



**TPC Benchmark™ H
Full Disclosure Report
DELL PowerEdge 2900/Dual-Core Intel® Xeon™
5160/3.0GHz 4
MB L2 Cache
Using
Microsoft Windows Server 2003 Enterprise x64 Edition™
and SQL Server 2005 Enterprise (x64) Edition™**



Second Edition

Submitted for Review

July 11, 2006

Dell Computer Corp PowerEdge 6800 Server with Microsoft Windows Server 2003 Enterprise x64 Edition and SQL Server 2005 Enterprise (x64) Edition

Second Printing July 2006

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Abstract

This report document the methodology and results of the TPC Benchmark H test conducted on a PowerEdge 2900 Server using Microsoft SQL Server 2005 Enterprise (x64) Edition in conformance with the requirements of the TPC-H Benchmark Specification. The operating system used for the benchmark was Windows Server 2003 Enterprise (x64) Edition. The application was written in C and compiled using the Visual Studio Professional Edition compiler.

Hardware	Software	Total System Cost
Dell PowerEdge 2900 with Twin Dual-Core Intel® Xeon™ 5160/ 3.0GHz Dell PowerVault MD1000 Storage Enclosures	Microsoft Windows Server 2003 Enterprise x64 Edition™ SQL Server 2005 Enterprise (x64) Edition™	\$119,799

TPC-H Power@100GB	TPC-H Throughput@100GB	<u>QphH@100GB</u>	\$/QphH@100GB
13,052.3	8,409.4	10,476.7	\$11.44

The Transaction Processing Performance Council (TPC) developed the TPC-H Benchmark. The TPC was founded to define transactions processing benchmarks and to disseminate objective, verifiable performance data to the industry.

In order to verify compliance to the TPC-H benchmark specification, Lorna Livingtree, Performance Metrics, Inc., audited the benchmark configuration, environment and methodology used to produce and validate the test results, and the pricing model used to calculate the price/performance.



DELL
PowerEdge 2900
with SQL Server 2005
Enterprise (x64) Edition™

TPC-H Revision 2.3.0

Report Date: Jul 10, 2006

Revision Date: Jul 11, 2006

Total System Cost
\$119,799 USD

TPC-H Composite Query per Hour
10,476.7 QphH@100GB

Price/Performance
\$11.44 USD/ QphH@100GB

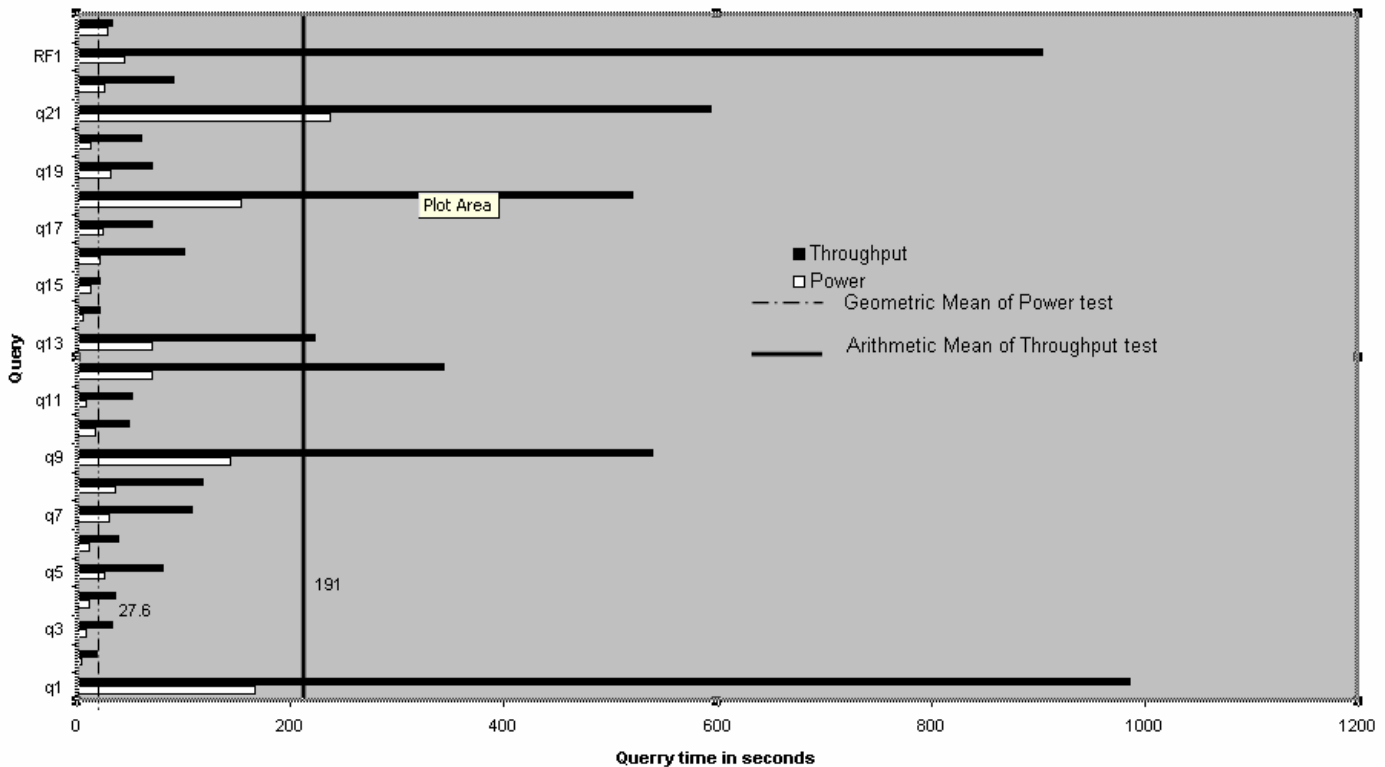
Database Size
100GB

Database Manager
 SQL Server 2005 Enterprise (x64) Edition™

Operating System
 Microsoft Windows Server 2003 Enterprise x64 Edition™

Other Software
 Visual C++ Standard Edition
 Visual Basic 2003 .Net Professional

Availability Date
July 17, 2006



Database Load Time
 1:34:49

Total Disk/Database Size
 41.38

Load Includes Backup
 Y

RAID (Base tables only)
 N

RAID (Base tables and auxiliary data structures)
 N

RAID (Everything)
 N

System Configuration : 1 node
Processors (per node) : 2x Dual-Core Intel® Xeon™ 5160/3.0GHz 4MB L2 Cache
Memory: (per node) : 48GB RAM
Disk Drives: 120 – 36GB 15k HDD & 8 – 36GB 15k HDD
Copyright 2005 Dell Computer Corporation

“Database Size includes only raw data (e.g., no temp, index, redundant storage space, etc.)”

Dell		PowerEdge PE2900			TPC-H REV 2.3 EXECUTIVE SUMMARY		
		Server			Report Date: 10-Jul-06		
					Revision Date: 11-Jul-06		
Description	Part Number	Third Party	Unit Price	Qty	Extended Price	3 yr. Maint. Price	
		Brand	Pricing				
Server Hardware							
Dell PowerEdge 2900 3.0GHz Dual Core XEON w/4MB L2 cache, 1333MHZ FSB, 2 onboard Gigabit NICs	222-3395		\$1,052.00	1	\$1,052.00	\$320.00	
5160,4MB/3.00GHz,1333FSB	311-6232		\$1,149.00	1	\$1,149.00		
48GB, 633MHZ(12X4GB), 2R	311-5738		\$44,998.00	1	\$44,998.00		
PERC5/i, X4, integrated	341-3068		\$299.00	1	\$299.00		
PERC5E, SAS, 2x4, PCIe, ADPTR	341-3023		\$799.00	2	\$1,598.00		
36GB, 3GBPS, SAS, 3.5IN, 15K (OS+LOG)	341-2816		\$249.00	8	\$1,992.00		
E773s 17-inch Color CRT Monitor	E7733YR		\$149.00	1	\$149.00		
				Subtotal	\$51,237.00	\$320.00	
PowerVault Disk Subsystem							
PV MD1000, RACK, 3U, 15 BAY, LBZL	222-2299		\$3,180.00	8	\$25,440.00	\$13,184.00	
TWO ENCL MGT MODULES, SAS/SATA	420-6220		\$500.00	8	\$4,000.00		
36GB, 3GBPS, SAS, 3.5IN, 15K	341-2816		\$249.00	120	\$29,880.00		
RACK-111/24U/Dell	A0213544		\$479.95	1	\$479.95		
				Subtotal	\$59,799.95	\$13,184.00	
Server Software							
SQL Server 2005 Enterprise x64 Edition **	810-04793	Microsoft	1	\$8,487.00	\$8,487.00		
SQL Server 2005 Client Licence **	359-01911	Microsoft	1	156	\$3,900.00		
Windows Server 2003 Enterprise x64 Server **	P72-00274	Microsoft	1	\$2,334.00	\$2,334.00		
Visual C++ Standard Edition **	254-00170	Microsoft	1	\$109.00	\$109.00		
Visual Basic 2003 Standard	046-00856	Microsoft	1	\$109.00	\$109.00		
Professional Support (1 Incident)		Microsoft	1	\$245.00		\$245.00	
				Subtotal	\$14,939.00	\$245.00	
All components from Dell are discounted 16% based on total dollar volume of this configuration.				Other Discounts (16%)	\$19,926.55		
				Total	\$106,049	\$13,749	
Notes: * Maint. included in PowerVault MD1000 disk pod				Three-Year Cost of Ownership:		\$119,799 USD	
** All Microsoft maintenance is covered by the maintenance costs of Microsoft SQL Server							
Pricing: 1 = Microsoft, all others are Dell				QphH@100G		10,476.7	
Pricing may be verified by calling 1-800-BUY-DELL and referencing quote # 304465831 as a complex quote.							
Audited by Lorna Livingtree, Performance Metrics Inc.				\$ / QphH@100G:		\$11.44 USD	
Prices used in TPC benchmarks reflect the actual prices a customer would pay for a one-time purchase of the stated components. Individually negotiated discounts are not permitted. Special prices based on assumptions about past or future purchases 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 items, please inform the TPC at pricing@tpc.org.							



