Const INFINITE                   As Long = -1&

Public Const STATUS_WAIT_0              As Long = &H0
Public Const STATUS_ABANDONED_WAIT_0    As Long = &H80
Public Const STATUS_USER_APC            As Long = &HC0
Public Const STATUS_TIMEOUT             As Long = &H102
Public Const STATUS_PENDING             As Long = &H103

Public Const WAIT_FAILED                As Long = &HFFFFFFFF
Public Const WAIT_OBJECT_0              As Long = STATUS_WAIT_0
Public Const WAIT_TIMEOUT               As Long = STATUS_TIMEOUT
```

```
Public Const WAIT_ABANDONED            As Long = STATUS_ABANDONED_WAIT_0
Public Const WAIT_ABANDONED_0          As Long = STATUS_ABANDONED_WAIT_0

Public Const WAIT_IO_COMPLETION        As Long = STATUS_USER_APC
Public Const STILL_ACTIVE              As Long = STATUS_PENDING

Public Const PROCESS_QUERY_INFORMATION  As Long = &H400
Public Const STANDARD_RIGHTS_REQUIRED   As Long = &HF0000

'--------------------------------------------------------------------------------
'Declarations for shelling:

Public Type STARTUPINFO
  cb              As Long
  lpReserved      As String
  lpDesktop       As String
  lpTitle         As String
  dwX             As Long
  dwY             As Long
  dwXSize         As Long
  dwYSize         As Long
  dwXCountChars   As Long
  dwYCountChars   As Long
  dwFillAttribute As Long
  dwFlags         As Long
  wShowWindow     As Integer
  cbReserved2     As Integer
  lpReserved2     As Long
  hStdInput       As Long
  hStdOutput      As Long
  hStdError       As Long
End Type

Public Declare Function WaitForSingleObject Lib "kernel32" ( _
  ByVal hProcess As Long, ByVal dwMilliseconds As Long) As Long

Public Declare Function InputIdle Lib "user32" Alias "WaitForInputIdle" ( _
  ByVal hProcess As Long, ByVal dwMilliseconds As Long) As Long

Public Declare Function CreateProcessA Lib "kernel32" ( _
  ByVal lpApplicationName As Long, ByVal lpCommandLine As String, _
  ByVal lpProcessAttributes As Long, ByVal lpThreadAttributes As Long, _
  ByVal bInheritHandles As Long, ByVal dwCreationFlags As Long, _
  ByVal lpEnvironment As Long, ByVal lpCurrentDirectory As Long, _
  lpStartupInfo As STARTUPINFO, lpProcessInformation As _
  PROCESS_INFORMATION) As Long

Public Declare Function GetLastError Lib "kernel32" () As Long

Private Type OPENFILENAME
  lStructSize As Long
  hwndOwner As Long
  hInstance As Long
```

```
  lpstrFilter As String
  lpstrCustomFilter As String
  nMaxCustFilter As Long
  nFilterIndex As Long
  lpstrFile As String
  nMaxFile As Long
  lpstrFileTitle As String
  nMaxFileTitle As Long
  lpstrInitialDir As String
  lpstrTitle As String
  Flags As Long
  nFileOffset As Integer
  nFileExtension As Integer
  lpstrDefExt As String
  lCustData As Long
  lpfnHook As Long
  lpTemplateName As Long
End Type

Private Declare Function GetOpenFileName Lib "COMDLG32" _
    Alias "GetOpenFileNameA" (file As OPENFILENAME) As Long

Private Declare Function lstrlen Lib "kernel32" (lpsz As String) As Long

Public Const MAX_PATH = 255

' Used when creating a process
Public Const SW_SHOWMINNOACTIVE = 7
Public Const STARTF_USESHOWWINDOW = &H1

Public Const MB_YESNOCANCEL = &H3&
Public Const MB_ABORTRETRYIGNORE = &H2&
Public Const MB_OK = &H0&

Public Const MB_APPLMODAL = &H0&

Public Const MB_ICONQUESTION = &H20&
Public Const MB_ICONEXCLAMATION = &H30&

Public Const IDABORT = 3
Public Const IDRETRY = 4
Public Const IDIGNORE = 5
Public Const IDYES = 6
Public Const IDNO = 7
Public Const IDCANCEL = 2