DELL
PowerEdge 2900
w/ SQL Server 2005
Enterprise (x64) Edition™

TPC-H Revision 2.3.0

Report Date: Jul 10, 2006

Revision Date: Jul 11, 2006

Numerical Quantities Summary

Measurement Results:

Database Scale Factor	100
Total Data Storage/Database Size	41.38
Start of Database Load	2006-06-22 12:59:12
End of Database Load	2006-06-22 14:34:00
Database Load Time	1:34:49
Query Streams for Throughput Test	5
TPC-H Power	13,052.3
TPC-H Throughput	8,409.4
TPC-H Composite Query-per-Hour Metric (QpH@100GB)	10,476.7
Total System Price Over 3 Years	\$119,799
TPC-H Price Performance Metric (\$/QpH@100GB)	\$11.44

Measurement Interval:

Measurement Interval in Throughput Test (Ts) = 4,709 seconds

Duration of stream execution:

	Seed	Start Date/Time	End Date/Time	Duration
Stream00	622143400	6/23/06 1:56:25	6/23/06 2:14:56	00:18:31
Stream01	622143401	6/23/06 2:15:27	6/23/06 3:25:12	01:09:45
Stream02	622143402	6/23/06 2:15:27	6/23/06 3:27:08	01:11:41
Stream03	622143403	6/23/06 2:15:27	6/23/06 3:26:54	01:11:27
Stream04	622143404	6/23/06 2:15:27	6/23/06 3:23:55	01:08:28
Stream05	622143405	6/23/06 2:15:27	6/23/06 3:24:10	01:08:43
Refresh00		6/23/06 1:55:39	6/23/06 1:56:24	0:00:45
		6/23/06 2:14:57	6/23/06 2:15:25	0:00:28
Refresh01		6/23/06 2:15:27	6/23/06 3:28:32	1:13:05
Refresh02		6/23/06 3:28:34	6/23/06 3:29:57	0:01:22
Refresh03		6/23/06 3:30:00	6/23/06 3:31:18	0:01:18
Refresh04		6/23/06 3:31:22	6/23/06 3:32:34	0:01:12
Refresh05		6/23/06 3:32:39	6/23/06 3:33:55	0:01:16



Numerical Quantities Summary

Timing Intervals in Seconds:

Query	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8
Stream00	166.7	4.4	9.1	11.2	25.3	11.6	29.8	35.5
Stream01	823.4	23.1	26.1	22.4	81.8	25.9	105.1	107.3
Stream02	900.4	19.8	75.2	26.3	79.5	55.0	97.9	115.3
Stream03	1211.3	20.0	9.8	36.8	83.3	35.5	101.0	121.8
Stream04	888.7	14.6	28.8	45.2	83.1	39.0	117.3	136.7
Stream05	1102.0	15.4	22.9	47.4	76.1	39.9	114.5	111.2
Min Qi	823.4	14.6	9.8	22.4	76.1	25.9	97.9	107.3
Max Qi	1211.3	23.1	75.2	47.4	83.3	55.0	117.3	136.7
Avg Qi	985.2	18.6	32.6	35.6	80.8	39.1	107.2	118.5
Query	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16
Stream00	143.6	16.7	9.3	70.5	50.0	6.1	12.7	22.2
Stream01	406.7	59.2	58.2	366.3	339.8	19.0	63.9	94.9
Stream02	845.0	47.1	56.2	282.5	182.4	21.2	54.0	104.0
Stream03	600.7	39.5	48.7	299.8	202.3	26.2	36.3	88.3
Stream04	510.2	58.2	46.6	402.6	148.1	20.3	49.2	103.2
Stream05	334.9	43.2	47.1	363.2	241.6	17.9	41.7	115.0
Min Qi	334.9	39.5	46.6	282.5	148.1	17.9	36.3	88.3
Max Qi	845.0	59.2	58.2	402.6	339.8	26.2	63.9	115.0
Avg Qi	539.5	49.4	51.4	342.9	222.8	20.9	49.0	101.1
Query	Q17	Q18	Q19	Q20	Q21	Q22	RF1	RF2
Stream00	24.6	154.0	31.5	12.4	237.5	26.5	45.1	28.5
Stream01	105.5	577.0	64.3	72.5	657.1	85.7	4351.6	33.1
Stream02	75.3	571.2	88.7	56.9	460.4	87.0	48.3	32.9
Stream03	70.1	441.8	58.4	48.8	609.6	97.1	43.0	33.6
Stream04	53.7	543.1	72.7	67.1	583.6	95.8	38.7	31.6
Stream05	45.3	471.3	71.0	57.6	659.1	84.8	41.5	33.3
Min Qi	45.3	441.8	58.4	48.8	460.4	84.8	38.7	31.6
Max Qi	105.5	577.0	88.7	72.5	659.1	97.1	4351.6	33.6
Avg Qi	70.0	520.9	71.0	60.6	594.0	90.1	904.6	32.9

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General Items

Test Sponsor

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

DELL is the sponsor of this TPC Benchmark™ H result.

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 parameter*
- *Configuration parameters and options for any other software in the pricing structure*
- *Compiler optimization options*

Providing a full list of all parameters and options can satisfy this requirement, as long as all those that have been modified from their default values have been clearly identified and these parameters and options are only set once.

Comment 1: *In the event that some parameters and options are set multiple times, it must be easily discernible by an interested reader when the parameter or option was modified and what new value it received each time.*

Comment 2: *This requirement can be satisfied by providing a full list of all parameters and options, as long as all those that have been modified from their default values have been clearly identified and these parameters and options are only set once.*

Details of system and database configurations and parameters are provided in Appendix A.

Configuration Items

Diagrams of both measured and priced configurations must be provided, accompanied by a description of the differences. This includes, but is not limited to:

- *Number and type of processors*
- *Size of allocated memory, and any specific mapping/partitioning of memory in the test.*
- *Number and type of disk units (and controllers, if applicable).*
- *Number of channels or bus connections to disk units, including their protocol type.*
- *Number of LAN (e.g. Ethernet) Connections, including routers, workstations, terminals, etc., that were physically used in the test or are incorporated into the pricing structure.*

- *Type and the run-time execution location of software components (e.g., DBMS, query processing tools/languages, middle-ware components, software drivers, etc.).*

The System Under Test (SUT), DELL PowerEdge 2900 Server, depicted in the next diagram consists of:

- 2 - Dual-Core Intel® Xeon™ 5160/3.0GHz 4MB L2 Cache.
- 48GB RAM.
- 2 - DELL PERC5e-DC RAID Controllers, each with 256MB RAM of cache.
- 8 - DELL PowerVault MD1000.
- 120 – 36GB,3GBPS 15k SAS
- 8 – 36GB 15k SAS.

Per *Clause 7.1.1:*

Specifically excluded from the priced system calculation are:

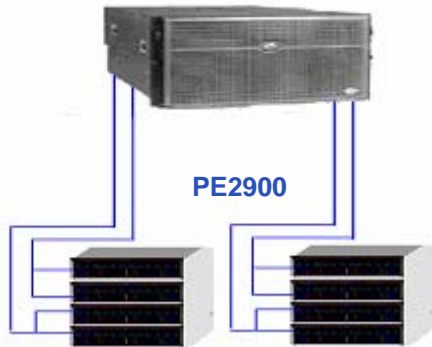
- *End-user communication devices and related cables, connectors, and concentrators;*
- *Equipment and tools used exclusively in the production of the full disclosure report;*
- *Equipment and tools used exclusively for the execution of the DBGEN or QGEN (see Clause 2.1.4 and Clause 4.2.1) programs.*

Measured and Priced Configuration

The measured and priced configurations are the same.

PE2900

2xDual-Core Intel Xeon 5160/
3.0GHz 4MB L2 cache
48 GB DDR
2xPERC5E-DC Controllers
8x36GB, U320, 15K SAS



DBMS

SQL Server 2005 Enterprise
(x64) Edition

OS

Microsoft Windows Server 2003
Enterprise x64 Edition

Storage

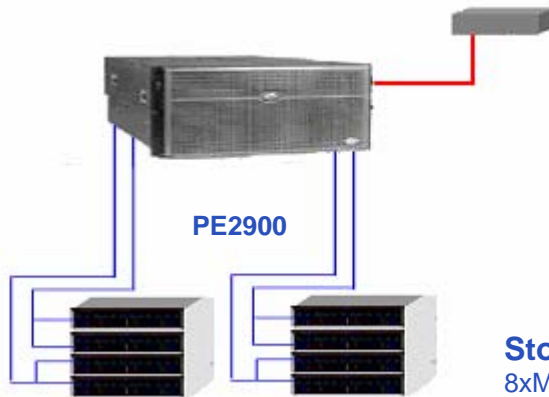
8xMD1000
120x36GB, 15K, U320 SAS

8xMD1000

Measured Configuration

PE2900

2xDual-Core Intel Xeon 5160/
3.0GHz 4MB L2 cache
48 GB DDR
2xPERC5E-DC Controllers
8x36GB, U320, 15K SAS



Client: PE SC 1420

2x3.4GHz Xeon 1MB L2
cache
2 GB DDR
40GB Sata

DBMS

SQL Server 2005 Enterprise
(x64) Edition

OS

Microsoft Windows Server 2003
Enterprise x64 Edition

Storage

8xMD1000
120x36GB, 15K, U320 SAS

8xMD1000

Clause 1: Logical Database Design

Table Definitions

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 scripts that create and analyze the tables and indexes for the TPC-H database.

Physical Organization of Database

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.

No record clustering or index clustering was used for this benchmark. Column ordering was reordered in tables. Refer to the table create statements in Appendix B for further details.

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 in this benchmark.

Replication

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

Replication was not used for this benchmark.

Clause 2: Queries and Update Functions

Query Language

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

SQL was the query language used to implement all queries.

Random Number Generation

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

Version 2.3.0 of DBGEN and version 2.3.0 of QGEN were used to generate the random numbers for this TPC-H benchmark.

Substitution Parameters Generation

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.

QGEN version 2.3.0 was used to generate the substitution parameters.

Query Text and Output Data from 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 D contains the query text and query output. The minor query modifications used in this implementation include the following:

Query Substitution Parameters and Seeds Used

All the query substitution parameters used during the performance test must be disclosed in tabular format, along with the seeds used to generate these parameters.

Appendix E contains the seed and query substitution parameters.

Isolation Level

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

The queries and transactions were run with isolation level 3 (repeatable read).

Refresh Function Source Code

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

The source code for the refresh functions is included in Appendix F.

Clause 3: Database System Properties

Atomicity

The results of the ACID tests must be disclosed along with a description of how the ACID requirements were met. This includes disclosing the code written to implement the ACID Transaction and Query.

Atomicity of 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 ORDER, LINEITEM, and HISTORY tables.

1. The total prices from the ORDER 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 was committed.
4. The total price from the ORDER 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.

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 ORDER, LINEITEM, and HISTORY tables.

1. The total price from the ORDER 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 ORDER table and the extended price from the LINEITEM table were retrieved for the same order key, and verified to not have changed.

Consistency

A consistent state for the TPC-H database is defined to exist when:

*$O_TOTALPRICE = \text{SUM}(\text{trunc}(\text{trunc}(L_EXTENDEDPRICE * (1 - L_DISCOUNT), 2) * (1 + L_TAX), 2))$ for each ORDERS and LINEITEM defined by $(O_ORDERKEY = L_ORDERKEY)$*

Consistency Test

Verify that ORDER 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 ORDER and LINEITEM tables.

1. The consistency of the ORDER and LINEITEM tables was verified based on a sample of O_ORDERKEYs.
2. 100 ACID transactions were submitted from each of 6 execution streams.
3. The consistency of the ORDER and LINEITEM tables was verified a second time with the same O_ORDERKEYs.

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 some order.

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. The ACID query completed and did not see the uncommitted changes made by the ACID transaction.
3. The ACID transaction was committed.

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 completed and did not see the uncommitted changes made by the ACID transaction.
3. The ACID transaction was rolled back.

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. The ACID transaction was suspended prior to commit.
2. A second ACID transaction, T2, was started using the same O_KEY and L_KEY and a different randomly selected DELTA.
3. T2 waited.
4. T1 was allowed to commit and then T2 completed.
5. It was verified that T2.L_EXTENDPRICE was calculated correctly.

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. The ACID transaction was suspended prior to rollback.
2. A second ACID transaction, T2, was started using the same O_KEY and L_KEY and a different randomly selected DELTA.
3. T2 waited.
4. T1 was allowed to rollback and then T2 completed.
5. It was verified that T2.L_EXTENDPRICE was calculated correctly.

Concurrent Read and Write Transactions on Different Tables

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

The following steps were performed:

1. An ACID Transaction T1 for a randomly selected O_KEY, L_KEY and DELTA. The ACID Transaction T1 was suspended prior to commit.
2. Another ACID Transaction T2 was started using random values for PS_PARTKEY and PS_SUPPKEY.
3. T2 completed.
4. T1 completed and the appropriate rows in the ORDER, LINEITEM and HISTORY tables were changed.

Update Transactions during Continuous Read-Only Query Stream

Demonstrate 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.

The following steps were performed:

1. An ACID Transaction T1 was started, executing Q1 against the qualification database. The substitution parameter was chosen from the interval [0..2159] so that the query ran for a sufficient amount of time.
2. Before T1 completed, an ACID Transaction T2 was started using randomly selected values of O_KEY, L_KEY and DELTA.
3. T2 completed before T1 completed.
4. It was verified that the appropriate rows in the ORDER, LINEITEM and HISTORY tables were changed.

Durability

The tested system 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 3.5.2.

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 database logs were stored on a RAID-10.

The tables for the database were stored on RAID-0 stripes.

During the test, one disk from the DELL MD1000 enclosure containing re-do log files was removed. As all re-do log files resided on RAID 10 volumes, the test continued uninterrupted. Next, a data drive was removed and a checkpoint submitted. Errors followed and the test was halted. The transaction log was backup up and the system rebooted replacing the failed drive. The database was restored from data and log backups. Post scripts confirmed success.

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.

1. Six streams of ACID transactions were started.
2. While the streams of ACID transactions were running the system was powered off.
3. When power was restored the system rebooted and the database was restarted.
4. The database went through a recovery period.
5. The success file and the HISTORY table counts were compared, and they matched.

Memory Failure

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

The system crash test and the memory failure test were combined. See the previous section.

Appendix C contains source code for all transactions.

Clause 4: Scaling and Database Population

Initial Cardinality of Tables

The cardinality (e.g., 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.

Initial number of rows

Table	Occurrences
Orders	150,000,000
Lineitem	600,037,902
Customer	15,000,000
Part	20,000,000
Supplier	1,000,000
Partsupp	80,000,000
Nation	25
Region	5

Distribution of Tables and Logs Across Media

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

The SQL Server Database was stored on a PowerVault storage system composed of the following:

- 2 x DELL PERC5E-DC Disk Controllers
- 8 x PowerVault MD1000 Disk Enclosures
- 120 x 36GB, 3GBPS, 15k rpm, SAS disk drives
- 8 x 36GB 15k rpm SAS disk drives

4 logical volumes were configured each spanning 30 physical drives across each SAS channel of the controller in a RAID0 formation. The server had 8 36GB SAS disks onboard for both the OS and database logs.

Each logical volume had 2 raw and 1 NTFS partitions except for volume1, which had 2 raw and 2 NTFS partitions. Each logical volume had 2 database filegroups on raw partitions and an NTFS partition for flat file and database backup storage. Volume1 had an additional NTFS partition for flat file storage.

A detailed description of distribution of database file groups and log can be found below.

Distribution of Storage

Windows 2003 Disk Administration			DELL PERC5E-DC Configuration				
Disk 0 1001.24 GB			Controller # 0				
Partition			Slot# 1		Channels		
1	2	3	SAS ID	A	B		
F: Lineitem_fg RAW 95.25 GB	J: General_fg RAW 46 GB	T: backup NTFS 859.99 GB	0	A0-1	B0-1		
			1	A0-2	B0-2		
			2	A0-3	B0-3		
			3	A0-4	B0-4		
			4	A0-5	B0-5		
			5	A0-6	B0-6		
			6	A0-7	B0-7		
			8	A0-8	B0-8		
			9	A0-9	B0-9		
			10	A0-10	B0-10		
			11	A0-11	B0-11		
			12	A0-12	B0-12		
			13	A0-13	B0-13		
			14	A0-14	B0-14		
			15	A0-15	B0-15		

Windows 2003 Disk Administration			DELL PERC5E-DC Configuration				
Disk 1 1001.24 GB			Controller # 0				
Partition			Slot# 1		Channels		
1	2	3	SAS ID	A	B		
G: Lineitem_fg RAW 95.25 GB	K: General_fg RAW 46 GB	U: backup NTFS 859.99 GB	0	A0-1	B0-1		
			1	A0-2	B0-2		
			2	A0-3	B0-3		
			3	A0-4	B0-4		
			4	A0-5	B0-5		
			5	A0-6	B0-6		
			6	A0-7	B0-7		
			8	A0-8	B0-8		
			9	A0-9	B0-9		
			10	A0-10	B0-10		
			11	A0-11	B0-11		
			12	A0-12	B0-12		
			13	A0-13	B0-13		
			14	A0-14	B0-14		
			15	A0-15	B0-15		

Windows 2003 Disk Administration				DELL PERC5E-DC Configuration				
Disk 2 1001.24 GB				Controller # 2				
Partition				Slot# 2	Channels			
1	2	3		SAS ID	A	B		
H: Lineitem_fg RAW 95.25 GB	L: General_fg RAW 46 GB	Y: RF_files NTFS 2 GB	X: backup NTFS 857.99	0	A0-1	B0-1		
				1	A0-2	B0-2		
				2	A0-3	B0-3		
				3	A0-4	B0-4		
				4	A0-5	B0-5		
				5	A0-6	B0-6		
				6	A0-7	B0-7		
				8	A0-8	B0-8		
				9	A0-9	B0-9		
				10	A0-10	B0-10		
				11	A0-11	B0-11		
				12	A0-12	B0-12		
				13	A0-13	B0-13		
				14	A0-14	B0-14		
				15	A0-15	B0-15		

Windows 2003 Disk Administration				DELL PERC5E-DC Configuration				
Disk 3 1001.24 GB				Controller # 1				
Partition				Slot# 1	Channels			
1	2	3		SAS ID	A	B		
I: Lineitem_fg RAW 95.25 GB	M: General_fg RAW 46 GB	Z: backup NTFS 859.99 GB		0	A0-1	B0-1		
				1	A0-2	B0-2		
				2	A0-3	B0-3		
				3	A0-4	B0-4		
				4	A0-5	B0-5		
				5	A0-6	B0-6		
				6	A0-7	B0-7		
				8	A0-8	B0-8		
				9	A0-9	B0-9		
				10	A0-10	B0-10		
				11	A0-11	B0-11		
				12	A0-12	B0-12		
				13	A0-13	B0-13		
				14	A0-14	B0-14		
				15	A0-15	B0-15		

Windows 2003 Disk Administration			DELL PERC5E-DC Configuration					
Disk 4 133.5 GB			Controller # 2					
Partition			Slot#	Int	Channels			
1	2		SAS ID	A	B			
C: OS NTFS 40 GB	E: Log RAW 60 GB		0	A0-1				
			1	A0-2				
			2	A0-3				
			3	A0-4				
			4		B0-5			
			5		B0-6			
			6		B0-7			
			8		B0-8			
			9					
			10					
			11					
			12					
			13					
			14					
			15					

Partitioning and Replication

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

The database was not replicated.
Horizontal partitioning was not used in this benchmark.

RAID Implementations

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 used must be disclosed for each device.

RAID 10 was used for logs and OS.

RAID 0 was used for all tables, indexes, temp files and flat files.

DBGEN Version and Modifications

The version number, release number, modification number, and patch level of DBGEN must be disclosed. 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 2.3.0 was used for database population. No modifications were made to DBGEN.

Database Load time

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

Database load time was 1 hour 34 minutes 15 seconds.

Data Storage Ratio

The data storage ratio must be disclosed. It is computed by dividing the total data storage of the priced configuration (expressed in GB) by the size chosen for the test database as defined in 4.1.3.1. The ratio must be reported to the nearest 1/100, rounded up.