Private Declare Function MessageBox Lib "user32" Alias "MessageBoxA" ( _
    ByVal hWnd As Long, ByVal lpText As String, _
    ByVal lpCaption As String, ByVal wType As Long) As Long

Private Type SYSTEMTIME
    wYear As Integer
    wMonth As Integer
    wDayOfWeek As Integer
```

```
    wDay As Integer
    wHour As Integer
    wMinute As Integer
    wSecond As Integer
    wMilliseconds As Integer
End Type

Private Declare Function Get64BitTime Lib "smtime.dll" ( _
    ByVal lpInitTime As Any) As Currency

Public Function ShowMessageBox(hWnd As Long, strText As String, _
    strTitle As String, wType As Integer) As Long
  ' Using the Windows MessageBox Api since the VB Msgbox function suppresses
  ' all events
  ShowMessageBox = MessageBox(hWnd, ByVal strText, ByVal strTitle, wType)

  If ShowMessageBox = 0 Then
    LogSystemError
    Err.Raise vbObjectError + errConfirmFailed, App.EXEName, _
        LoadResString(errConfirmFailed)
  End If

End Function
Public Function ShowFileOpenDialog(ByVal strFilter As String, _
    ByVal strDialogTitle As String, ByVal lngFlags As Long, _
    Optional ByVal strOldFile As String = gstrEmptyString) As String
  ' Returns the file name selected by the user
  Dim strInitDir As String
  Dim intPos As Integer
  Dim opfile As OPENFILENAME
  Dim sFile As String

  On Error GoTo ShowFileOpenDialogErr

  If Not StringEmpty(strOldFile) Then
    intPos = InstrR(strOldFile, gstrFileSeparator)
    If intPos > 0 Then
      strInitDir = Left$(strOldFile, intPos - 1)
    End If
  End If

  With opfile
    .lStructSize = Len(opfile)
    .Flags = lngFlags
    .lpstrInitialDir = strInitDir
    .lpstrTitle = strDialogTitle
    .lpstrFilter = MakeWindowsFilter(strFilter)
    sFile = strOldFile & String$(MAX_PATH - Len(strOldFile), 0)
    .lpstrFile = sFile
    .nMaxFile = MAX_PATH
  End With

  If GetOpenFileName(opfile) Then
    ShowFileOpenDialog = Left$(opfile.lpstrFile, InStr(opfile.lpstrFile, vbNullChar) - 1)
```

```
  Else
     ShowFileOpenDialog = strOldFile
  End If

  Exit Function

ShowFileOpenDialogErr:
  Call LogErrors(Errors)
  ' Reset the selection to the passed in file, if any
  ShowFileOpenDialog = strOldFile

End Function

Private Function MakeWindowsFilter(sFilter As String) As String

  Dim s As String, ch As String, iTemp As Integer

  On Error GoTo MakeWindowsFilterErr

  ' To make Windows-style filter, replace | and : with nulls
  For iTemp = 1 To Len(sFilter)
     ch = Mid$(sFilter, iTemp, 1)
     If ch = "|" Then
        s = s & vbNullChar
     Else
        s = s & ch
     End If
  Next iTemp

  ' Put double null at end
  s = s & vbNullChar & vbNullChar
  MakeWindowsFilter = s

  Exit Function

MakeWindowsFilterErr:
  Call LogErrors(Errors)
  gstrSource = mstrModuleName & "MakeWindowsFilter"
  On Error GoTo 0
  Err.Raise vbObjectError + errApiFailed, gstrSource, _
        LoadResString(errApiFailed)

End Function


Public Function GetShortName(ByVal sLongFileName As String) As String
  ' Returns the short name for the passed in file - will only work
  ' if the passed in path/file exists

  Dim lRetVal As Long, sShortPathName As String, iLen As Integer
  Dim sLongFile As String
  Dim sDir As String
  Dim sFile As String
  Dim intPos As Integer
```