Data Storage Ratio

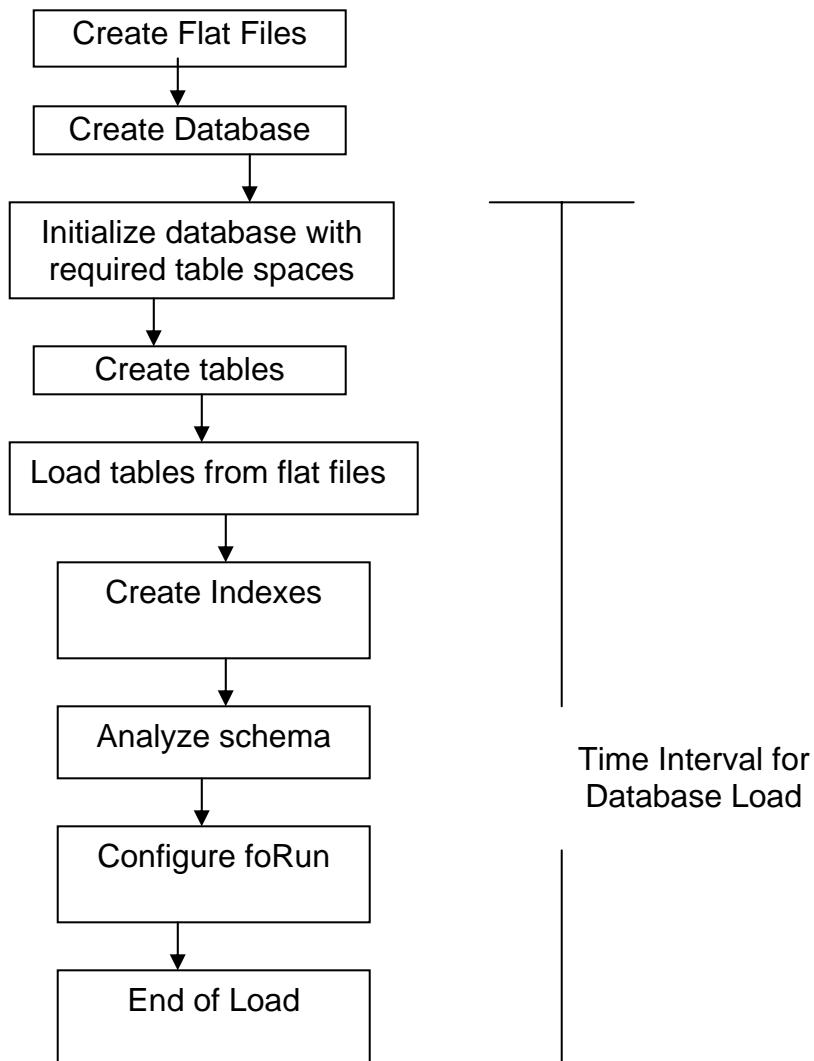
Disk Type	Number of Disks	Space per Disk	Subtotal Disk Space	Total Disk Storage	Data Storage Ratio
36GB 15k	120	33.37GB	4004.96GB		
36GB 15k	8	33.37GB	133.50GB		
				4138.46GB	41.38

Database Load Mechanism Details and Illustration

The details of the database load must be disclosed, including a block diagram illustrating the overall process. Disclosure of the load procedure includes all steps, scripts, input and configuration files required to completely reproduce the test and qualification databases.

DBGEN was used to create the flat files. The figure below describes the load procedure.

Database Load Process



Clause 5: Performance Metrics and Execution Rules

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. Database restart.
2. RF1 update transaction.
3. Stream 00 execution.
4. RF2 update transaction.

Timing Intervals

The timing intervals (see Clause 5.3.6) for each query of the measured set and for both update functions must be reported for the power test.

The power test timing intervals are disclosed in the Numerical Quantities Summary at the beginning of this document.

Number of Streams for the Throughput Test

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

Five streams were used for the throughput test.

Start/Finish Time of Each Query Stream

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

The throughput test start time and finish time for each stream are disclosed in the Numerical Quantities Summary at the beginning of this document.

Total Elapsed Time

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

The total elapsed time of the throughput test was 4,709.0 seconds.

Start/Finish Time for Refresh Functions

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

The start and finish time for each refresh function in the update stream are disclosed in the Numerical Quantities Summary at the beginning of this document.

Timing Intervals for Each Query and Each Update

The timing intervals (see Clause 5.3.6) for each query of each stream and for each update function must be reported for the throughput test.

The timing intervals for each query and each update function are contained in the Numerical Quantities Summary disclosed earlier in this document.

Performance Metrics

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

The performance metrics, and the numbers, on which they are based, are contained in the Numerical Quantities section of the Executive Summary.

Reproducibility Method

A description of the method used to determine the reproducibility of the measurement results must be reported. This must include the performance metrics (QppH and QthH) from the reproducibility runs.

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

Percentage Differences in Benchmark Executions

Run	QppH@100GB	QthH@100GB	QphH@100GB
1	13,294.2	8,512.3	10,637.9
2	13,052.3	8,409.4	10,476.7
Percent Difference	0.98%	0.99%	0.98%

System Activity Between Run1 and Run2

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

The server was rebooted and the database was re-started between Run1 and Run2.

Clause 6: SUT and Driver Implementation

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.

A single script performs all stream executions. QGEN is used to produce query text.

For each power-test run:

- RF1 refresh updates are submitted to the database
- QGEN-generated queries are submitted in the order defined by Clause 5.3.5.4
- RF2 refresh updates are submitted to the database

Implementation Specific Layer (ISL)

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.

A command script was used to control and track the execution of queries. The scripts are contained in Appendix F. Qgen was used to generate the query streams, along with the appropriate substitution values.

Profile-Directed Optimization

If profile-directed optimization as described in Clause 5.2.9 is used, such use must be disclosed. In particular, the procedure and any scripts used to perform the optimization must be disclosed.

Profile-directed optimization was not used.

Clause 7: Pricing

Hardware and Software Used in the Priced System

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.

A detailed list of the hardware and software used in the priced system is included in the Executive Summary at the beginning of this document. The price quotes are located in Appendix G.

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.

A detailed price sheet of all the hardware and software used in this configuration, including the 3-year maintenance cost, and total price, is included in the executive summary at the beginning of this document. This purchase qualifies for a 16% discount from Dell Computer Corporation. The price quotes are located in Appendix G.

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 availability date reported on the executive summary must be the date by which all components are committed to being available. The full disclosure report must report availability dates individually for at least each of the categories for which a pricing subtotal must be provided.

All Dell components are available at the time of publication.

Clause 8: Auditor-Related Items

Auditor's Report

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.

Lorna Livingtree of Performance Metrics audited this implementation of the TPC Benchmark H. Information regarding the audit process may be obtained from:

Performance Metrics, Inc.
P.O Box 984
Klamath, CA 95548
(Phone) (707) 482-0523
(Fax) (707) 482-0115
E-mail: LornaL@perfmetrics.com

Requests for this TPC Benchmark H Full Disclosure Report should be sent to:

Transaction Processing Performance Council
Presidio of San Francisco
Building 572B (surface)
P.O Box 29920 (Mail)
San Francisco, CA 94129-0920 USA
Telephone: (415) 561-6272
Fax: (415) 561-6120
Info@tpc.org



July 8, 2006

Mr. Eugene Purdy
Dell Computer Corporation
One Dell Way
Round Rock, TX 78682

I have verified the TPC Benchmark™ H for the following configuration:

Platform: PowerEdge 2900
Database Manager: Microsoft SQL Server 2005 Enterprise x64 Edition
Operating System: Windows Server 2003 Enterprise x 64 Edition

CPU's	Memory	Total Disks	Qpph@ 100GB	QthH@100GB	QphH@100GB
2 Intel @ 3.0 Ghz	48 GB	128 @ 36 GB	13,052.3	8,409.4	10,476.7

In my opinion, these performance results were produced in compliance with the TPC requirements for the benchmark. The following attributes of the benchmark were given special attention:

- The database tables were defined with the proper columns, layout and sizes.
- The tested database was correctly scaled and populated for 100GB using DBGEN. The version of DBGEN was 2.3.0.
- The qualification database layout was identical to the tested database except for the number and size of the files and nodes.
- The query text was verified to use only compliant variants and minor modifications.
- The executable query text was generated by QGEN and submitted through a standard interactive interface. The version of QGEN was 2.3.0.
- The validation of the query text against the qualification database produced compliant results.
- The refresh functions were properly implemented and executed the correct number of inserts and deletes.
- The load timing was properly measured and reported.
- The execution times were correctly measured and reported.
- The performance metrics were correctly computed and reported.
- The repeatability of the measurement was verified.

- The ACID properties were successfully demonstrated and verified.
- The system pricing was checked for major components and maintenance.
- The executive summary pages of the FDR were verified for accuracy.

Auditor's Notes:

None.

Sincerely,

A handwritten signature in cursive script that reads "Lorna Livingtree".