```
  On Error GoTo GetShortNameErr

  sFile = gstrEmptyString
  sLongFile = MakePathValid(sLongFileName)
  If StringEmpty(Dir$(sLongFile, vbNormal + vbDirectory)) Then
     ' The passed in path is a file that does not exist - since
     ' the GetShortPathName api does not work on non-existent files
     ' on Win2K, use the directory as an argument to the api and
     ' then append the file
     intPos = InstrR(sLongFile, gstrFileSeparator)
     sDir = Mid$(sLongFile, 1, intPos - 1)
     sFile = Right(sLongFile, Len(sLongFile) - intPos + 1)
     sLongFile = sDir
  End If

  'Set up buffer area for API function call return
  sShortPathName = Space(MAX_PATH)
  iLen = Len(sShortPathName)

  'Call the function
  lRetVal = GetShortPathName(sLongFile, sShortPathName, iLen)
  If lRetVal = 0 Then
     Call LogSystemError
  End If

  GetShortName = IIf(lRetVal = 0, sLongFile, Left(sShortPathName, lRetVal))
  If Not StringEmpty(sFile) Then
     GetShortName = GetShortName & sFile
  End If

  Exit Function

GetShortNameErr:
  Call LogErrors(Errors)
  gstrSource = mstrModuleName & "GetShortName"
  On Error GoTo 0
  Err.Raise vbObjectError + errApiFailed, gstrSource, _
        LoadResString(errApiFailed)

End Function
Public Function Determine64BitTime() As Currency

  Determine64BitTime = Get64BitTime(ByVal 0&)

End Function


Attribute VB_Name = "WorkspaceCommon"
'  FILE:      WorkspaceCommon.bas
'             Microsoft TPC-H Kit Ver. 2.7.0-1005
'             Copyright Microsoft, 2008
'             All Rights Reserved
'
```

```
'
'  PURPOSE:    Contains functionality common across StepMaster and
'              SMRunOnly, pertaining to workspaces
'              Specifically, functions to read workspace records from
'              the database and so on.
'  Contact:    Reshma Tharamal (reshmat@microsoft.com)
'
Option Explicit

' Used to indicate the source module name when errors
' are raised by this module
Private Const mstrModuleName As String = "WorkspaceCommon."


Public Function GetWorkspaceDetails( _
   Optional ByVal WorkspaceId As Long, _
   Optional WorkspaceName As String = gstrEmptyString _
   ) As Variant
   ' Depending on the passed in parameter, it returns
   ' either the workspace name or the workspace identifier
   ' in a variant. The calling function must convert the
   ' return value to the appropriate type

   Dim rstWorkspace As Recordset
   Dim qyWsp As DAO.QueryDef
   Dim strSql As String
   Dim cTempStr As cStringSM

   On Error GoTo GetWorkspaceDetailsErr
   gstrSource = mstrModuleName & "GetWorkspaceDetails"

   If WorkspaceId = 0 And _
         WorkspaceName = gstrEmptyString Then
      On Error GoTo 0
      Err.Raise vbObjectError + errMandatoryParameterMissing, _
            gstrSource, _
            LoadResString(errMandatoryParameterMissing)
   End If

   Set cTempStr = New cStringSM

   If WorkspaceId = 0 Then
      strSql = " Select workspace_id from att_workspaces " & _
            " where workspace_name = [w_name] "
      Set qyWsp = dbsAttTool.CreateQueryDef(gstrEmptyString, strSql)
      qyWsp.Parameters("w_name").Value = WorkspaceName
   Else
      strSql = " Select workspace_name from att_workspaces " & _
            " where workspace_id = [w_id] "
      Set qyWsp = dbsAttTool.CreateQueryDef(gstrEmptyString, strSql)
      qyWsp.Parameters("w_id").Value = WorkspaceId
   End If

   Set cTempStr = Nothing
```

```
  Set rstWorkspace = qyWsp.OpenRecordset(dbOpenForwardOnly)

  If rstWorkspace.RecordCount <> 0 Then
     GetWorkspaceDetails = rstWorkspace.Fields(0)
  Else
     rstWorkspace.Close
     qyWsp.Close
     On Error GoTo 0
     Err.Raise vbObjectError + errInvalidWorkspaceData, _
           gstrSource, _
           LoadResString(errInvalidWorkspaceData)
  End If

  rstWorkspace.Close
  qyWsp.Close
  Exit Function

GetWorkspaceDetailsErr:
  Call LogErrors(Errors)
  gstrSource = mstrModuleName & "GetWorkspaceDetails"
  On Error GoTo 0
  Err.Raise vbObjectError + errGetWorkspaceDetailsFailed, _
        gstrSource, _
        LoadResString(errGetWorkspaceDetailsFailed)

End Function

Public Sub ReadStepsInWorkspace(rstStepsInWorkSpace As Recordset, _
     qySteps As DAO.QueryDef, _
     Optional lngWorkspaceId As Long = glInvalidId, _
     Optional dbLoad As DAO.Database = Nothing, _
     Optional ByVal bSelectArchivedRecords As Boolean = False)

  ' This function will populate the passed in recordset with
  ' all the steps for a given workspace (if one is passed in, else all workspaces)

  Dim strSql As String

  On Error GoTo ReadStepsInWorkspaceErr

  ' Create a recordset object to retrieve all steps for
  ' the given workspace
  strSql = "Select step_id, step_label, step_file_name, step_text, " & _
     " start_directory, version_no, workspace_id, " & _
     " parent_step_id, parent_version_no, " & _
     " sequence_no, step_level, " & _
     " enabled_flag, degree_parallelism, " & _
     " execution_mechanism, " & _
     " failure_details, continuation_criteria, " & _
     " global_flag, archived_flag, " & _
     " output_file_name, " & _
     " error_file_name, iterator_name " & _
     " from att_steps a " & _
```

```
      " where "

      ' log_file_name,

  If lngWorkspaceId <> glInvalidId Then
     strSql = strSql & " workspace_id = [w_id] AND "
  End If

  If Not bSelectArchivedRecords Then
     strSql = strSql & " archived_flag = [archived] AND "
  End If

  ' Find the highest X-component of the version number
  strSql = strSql & " cint( mid( version_no, 1, instr( version_no, " & gstrDQ & gstrVerSeparator & gstrDQ & " ) -
1 ) ) = " & _
      " ( select max( cint( mid( version_no, 1, instr( version_no, " & gstrDQ & gstrVerSeparator & gstrDQ & " ) -
1 ) ) ) " & _
      " from att_steps AS d " & _
      " WHERE a.step_id = d.step_id ) "

  ' Find the highest Y-component of the version number for the highest X-component
  strSql = strSql & " AND cint( mid( version_no, instr( version_no, " & gstrDQ & gstrVerSeparator & gstrDQ & " )
+ 1 ) ) = " & _
      " ( select max( cint( mid( version_no, instr( version_no, " & gstrDQ & gstrVerSeparator & gstrDQ & " ) + 1 ) ) )
" & _
      " from att_steps AS b " & _
      " Where a.step_id = b.step_id " & _
      " AND cint( mid( version_no, 1, instr( version_no, " & gstrDQ & gstrVerSeparator & gstrDQ & " ) - 1 ) ) = " &
_
      " ( select max( cint( mid( version_no, 1, instr( version_no, " & gstrDQ & gstrVerSeparator & gstrDQ & " ) -
1 ) ) ) " & _
      " from att_steps AS c " & _
      " WHERE a.step_id = c.step_id ) ) "

  ' Append the order clause as follows
  ' First, separate all global/non-global steps
  ' Order the worker and manager steps by step_level to
  ' ensure that the parent steps are populated before
  ' any sub-steps within it
  ' Further ordering by parent_step_id and sequence_no
  ' ensures that all the children within a parent are
  ' selected in the necessary order
  strSql = strSql & " order by global_flag, step_level, " & _
      " parent_step_id, sequence_no "

  If dbLoad Is Nothing Then Set dbLoad = dbsAttTool

  ' Create a temporary Querydef object
  Set qySteps = dbLoad.CreateQueryDef(gstrEmptyString, strSql)

  ' Initialize the parameter values
  If lngWorkspaceId <> glInvalidId Then
     qySteps.Parameters("w_id").Value = lngWorkspaceId
  End If
```