Lorna Livingtree
Auditor

Appendix A: Tunable Parameters

Server Configuration Parameters

Microsoft Windows 2003 Server Parameters

The following registry key was added to disable the kernel counters for Global and Per-Process I/Os:
 [HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Control\Session Manager\I/O System]
 "CountOperations"=dword:00000000"

Microsoft SQL Server 2005 Startup Parameters

Microsoft SQL Server was started with the following command line options

```
sqlservr -c -x -E -T834 -T1204
```

Microsoft SQL Server 2005 Configuration Parameters

name	minimum	maximum			
config_value	run_value				
-----	-----				
Ad Hoc Distributed Queries		0	1	0	0
affinity I/O mask	-2147483648	2147483647			
affinity mask	-2147483648	2147483647			
affinity64 I/O mask	-2147483648	2147483647			
affinity64 mask	-2147483648	2147483647			
Agent XPs	0	1	0	0	
allow updates	0	1	1	1	
awe enabled	0	1	1	1	
blocked process threshold	0	86400	0	0	
c2 audit mode	0	1	0	0	
clr enabled	0	1	0	0	
cost threshold for parallelism	0	32767	0	0	
cross db ownership chaining	0	1	0	0	
cursor threshold	-1	2147483647	-1		
Database Mail XPs	0	1	0	0	

default full-text language	0	2147483647			
1033	1033				
default language	0	9999	0		
default trace enabled	0	1	1		
disallow results from triggers	0	1	0		
fill factor (%)	0	100	0	0	
ft crawl bandwidth (max)	0	32767	100		
ft crawl bandwidth (min)	0	32767	0		
ft notify bandwidth (max)	0	32767	100		
ft notify bandwidth (min)	0	32767	0		
in-doubt xact resolution	0	2	0		
index create memory (KB)	704	2147483647			
lightweight pooling	0	1	1		
locks	5000	2147483647	0		
max degree of parallelism	0	64	0		
max full-text crawl range	0	256	4		
max server memory (MB)	16	2147483647			
max text repl size (B)	0	2147483647			
max worker threads	128	32767	1024		
media retention	0	365	0		
min memory per query (KB)	512	2147483647			
min server memory (MB)	0	2147483647			
nested triggers	0	1	1	1	
network packet size (B)	512	32767			
Ole Automation Procedures	0	1	0		
open objects	0	2147483647	0		
PH timeout (s)	1	3600	60		
precompute rank	0	1	0		
priority boost	0	1	1	1	
query governor cost limit	0	2147483647			
query wait (s)	-1	2147483647			
recovery interval (min)	0	32767	32767		

```

remote access                0      1      1      1
remote admin connections     0      0      1      0
0
remote login timeout (s)    0 2147483647
20      20
remote proc trans           0      1      0
0
remote query timeout (s)    0 2147483647
600     600
Replication XPs             0      1      0
0
scan for startup procs      0      1      0
0
server trigger recursion    0      1      1
1
set working set size        0      1      0
0
show advanced options       0      1      1
1
SMO and DMO XPs             0      1      1
1
SQL Mail XPs                 0      1      0
0
transform noise words        0      1      0
0
two digit year cutoff       1753   9999   2049
2049
user connections             0 32767   0
0
user options                 0 32767   0
0
Web Assistant Procedures    0      1      0
0
xp_cmdshell                  0      1      0      0

```

System Information

System Information report written at: 06/23/06 07:56:10
System Name: PE2900
[System Summary]

```

Item      Value
OS Name   Microsoft(R) Windows(R) Server 2003 Enterprise x64 Edition
Version   5.2.3790 Service Pack 1 Build 3790
Other OS Description Not Available
OS Manufacturer Microsoft Corporation
System Name PE2900
System Manufacturer Dell Inc.
System Model PowerEdge 2900
System Type x64-based PC
Processor EM64T Family 6 Model 15 Stepping 4 GenuineIntel ~2993 Mhz
Processor EM64T Family 6 Model 15 Stepping 4 GenuineIntel ~2993 Mhz
Processor EM64T Family 6 Model 15 Stepping 4 GenuineIntel ~2993 Mhz
Processor EM64T Family 6 Model 15 Stepping 4 GenuineIntel ~2993 Mhz
BIOS Version/Date Dell Inc. 99.3.2 [MRC v1.1 Normal], 6/5/2006
SMBIOS Version 2.4
Windows Directory C:\WINDOWS
System Directory C:\WINDOWS\system32
Boot Device \Device\HarddiskVolume7
Locale United States

```

```

Hardware Abstraction Layer Version = "5.2.3790.1830
(srv03_sp1_rtm.050324-1447)"
User Name Not Available
Time Zone Central Daylight Time
Total Physical Memory 49,150.98 MB
Available Physical Memory 342.93 MB
Total Virtual Memory 51.34 GB
Available Virtual Memory 4.72 GB
Page File Space 4.59 GB
Page File C:\pagefile.sys

```

[Hardware Resources]

[Conflicts/Sharing]

```

Resource Device
I/O Port 0x00000000-0x00000CF7 PCI bus
I/O Port 0x00000000-0x00000CF7 Direct memory access controller

IRQ 20 Standard Universal PCI to USB Host Controller
IRQ 20 Standard Universal PCI to USB Host Controller

Memory Address 0xF4000000-0xF7FFFFFF PCI standard PCI-to-PCI bridge
Memory Address 0xF4000000-0xF7FFFFFF PCI standard PCI-to-PCI bridge
Memory Address 0xF4000000-0xF7FFFFFF PCI standard PCI-to-PCI bridge
Memory Address 0xF4000000-0xF7FFFFFF Broadcom BCM5708C
NetXtreme II GigE

IRQ 21 Standard Universal PCI to USB Host Controller
IRQ 21 Standard Universal PCI to USB Host Controller
IRQ 21 Standard Enhanced PCI to USB Host Controller

Memory Address 0xD8000000-0xD80FFFFFF PCI standard PCI-to-
PCI bridge
Memory Address 0xD8000000-0xD80FFFFFF PCI standard PCI-to-
PCI bridge

Memory Address 0xD8100000-0xD81FFFFFF PCI standard PCI-to-
PCI bridge
Memory Address 0xD8100000-0xD81FFFFFF PCI standard PCI-to-
PCI bridge

Memory Address 0xD8200000-0xD82FFFFFF PCI standard PCI-to-
PCI bridge
Memory Address 0xD8200000-0xD82FFFFFF PCI standard PCI-to-
PCI bridge

IRQ 16 PCI standard host CPU bridge
IRQ 16 PCI standard PCI-to-PCI bridge
IRQ 16 PCI standard PCI-to-PCI bridge
IRQ 16 PCI standard PCI-to-PCI bridge
IRQ 16 Broadcom BCM5708C NetXtreme II GigE
IRQ 16 PCI standard PCI-to-PCI bridge
IRQ 16 PCI standard PCI-to-PCI bridge
IRQ 16 PCI standard PCI-to-PCI bridge
IRQ 16 PCI standard PCI-to-PCI bridge
IRQ 16 PCI standard PCI-to-PCI bridge
IRQ 16 PCI standard PCI-to-PCI bridge
IRQ 16 PCI standard PCI-to-PCI bridge
IRQ 16 PCI standard PCI-to-PCI bridge
IRQ 16 Broadcom BCM5708C NetXtreme II GigE

Memory Address 0xD0000000-0xFDFFFFFF PCI bus
Memory Address 0xD0000000-0xFDFFFFFF Standard VGA
Graphics Adapter

IRQ 18 DELL PERC 5/E Adapter RAID Controller
IRQ 18 DELL PERC 5/E Adapter RAID Controller

Memory Address 0xA0000-0xBFFFF PCI bus
Memory Address 0xA0000-0xBFFFF Standard VGA Graphics Adapter

```

Memory Address 0xF8000000-0xFBFFFFFF PCI standard PCI-to-PCI bridge
 Memory Address 0xF8000000-0xFBFFFFFF PCI standard PCI-to-PCI bridge
 Memory Address 0xF8000000-0xFBFFFFFF Broadcom
 BCM5708C NetXtreme II GigE

[DMA]

Resource Device Status
 Channel 4 Direct memory access controller OK
 Channel 2 Standard floppy disk controller OK

[Forced Hardware]

Device PNP Device ID

[I/O]

Resource Device Status
 0x00000000-0x00000CF7 PCI bus OK
 0x00000000-0x00000CF7 Direct memory access controller OK
 0x00000D00-0x0000FFFF PCI bus OK
 0x0000DCE0-0x0000DCFF Standard Universal PCI to USB Host Controller OK
 0x0000DCC0-0x0000DCDF Standard Universal PCI to USB Host Controller OK
 0x0000DCA0-0x0000DCBF Standard Universal PCI to USB Host Controller OK
 0x0000DC80-0x0000DC9F Standard Universal PCI to USB Host Controller OK
 0x0000EC00-0x0000ECFF Standard VGA Graphics Adapter OK
 0x000003B0-0x000003BB Standard VGA Graphics Adapter OK
 0x000003C0-0x000003DF Standard VGA Graphics Adapter OK
 0x00000080-0x0000009F Direct memory access controller OK
 0x000000C0-0x000000DF Direct memory access controller OK
 0x000000F0-0x000000FF Numeric data processor OK
 0x00000020-0x0000003F Programmable interrupt controller OK
 0x000000A0-0x000000BF Programmable interrupt controller OK
 0x000004D0-0x000004D1 Programmable interrupt controller OK
 0x00000061-0x00000061 System board OK
 0x00000070-0x0000007F System CMOS/real time clock OK
 0x00000040-0x0000005F System timer OK
 0x000003F0-0x000003F5 Standard floppy disk controller OK
 0x000003F7-0x000003F7 Standard floppy disk controller OK
 0x000003F8-0x000003FF Communications Port (COM1) OK
 0x000002F8-0x000002FF Communications Port (COM2) OK
 0x00000800-0x0000087F System board OK
 0x00000880-0x000008BF System board OK
 0x000008C0-0x000008DF System board OK
 0x000008E0-0x000008E3 System board OK
 0x00000C00-0x00000C7F System board OK
 0x00000CA0-0x00000CA7 System board OK
 0x00000CA9-0x00000CAB System board OK
 0x00000CAD-0x00000CAF System board OK
 0x00000060-0x00000060 System board OK
 0x00000064-0x00000064 System board OK
 0x00000CA8-0x00000CA8 System board OK
 0x00000CAC-0x00000CAC System board OK
 0x0000FC00-0x0000FC0F Standard Dual Channel PCI IDE Controller OK
 0x000001F0-0x000001F7 Primary IDE Channel OK
 0x000003F6-0x000003F6 Primary IDE Channel OK
 0x00000170-0x00000177 Secondary IDE Channel OK
 0x00000376-0x00000376 Secondary IDE Channel OK

[IRQs]