```
  If Not bSelectArchivedRecords Then
     qySteps.Parameters("archived").Value = False
  End If

  Set rstStepsInWorkSpace = qySteps.OpenRecordset(dbOpenSnapshot)

  Exit Sub

ReadStepsInWorkspaceErr:

  LogErrors Errors
  gstrSource = mstrModuleName & "ReadStepsInWorkspace"
  On Error GoTo 0
  Err.Raise vbObjectError + errReadWorkspaceDataFailed, _
        gstrSource, _
        LoadResString(errReadWorkspaceDataFailed)

End Sub
Public Sub ReadWorkspaces(dbLoad As Database, rstWsp As Recordset, _
     qyWsp As DAO.QueryDef, _
     Optional ByVal bSelectArchivedRecords As Boolean = False)

  ' This function will populate the passed in recordset with all workspace records

  Dim strSql As String

  On Error GoTo ReadWorkspacesErr

  ' Create a recordset object containing all the workspaces
  ' (that haven't been archived) in the database
  strSql = " Select workspace_id, workspace_name, archived_flag " & _
        " from att_workspaces "

  If Not bSelectArchivedRecords Then
     strSql = strSql & " where archived_flag = [archived]"
  End If
  strSql = strSql & " order by workspace_name"

  Set qyWsp = dbLoad.CreateQueryDef(gstrEmptyString, strSql)
  If Not bSelectArchivedRecords Then
     qyWsp.Parameters("archived").Value = False
  End If

  Set rstWsp = qyWsp.OpenRecordset(dbOpenForwardOnly)

  Exit Sub

ReadWorkspacesErr:

  LogErrors Errors
  gstrSource = mstrModuleName & "ReadWorkspaces"
  On Error GoTo 0
  Err.Raise vbObjectError + errReadWorkspaceDataFailed, _
```

```
        gstrSource, _
        LoadResString(errReadWorkspaceDataFailed)

End Sub
Public Sub ShowWorkspacesInDb(dbLoad As Database)

  Dim recWorkspaces As Recordset
  Dim qryAllWsp As QueryDef

  On Error GoTo ShowWorkspacesInDbErr

  ' Set the mousepointer to indicate Busy
  Call ShowBusy

  Load frmWorkspaceOpen

  Call ReadWorkspaces(dbLoad, recWorkspaces, qryAllWsp)

  frmWorkspaceOpen.lstWorkspaces.Clear

  ' Load all the workspaces into the listbox
  If recWorkspaces.RecordCount <> 0 Then
     Do
        ' Add the workspace name to the list and store
        ' the corresponding workspace id as the ItemData
        ' property of the item.
        ' The workspace id will be used for all further
        ' processing of the workspace
        frmWorkspaceOpen.lstWorkspaces.AddItem recWorkspaces![workspace_name]
        frmWorkspaceOpen.lstWorkspaces.ItemData(frmWorkspaceOpen.lstWorkspaces.NewIndex) = _
              recWorkspaces![workspace_id]
        recWorkspaces.MoveNext

     Loop Until recWorkspaces.EOF
  End If
  recWorkspaces.Close
  qryAllWsp.Close

  ' Reset the mousepointer
  ShowFree

  #If RUN_ONLY Then
     frmWorkspaceOpen.Show vbModal
  #Else
     frmWorkspaceOpen.Show vbModal, frmMain
  #End If

  Exit Sub

ShowWorkspacesInDbErr:
  LogErrors Errors
  Call ShowFree
  Err.Raise vbObjectError + errProgramError, mstrModuleName & "ShowWorkspacesInDb", _
        LoadResString(errProgramError)
```

```
End Sub
Private Sub ReadWorkspaceParameters(lngWorkspaceId As Long, _
  rstWorkSpaceParameters As Recordset, _
  qyWspParams As DAO.QueryDef)

  ' Will populate the recordset with all the parameters for
  ' a given workspace

  Dim strSql As String

  On Error GoTo ReadWorkspaceParametersErr

  strSql = "Select parameter_id, parameter_name, " & _
       " parameter_value, workspace_id, parameter_type, description " & _
       " from workspace_parameters " & _
       " where workspace_id = [w_id] " & _
       " order by parameter_name, parameter_value "