Resource Device Status

IRQ 9 Microsoft ACPI-Compliant System OK
 IRQ 16 PCI standard host CPU bridge OK
 IRQ 16 PCI standard PCI-to-PCI bridge OK
 IRQ 16 PCI standard PCI-to-PCI bridge OK
 IRQ 16 PCI standard PCI-to-PCI bridge OK
 IRQ 16 Broadcom BCM5708C NetXtreme II GigE OK
 IRQ 16 PCI standard PCI-to-PCI bridge OK
 IRQ 16 PCI standard PCI-to-PCI bridge OK
 IRQ 16 PCI standard PCI-to-PCI bridge OK
 IRQ 16 PCI standard PCI-to-PCI bridge OK
 IRQ 16 PCI standard PCI-to-PCI bridge OK
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 IRQ 16 PCI standard PCI-to-PCI bridge OK
 IRQ 16 PCI standard PCI-to-PCI bridge OK
 IRQ 16 PCI standard PCI-to-PCI bridge OK
 IRQ 16 PCI standard PCI-to-PCI bridge OK
 IRQ 16 PCI standard PCI-to-PCI bridge OK
 IRQ 18 Broadcom BCM5708C NetXtreme II GigE OK
 IRQ 18 DELL PERC 5/E Adapter RAID Controller OK
 IRQ 18 DELL PERC 5/E Adapter RAID Controller OK
 IRQ 142 DELL PERC 5/i Integrated RAID Controller OK
 IRQ 21 Standard Universal PCI to USB Host Controller OK
 IRQ 21 Standard Universal PCI to USB Host Controller OK
 IRQ 21 Standard Enhanced PCI to USB Host Controller OK
 IRQ 20 Standard Universal PCI to USB Host Controller OK
 IRQ 20 Standard Universal PCI to USB Host Controller OK
 IRQ 13 Numeric data processor OK
 IRQ 8 System CMOS/real time clock OK
 IRQ 0 System timer OK
 IRQ 6 Standard floppy disk controller OK
 IRQ 4 Communications Port (COM1) OK
 IRQ 3 Communications Port (COM2) OK
 IRQ 14 Primary IDE Channel OK

[Memory]

Resource Device Status
 0xA0000-0xBFFFF PCI bus OK
 0xA0000-0xBFFFF Standard VGA Graphics Adapter OK
 0xD0000000-0xFDFFFFFF PCI bus OK
 0xD0000000-0xFDFFFFFF Standard VGA Graphics Adapter OK
 0xF2000000-0xF7FFFFFF PCI standard PCI-to-PCI bridge OK
 0xF4000000-0xF7FFFFFF PCI standard PCI-to-PCI bridge OK
 0xF4000000-0xF7FFFFFF PCI standard PCI-to-PCI bridge OK
 0xF4000000-0xF7FFFFFF PCI standard PCI-to-PCI bridge OK
 0xF4000000-0xF7FFFFFF PCI standard PCI-to-PCI bridge OK
 0xF4000000-0xF7FFFFFF Broadcom BCM5708C NetXtreme II GigE OK
 0xFC600000-0xFC8FFFFFF PCI standard PCI-to-PCI bridge OK
 0xD8100000-0xD81FFFFFF PCI standard PCI-to-PCI bridge OK
 0xD8100000-0xD81FFFFFF PCI standard PCI-to-PCI bridge OK
 0xFC700000-0xFC8FFFFFF PCI standard PCI-to-PCI bridge OK
 0xD81F0000-0xD81FFFFFF DELL PERC 5/E Adapter RAID Controller OK
 0xFC7E0000-0xFC7FFFFFF DELL PERC 5/E Adapter RAID Controller OK
 0xFC900000-0xFCBFFFFFF PCI standard PCI-to-PCI bridge OK
 0xD8200000-0xD82FFFFFF PCI standard PCI-to-PCI bridge OK
 0xD8200000-0xD82FFFFFF PCI standard PCI-to-PCI bridge OK
 0xFCA00000-0xFCBFFFFFF PCI standard PCI-to-PCI bridge OK
 0xD82F0000-0xD82FFFFFF DELL PERC 5/i Integrated RAID Controller OK
 0xFCAE0000-0xFCAFFFFFF DELL PERC 5/i Integrated RAID Controller OK
 0xFC300000-0xFC5FFFFFF PCI standard PCI-to-PCI bridge OK
 0xD8000000-0xD80FFFFFF PCI standard PCI-to-PCI bridge OK
 0xD8000000-0xD80FFFFFF PCI standard PCI-to-PCI bridge OK
 0xFC400000-0xFC5FFFFFF PCI standard PCI-to-PCI bridge OK
 0xD80F0000-0xD80FFFFFF DELL PERC 5/E Adapter RAID Controller OK
 0xFC4E0000-0xFC4FFFFFF DELL PERC 5/E Adapter RAID Controller OK
 0xF8000000-0xFBFFFFFF PCI standard PCI-to-PCI bridge OK
 0xF8000000-0xFBFFFFFF PCI standard PCI-to-PCI bridge OK
 0xF8000000-0xFBFFFFFF Broadcom BCM5708C NetXtreme II GigE OK
 0xFCC00000-0xFCC003FF Standard Enhanced PCI to USB Host Controller OK
 0xFC1F0000-0xFC1FFFFFF Standard VGA Graphics Adapter OK

0xE0000000-0xEFFFFFFF Motherboard resources OK
 0xFED00000-0xFED003FF High precision event timer 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
(24,576 bytes)	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	24.00 KB		3/25/2005 6:00 AM
c:\windows\system32\msg711.acm	Microsoft Corporation		OK	C:\WINDOWS\system32\MSG711.ACM
(13,824 bytes)	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	13.50 KB		3/25/2005 6:00 AM
c:\windows\system32\tsoft32.acm	DSP GROUP, INC.		OK	C:\WINDOWS\system32\TSSOFT32.ACM
(13,824 bytes)	1.01	13.50 KB (13,824 bytes)		3/25/2005 6:00 AM
c:\windows\system32\msgsm32.acm	Microsoft Corporation		OK	C:\WINDOWS\system32\MSGSM32.ACM
(35,328 bytes)	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	34.50 KB		3/25/2005 6:00 AM
c:\windows\system32\msadp32.acm	Microsoft Corporation		OK	C:\WINDOWS\system32\MSADP32.ACM
(24,064 bytes)	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	23.50 KB		3/25/2005 6:00 AM

[Video Codecs]

CODEC	Manufacturer	Description	Status	File
	Version	Size	Creation Date	
c:\windows\system32\msrle32.dll	Microsoft Corporation		OK	C:\WINDOWS\system32\MSRLE32.DLL
(15,872 bytes)	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	15.50 KB		3/25/2005 6:00 AM
c:\windows\system32\iyuv_32.dll	Microsoft Corporation		OK	C:\WINDOWS\system32\IYUV_32.DLL
(53,760 bytes)	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	52.50 KB		3/24/2005 11:19 AM
c:\windows\system32\msvidc32.dll	Microsoft Corporation		OK	C:\WINDOWS\system32\MSVIDC32.DLL
(44,032 bytes)	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	43.00 KB		3/25/2005 6:00 AM
c:\windows\system32\msyuv.dll	Microsoft Corporation		OK	C:\WINDOWS\system32\MSYUV.DLL
(21,504 bytes)	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	21.00 KB		3/24/2005 11:21 AM
c:\windows\system32\tsbyuv.dll	Microsoft Corporation		OK	C:\WINDOWS\system32\TSBYUV.DLL
(12,800 bytes)	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	12.50 KB		3/24/2005 11:34 AM

[CD-ROM]

Item Value
 Drive D:
 Description CD-ROM Drive
 Media Loaded No
 Media Type CD-ROM
 Name HL-DT-ST CD-ROM GCR-8483B
 Manufacturer (Standard CD-ROM drives)
 Status OK
 Transfer Rate Not Available
 SCSI Target ID 0

PNP Device ID IDE\CDROMHL-DT-ST_CD-ROM_GCR-8483B_____1.05____\5&41A3CB2&0&0.0.0
 Driver c:\windows\system32\drivers\cdrom.sys (5.2.3790.1830 (srv03_sp1_rtm.050324-1447), 75.50 KB (77,312 bytes), 3/25/2005 6:00 AM)

[Sound Device]

Item Value

[Display]

Item Value
 Name Standard VGA Graphics Adapter
 PNP Device ID PCI\VEN_1002&DEV_515E&SUBSYS_01B11028&REV_02\4&2014205D&0&68F0
 Adapter Type ATI ES1000, (Standard display types) compatible
 Adapter Description Standard VGA Graphics Adapter
 Adapter RAM 16.00 MB (16,777,216 bytes)
 Installed Drivers vga.dll,framebuf.dll,vga256,vga64k
 Driver Version 5.2.3790.1830
 INF File display.inf (vga section)
 Color Planes 1
 Color Table Entries 4294967296
 Resolution 1024 x 768 x 1 hertz
 Bits/Pixel 32
 Memory Address 0xD0000000-0xFDFFFFFFFF
 I/O Port 0x0000EC00-0x0000ECFF
 Memory Address 0xFC1F0000-0xFC1FFFFFFF
 I/O Port 0x000003B0-0x000003BB
 I/O Port 0x000003C0-0x000003DF
 Memory Address 0xA0000-0xBFFFFF
 Driver c:\windows\system32\drivers\vgapnp.sys (5.2.3790.1830 (srv03_sp1_rtm.050324-1447), 33.00 KB (33,792 bytes), 6/16/2006 4:17 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_0518&PID_0001&MI_00\6&1DC73AF8&0&0000
 Number of Function Keys 12
 Driver c:\windows\system32\drivers\hidusb.sys (5.2.3790.1830 (srv03_sp1_rtm.050324-1447), 18.50 KB (18,944 bytes), 3/25/2005 6:00 AM)

[Pointing Device]

Item Value
 Hardware Type HID-compliant mouse
 Number of Buttons 3
 Status OK
 PNP Device ID HID\VID_0518&PID_0001&MI_01&COL01\7&3B4280F4&0&0000
 Power Management Supported No
 Double Click Threshold 6
 Handedness Right Handed Operation
 Driver c:\windows\system32\drivers\mouhid.sys (5.2.3790.1830 (srv03_sp1_rtm.050324-1447), 19.00 KB (19,456 bytes), 3/24/2005 11:21 AM)

[Modem]

Item Value

[Network]

[Adapter]

Item Value

Name [00000001] RAS Async Adapter
 Adapter Type Not Available
 Product Type RAS Async Adapter
 Installed Yes
 PNP Device ID Not Available
 Last Reset 6/23/2006 1:51 AM
 Index 1
 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 Not Available

Name [00000002] WAN Miniport (L2TP)
 Adapter Type Not Available
 Product Type WAN Miniport (L2TP)
 Installed Yes
 PNP Device ID ROOT\MS_L2TPMINIPOINT\0000
 Last Reset 6/23/2006 1:51 AM
 Index 2
 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 (5.2.3790.1830
 (srv03_sp1_rtm.050324-1447), 132.00 KB (135,168 bytes), 3/25/2005 6:00
 AM)

Name [00000003] WAN Miniport (PPTP)
 Adapter Type Wide Area Network (WAN)
 Product Type WAN Miniport (PPTP)
 Installed Yes
 PNP Device ID ROOT\MS_PPTPMINIPOINT\0000
 Last Reset 6/23/2006 1:51 AM
 Index 3
 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 (5.2.3790.1830
 (srv03_sp1_rtm.050324-1447), 117.50 KB (120,320 bytes), 3/25/2005 6:00
 AM)

Name [00000004] WAN Miniport (PPPOE)
 Adapter Type Wide Area Network (WAN)
 Product Type WAN Miniport (PPPOE)
 Installed Yes
 PNP Device ID ROOT\MS_PPPOEMINIPOINT\0000
 Last Reset 6/23/2006 1:51 AM
 Index 4

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\rasppoe.sys (5.2.3790.1830
 (srv03_sp1_rtm.050324-1447), 67.50 KB (69,120 bytes), 3/25/2005 6:00 AM)

Name [00000005] Direct Parallel
 Adapter Type Not Available
 Product Type Direct Parallel
 Installed Yes
 PNP Device ID ROOT\MS_PTMINIPOINT\0000
 Last Reset 6/23/2006 1:51 AM
 Index 5
 Service Name Raspti
 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\raspti.sys (5.2.3790.1830
 (srv03_sp1_rtm.050324-1447), 30.50 KB (31,232 bytes), 3/25/2005 6:00 AM)

Name [00000006] WAN Miniport (IP)
 Adapter Type Not Available
 Product Type WAN Miniport (IP)
 Installed Yes
 PNP Device ID ROOT\MS_NDISWANIP\0000
 Last Reset 6/23/2006 1:51 AM
 Index 6
 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 (5.2.3790.1830
 (srv03_sp1_rtm.050324-1447), 157.50 KB (161,280 bytes), 3/25/2005 6:00
 AM)

Name [00000007] Broadcom BCM5708C NetXtreme II GigE (NDIS
 VBD Client)
 Adapter Type Ethernet 802.3
 Product Type Broadcom BCM5708C NetXtreme II GigE (NDIS VBD
 Client)
 Installed Yes
 PNP Device ID
 B06BDRV\L2ND&PCI_164C14E4&SUBSYS_01B11028&REV_
 11\6&3100A6D6&0&20050500
 Last Reset 6/23/2006 1:51 AM
 Index 7
 Service Name l2nd
 IP Address 192.2.2.29
 IP Subnet 255.255.255.0
 Default IP Gateway Not Available
 DHCP Enabled No
 DHCP Server Not Available
 DHCP Lease Expires Not Available
 DHCP Lease Obtained Not Available
 MAC Address 00:13:72:4F:AC:B1
 Driver c:\windows\system32\drivers\bxd52a.sys (2.6.14.0 built by:
 WinDDK, 78.00 KB (79,872 bytes), 4/3/2006 1:53 PM)

Name [00000008] Broadcom BCM5708C NetXtreme II GigE (NDIS VBD Client)
 Adapter Type Not Available
 Product Type Broadcom BCM5708C NetXtreme II GigE (NDIS VBD Client)
 Installed Yes
 PNP Device ID B06BDRV\L2ND&PCI_164C14E4&SUBSYS_01B11028&REV_11\8&2EA87DA4&0&20050900
 Last Reset 6/23/2006 1:51 AM
 Index 8
 Service Name l2nd
 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 Not Available
 Driver c:\windows\system32\drivers\bxd52a.sys (2.6.14.0 built by: WinDDK, 78.00 KB (79,872 bytes), 4/3/2006 1:53 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	63.93 KB (65,467 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	RSVP UDP Service Provider
Connectionless Service	Yes
Guarantees Delivery	No
Guarantees Sequencing	No
Maximum Address Size	16 bytes
Maximum Message Size	63.93 KB (65,467 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

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

[WinSock]

Item	Value
File	c:\windows\system32\wsock32.dll
Size	24.50 KB (25,088 bytes)
Version	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)

[Ports]

[Serial]

Item	Value
Name	Communications Port (COM1)
Status	OK
PNP Device ID	ACPI\PNP0501\1
Maximum Input Buffer Size	0
Maximum Output Buffer Size	No
Settable Baud Rate	Yes
Settable Data Bits	Yes
Settable Flow Control	Yes
Settable Parity	Yes
Settable Parity Check	Yes
Settable Stop Bits	Yes
Settable RLSD	Yes
Supports RLSD	Yes
Supports 16 Bit Mode	No
Supports Special Characters	No
Baud Rate	9600
Bits/Byte	8
Stop Bits	1
Parity	None
Busy	No
Abort Read/Write on Error	No
Binary Mode Enabled	Yes
Continue XMit on XOff	No
CTS Outflow Control	No
Discard NULL Bytes	No
DSR Outflow Control	0
DSR Sensitivity	0
DTR Flow Control Type	Enable
EOF Character	0
Error Replace Character	0
Error Replacement Enabled	No
Event Character	0
Parity Check Enabled	No

RTS Flow Control Type Enable
 XOff Character 19
 XOffXMit Threshold 512
 XOn Character 17
 XOnXMit Threshold 2048
 XOnXOff InFlow Control 0
 XOnXOff OutFlow Control 0
 I/O Port 0x000003F8-0x000003FF
 IRQ Channel IRQ 4
 Driver c:\windows\system32\drivers\serial.sys (5.2.3790.1830
 (srv03_sp1_rtm.050324-1447), 118.50 KB (121,344 bytes), 3/25/2005 6:00
 AM)

Name Communications Port (COM2)
 Status OK
 PNP Device ID ACPI\PNP0501\2
 Maximum Input Buffer Size 0
 Maximum Output Buffer Size No
 Settable Baud Rate Yes
 Settable Data Bits Yes
 Settable Flow Control Yes
 Settable Parity Yes
 Settable Parity Check Yes
 Settable Stop Bits Yes
 Settable RLS D Yes
 Supports RLS D Yes
 Supports 16 Bit Mode No
 Supports Special Characters No
 Baud Rate 9600
 Bits/Byte 8
 Stop Bits 1
 Parity None
 Busy No
 Abort Read/Write on Error No
 Binary Mode Enabled Yes
 Continue XMit on XOff No
 CTS Outflow Control No
 Discard NULL Bytes No
 DSR Outflow Control 0
 DSR Sensitivity 0
 DTR Flow Control Type Enable
 EOF Character 0
 Error Replace Character 0
 Error Replacement Enabled No
 Event Character 0
 Parity Check Enabled No
 RTS Flow Control Type Enable
 XOff Character 19
 XOffXMit Threshold 512
 XOn Character 17
 XOnXMit Threshold 2048
 XOnXOff InFlow Control 0
 XOnXOff OutFlow Control 0
 I/O Port 0x000002F8-0x000002FF
 IRQ Channel IRQ 3
 Driver c:\windows\system32\drivers\serial.sys (5.2.3790.1830
 (srv03_sp1_rtm.050324-1447), 118.50 KB (121,344 bytes), 3/25/2005 6:00
 AM)

[Parallel]

Item Value

[Storage]

[Drives]

Item Value

Drive A:
 Description 3 1/2 Inch Floppy Drive

Drive C:
 Description Local Fixed Disk
 Compressed No
 File System NTFS
 Size 40.00 GB (42,952,376,320 bytes)
 Free Space 23.07 GB (24,774,127,616 bytes)
 Volume Name
 Volume Serial Number 10BECB34

Drive D:
 Description CD-ROM Disc

Drive E:
 Description Local Fixed Disk
 Compressed Not Available
 File System Not Available
 Size Not Available
 Free Space Not Available
 Volume Name Not Available
 Volume Serial Number Not Available

Drive F:
 Description Local Fixed Disk
 Compressed Not Available
 File System Not Available
 Size Not Available
 Free Space Not Available
 Volume Name Not Available
 Volume Serial Number Not Available

Drive G:
 Description Local Fixed Disk
 Compressed Not Available
 File System Not Available
 Size Not Available
 Free Space Not Available
 Volume Name Not Available
 Volume Serial Number Not Available

Drive H:
 Description Local Fixed Disk
 Compressed Not Available
 File System Not Available
 Size Not Available
 Free Space Not Available
 Volume Name Not Available
 Volume Serial Number Not Available

Drive I:
 Description Local Fixed Disk
 Compressed Not Available
 File System Not Available
 Size Not Available
 Free Space Not Available
 Volume Name Not Available
 Volume Serial Number Not Available

Drive J:
 Description Local Fixed Disk
 Compressed Not Available
 File System Not Available
 Size Not Available
 Free Space Not Available
 Volume Name Not Available
 Volume Serial Number Not Available

Drive K:
 Description Local Fixed Disk
 Compressed Not Available
 File System Not Available
 Size Not Available
 Free Space Not Available
 Volume Name Not Available

Volume Serial Number Not Available

Drive L:
Description Local Fixed Disk
Compressed Not Available
File System Not Available
Size Not Available
Free Space Not Available
Volume Name Not Available
Volume Serial Number Not Available

Drive M:
Description Local Fixed Disk
Compressed Not Available
File System Not Available
Size Not Available
Free Space Not Available
Volume Name Not Available
Volume Serial Number Not Available

Drive T:
Description Local Fixed Disk
Compressed No
File System NTFS
Size 859.99 GB (923,402,829,824 bytes)
Free Space 718.63 GB (771,624,730,624 bytes)
Volume Name
Volume Serial Number 0C3D5757

Drive U:
Description Local Fixed Disk
Compressed No
File System NTFS
Size 859.99 GB (923,402,829,824 bytes)
Free Space 774.15 GB (831,238,045,696 bytes)
Volume Name
Volume Serial Number BC4D7B52

Drive X:
Description Local Fixed Disk
Compressed No
File System NTFS
Size 857.98 GB (921,247,809,536 bytes)
Free Space 731.11 GB (785,021,992,960 bytes)
Volume Name
Volume Serial Number 6056FD6F