  ' Create a temporary Querydef object and initialize
  ' it's parameter values
  Set qyWspParams = dbsAttTool.CreateQueryDef(gstrEmptyString, strSql)
  qyWspParams.Parameters("w_id").Value = lngWorkspaceId

  Set rstWorkSpaceParameters = qyWspParams.OpenRecordset(dbOpenSnapshot)

  Exit Sub

ReadWorkspaceParametersErr:

  LogErrors Errors
  gstrSource = mstrModuleName & "ReadWorkspaceParameters"
  On Error GoTo 0
  Err.Raise vbObjectError + errReadWorkspaceDataFailed, _
       gstrSource, _
       LoadResString(errReadWorkspaceDataFailed)

End Sub
Private Sub ReadConnections(lngWorkspaceId As Long, rstConns As Recordset, _
  qyConns As DAO.QueryDef)

  ' Will populate the recordset with all the parameters for
  ' a given workspace

  Dim strSql As String

  On Error GoTo ReadWorkspaceParametersErr

  strSql = "Select connection_id, " & _
       " connection_name, connection_value, workspace_id, description, " & _
       " no_count_display, no_execute, parse_query_only, ANSI_quoted_identifiers, " & _
       " ANSI_nulls, show_query_plan, show_stats_time, show_stats_io, " & _
       " parse_odbc_msg_prefixes, row_count, tsql_batch_separator, query_time_out, " & _
       " server_language, character_translation, regional_settings " & _
```

```
        " from workspace_connections " & _
        " where workspace_id = [w_id] " & _
        " order by connection_name, connection_value "

  ' Create a temporary Querydef object and initialize
  ' it's parameter values
  Set qyConns = dbsAttTool.CreateQueryDef(gstrEmptyString, strSql)
  qyConns.Parameters("w_id").Value = lngWorkspaceId

  Set rstConns = qyConns.OpenRecordset(dbOpenSnapshot)

  Exit Sub

ReadWorkspaceParametersErr:

  LogErrors Errors
  On Error GoTo 0
  Err.Raise vbObjectError + errReadWorkspaceDataFailed, _
        mstrModuleName & "ReadConnections", LoadResString(errReadWorkspaceDataFailed)

End Sub
Private Sub ReadConnectionDtls(lngWorkspaceId As Long, rstConns As Recordset, _
  qyConns As DAO.QueryDef)

  ' Will populate the recordset with all the connection_dtls records for
  ' a given workspace

  Dim strSql As String

  On Error GoTo ReadWorkspaceParametersErr

  strSql = "Select " & FLD_ID_CONN_NAME & ", " & _
        FLD_CONN_DTL_CONNECTION_NAME & ", " & _
        FLD_CONN_DTL_CONNECTION_STRING & ", " & _
        FLD_ID_WORKSPACE & ", " & _
        FLD_CONN_DTL_CONNECTION_TYPE & _
        " from " & TBL_CONNECTION_DTLS & _
        " where " & FLD_ID_WORKSPACE & " = [w_id] " & _
        " order by " & FLD_CONN_DTL_CONNECTION_NAME

  ' Create a temporary Querydef object and initialize
  ' it's parameter values
  Set qyConns = dbsAttTool.CreateQueryDef(gstrEmptyString, strSql)
  qyConns.Parameters("w_id").Value = lngWorkspaceId

  Set rstConns = qyConns.OpenRecordset(dbOpenSnapshot)

  Exit Sub

ReadWorkspaceParametersErr:

  LogErrors Errors
  On Error GoTo 0
  Err.Raise vbObjectError + errReadWorkspaceDataFailed, _
```

```
        mstrModuleName & "ReadConnectionDtls", LoadResString(errReadWorkspaceDataFailed)

End Sub

Public Sub ReadWorkspaceData(lngWorkspaceId As Long, _
      cStepsCol As cArrSteps, _
      cParamsCol As cArrParameters, _
      cConsCol As cArrConstraints, _
      cConns As cConnections, _
      cConnDetails As cConnDtls, _
      rstStepsInWsp As Recordset, _
      qyStepsInWsp As DAO.QueryDef, _
      rstParamsInWsp As Recordset, _
      qyParamsInWsp As DAO.QueryDef, _
      rstConns As Recordset, _
      qyConns As DAO.QueryDef, _
      rstConnDtls As Recordset, _
      qyConnDtls As DAO.QueryDef)
  ' Loads the passed in structures with all the data for
  ' the workspace. It also initializes the recordsets
  ' with the step and parameter records for the workspace.

  On Error GoTo ReadWorkspaceDataErr

  ShowBusy

  Call ReadStepsInWorkspace(rstStepsInWsp, qyStepsInWsp, lngWorkspaceId)

  ' Load all the steps in the array
  LoadRecordsetInStepsArray rstStepsInWsp, cStepsCol

  ' Initialize the steps with all the iterator
  ' records for each step
  Call LoadIteratorsForWsp(cStepsCol, lngWorkspaceId, rstStepsInWsp)

  ReadWorkspaceParameters lngWorkspaceId, rstParamsInWsp, qyParamsInWsp

  ' Load all the workspace parameters in the array
  LoadRecordsetInParameterArray rstParamsInWsp, cParamsCol

  ' Read and load connection strings
  ReadConnections lngWorkspaceId, rstConns, qyConns

  LoadRecordsetInConnectionArray rstConns, cConns

  ' Read and load connection information
  ReadConnectionDtls lngWorkspaceId, rstConnDtls, qyConnDtls

  LoadRSInConnDtlArray rstConnDtls, cConnDetails

  ' Finally, load the step constraints collection class with
  ' all the constraints for the steps in the workspace
  cConsCol.LoadConstraints lngWorkspaceId, rstStepsInWsp
```

```
  ShowFree
  Exit Sub

ReadWorkspaceDataErr:
  ' Log the error code raised by Visual Basic
  ShowFree
  Call LogErrors(Errors)
  On Error GoTo 0
  gstrSource = mstrModuleName & "ReadWorkspaceData"
  Err.Raise vbObjectError + errReadWorkspaceDataFailed, _
        gstrSource, _
        LoadResString(errReadWorkspaceDataFailed)

End Sub
```

Appendix G: Price Quotations

Microsoft Corporation
One Microsoft Way
Redmond, WA 98052-6399

Tel 425 882 8080
Fax 425 936 7329
http://www.microsoft.com/

Microsoft

June 30, 2009

Sun Microsystems
Guido Ficco
1 Network Drive
Burlington, MA 03062

Here is the information you requested regarding pricing for several Microsoft products to be used in conjunction with your TPC-H benchmark testing.

All pricing shown is in US Dollars ($).

Part Number	Description	Unit Price	Quantity	Price
810-07578	**SQL Server 2008 Enterprise x64 Edition** *Server License with 25 CALs* *Discount Schedule: Open Program - Level C* *Unit Price reflects a 40% discount from the retail unit price of $13,969.*	$8,318	1	$8,318
359-01912	**SQL Server 2008 Client License** *Client Access License* *Discount Schedule: Open Program - No Level* *Unit Price reflects a 4% discount from the retail unit price of $163.*	$156	35	$5,460
P72-03168	**Windows Server 2008 Enterprise Edition (x64)** *Server License with 25 CALs* *Discount Schedule: Open Program - Level C* *Unit Price reflects a 42% discount from the retail unit price of $3,999.*	$2,310	1	$2,310
127-00012	**Visual Studio Standard 2005** *Full License* *No Discount Applied*	$250	1	$250
N/A	**Microsoft Problem Resolution Services** *Professional Support* *(1 Incident)*	$245	1	$245

A list of Microsoft's resellers can be found at **http://www.microsoft.com/sqlserver/2008/en/us/large-account-resellers.aspx.**

All products listed above are currently orderable and available.

Defect support is included in the purchase price. Additional support is available from Microsoft PSS on an incident by incident basis at $245 per call.

This quote is valid for the next 90 days.

Reference ID: PHsera09060300000004339.