Drive Y:
Description Local Fixed Disk
Compressed No
File System NTFS
Size 2.01 GB (2,155,020,288 bytes)
Free Space 259.63 MB (272,236,544 bytes)
Volume Name
Volume Serial Number B0C99226

Drive Z:
Description Local Fixed Disk
Compressed No
File System NTFS
Size 859.99 GB (923,402,829,824 bytes)
Free Space 733.11 GB (787,174,195,200 bytes)
Volume Name
Volume Serial Number 94613996

[Disks]

Item Value
Description Disk drive
Manufacturer (Standard disk drives)
Model DELL PERC 5/E Adapter SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes

Media Type Fixed hard disk
Partitions 4
SCSI Bus 1
SCSI Logical Unit 0
SCSI Port 3
SCSI Target ID 0
Sectors/Track 63
Size 1,001.24 GB (1,075,076,997,120 bytes)
Total Cylinders 130,704
Total Sectors 2,099,759,760
Total Tracks 33,329,520
Tracks/Cylinder 255
Partition Disk #2, Partition #0
Partition Size 95.26 GB (102,281,324,544 bytes)
Partition Starting Offset 32,256 bytes
Partition Disk #2, Partition #1
Partition Size 46.00 GB (49,392,806,400 bytes)
Partition Starting Offset 102,281,356,800 bytes
Partition Disk #2, Partition #2
Partition Size 2.01 GB (2,155,023,360 bytes)
Partition Starting Offset 151,674,163,200 bytes
Partition Disk #2, Partition #3
Partition Size 857.98 GB (921,247,810,560 bytes)
Partition Starting Offset 153,829,186,560 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model DELL PERC 5/E Adapter SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 3
SCSI Bus 1
SCSI Logical Unit 0
SCSI Port 3
SCSI Target ID 1
Sectors/Track 63
Size 1,001.24 GB (1,075,076,997,120 bytes)
Total Cylinders 130,704
Total Sectors 2,099,759,760
Total Tracks 33,329,520
Tracks/Cylinder 255
Partition Disk #3, Partition #0
Partition Size 95.26 GB (102,281,324,544 bytes)
Partition Starting Offset 32,256 bytes
Partition Disk #3, Partition #1
Partition Size 46.00 GB (49,392,806,400 bytes)
Partition Starting Offset 102,281,356,800 bytes
Partition Disk #3, Partition #2
Partition Size 859.99 GB (923,402,833,920 bytes)
Partition Starting Offset 151,674,163,200 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model DELL PERC 5/E Adapter SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 3
SCSI Bus 1
SCSI Logical Unit 0
SCSI Port 2
SCSI Target ID 0
Sectors/Track 63
Size 1,001.24 GB (1,075,076,997,120 bytes)
Total Cylinders 130,704
Total Sectors 2,099,759,760
Total Tracks 33,329,520
Tracks/Cylinder 255
Partition Disk #0, Partition #0
Partition Size 95.26 GB (102,281,324,544 bytes)
Partition Starting Offset 32,256 bytes
Partition Disk #0, Partition #1

Partition Size 46.00 GB (49,392,806,400 bytes)
Partition Starting Offset 102,281,356,800 bytes
Partition Disk #0, Partition #2
Partition Size 859.99 GB (923,402,833,920 bytes)
Partition Starting Offset 151,674,163,200 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model DELL PERC 5/E Adapter SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 3
SCSI Bus 1
SCSI Logical Unit 0
SCSI Port 2

SCSI Target ID 1
Sectors/Track 63
Size 1,001.24 GB (1,075,076,997,120 bytes)
Total Cylinders 130,704
Total Sectors 2,099,759,760
Total Tracks 33,329,520
Tracks/Cylinder 255

Partition Disk #1, Partition #0
Partition Size 95.26 GB (102,281,324,544 bytes)
Partition Starting Offset 32,256 bytes
Partition Disk #1, Partition #1
Partition Size 46.00 GB (49,392,806,400 bytes)
Partition Starting Offset 102,281,356,800 bytes
Partition Disk #1, Partition #2
Partition Size 859.99 GB (923,402,833,920 bytes)
Partition Starting Offset 151,674,163,200 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model DELL PERC 5/i SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 2
SCSI Bus 1
SCSI Logical Unit 0
SCSI Port 4
SCSI Target ID 0
Sectors/Track 63
Size 133.50 GB (143,341,954,560 bytes)
Total Cylinders 17,427
Total Sectors 279,964,755
Total Tracks 4,443,885
Tracks/Cylinder 255

Partition Disk #4, Partition #0
Partition Size 40.00 GB (42,952,379,904 bytes)
Partition Starting Offset 32,256 bytes
Partition Disk #4, Partition #1
Partition Size 60.00 GB (64,428,618,240 bytes)
Partition Starting Offset 42,952,412,160 bytes

[SCSI]

Item Value
Name DELL PERC 5/E Adapter RAID Controller
Manufacturer DELL
Status OK
PNP Device ID
PCI\VEN_1028&DEV_0015&SUBSYS_1F011028&REV_00\5&
20524F73&0&700020
Memory Address 0xD81F0000-0xD81FFFFF
Memory Address 0xFC7E0000-0xFC7FFFFF
IRQ Channel IRQ 18
Driver c:\windows\system32\drivers\percscas.sys (1.20.0.64 built by:
WinDDK, 26.50 KB (27,136 bytes), 6/16/2006 4:03 AM)

Name DELL PERC 5/i Integrated RAID Controller

Manufacturer DELL
Status OK
PNP Device ID
PCI\VEN_1028&DEV_0015&SUBSYS_1F031028&REV_00\5&
22FD9970&0&700028
Memory Address 0xD82F0000-0xD82FFFFF
Memory Address 0xFC4E0000-0xFC4FFFFF
IRQ Channel IRQ 142
Driver c:\windows\system32\drivers\percscas.sys (1.20.0.64 built by:
WinDDK, 26.50 KB (27,136 bytes), 6/16/2006 4:03 AM)

Name DELL PERC 5/E Adapter RAID Controller
Manufacturer DELL
Status OK
PNP Device ID
PCI\VEN_1028&DEV_0015&SUBSYS_1F011028&REV_00\5&
376DDE58&0&700030
Memory Address 0xD80F0000-0xD80FFFFF
Memory Address 0xFC4E0000-0xFC4FFFFF
IRQ Channel IRQ 18
Driver c:\windows\system32\drivers\percscas.sys (1.20.0.64 built by:
WinDDK, 26.50 KB (27,136 bytes), 6/16/2006 4:03 AM)

[IDE]

Item Value
Name Standard Dual Channel PCI IDE Controller
Manufacturer (Standard IDE ATA/ATAPI controllers)
Status OK
PNP Device ID
PCI\VEN_8086&DEV_269E&SUBSYS_01B11028&REV_09\3&
61AAA01&0&F9
I/O Port 0x0000FC00-0x0000FC0F
Driver c:\windows\system32\drivers\pciide.sys (5.2.3790.1830
(srv03_sp1_rtm.050324-1447), 6.00 KB (6,144 bytes), 3/25/2005 6:00 AM)

Name Primary IDE Channel
Manufacturer (Standard IDE ATA/ATAPI controllers)
Status OK
PNP Device ID PCIIDE\IDECHANNEL\4&1D8A9C03&0&0
I/O Port 0x000001F0-0x000001F7
I/O Port 0x000003F6-0x000003F6
IRQ Channel IRQ 14
Driver c:\windows\system32\drivers\atapi.sys (5.2.3790.1830
(srv03_sp1_rtm.050324-1447), 145.00 KB (148,480 bytes), 3/25/2005 6:00
AM)

Name Secondary IDE Channel
Manufacturer (Standard IDE ATA/ATAPI controllers)
Status OK
PNP Device ID PCIIDE\IDECHANNEL\4&1D8A9C03&0&1
I/O Port 0x00000170-0x00000177
I/O Port 0x00000376-0x00000376
Driver c:\windows\system32\drivers\atapi.sys (5.2.3790.1830
(srv03_sp1_rtm.050324-1447), 145.00 KB (148,480 bytes), 3/25/2005 6:00
AM)

[Printing]

Name Driver Port Name Server Name

[Problem Devices]

Device PNP Device ID Error Code
Broadcom BCM5708C NetXtreme II GigE (NDIS VBD Client) #2
B06BDRV\L2ND&PCI_164C14E4&SUBSYS_01B11028&REV_
11\8&2EA87DA4&0&20050900 This device is disabled.

[USB]

Device PNP Device ID

Standard Universal PCI to USB Host Controller
 PCI\VEN_8086&DEV_2688&SUBSYS_01B11028&REV_09\3&
 61AAA01&0&E8
 Standard Universal PCI to USB Host Controller
 PCI\VEN_8086&DEV_2689&SUBSYS_01B11028&REV_09\3&
 61AAA01&0&E9
 Standard Universal PCI to USB Host Controller
 PCI\VEN_8086&DEV_268A&SUBSYS_01B11028&REV_09\3&
 61AAA01&0&EA
 Standard Universal PCI to USB Host Controller
 PCI\VEN_8086&DEV_268B&SUBSYS_01B11028&REV_09\3&
 61AAA01&0&EB
 Standard Enhanced PCI to USB Host Controller
 PCI\VEN_8086&DEV_268C&SUBSYS_01B11028&REV_09\3&
 61AAA01&0&EF

[Software Environment]

[System Drivers]

Name	Description	File	Type	Started	Start Mode
	State	Status	Error Control	Accept	Pause
Accept Stop					
abiosdsk	Abiosdsk	Not Available	Kernel Driver	No	No
acpi	Microsoft ACPI Driver	OK	Ignore	No	No
	c:\windows\system32\drivers\acpi.sys	Kernel Driver			
	Yes	Boot	Running	OK	Normal
	Yes				
acpiec Driver	ACPIEC	c:\windows\system32\drivers\acpiec.sys	Kernel Driver	No	No
	No	Disabled	Stopped	OK	Normal
	No				
adpu160m	adpu160m	Not Available	Kernel Driver	No	No
	Disabled	Stopped	OK	Normal	No
adpu320	adpu320	Not Available	Kernel Driver	No	No
	Disabled	Stopped	OK	Normal	No
afd Driver	AFD	c:\windows\system32\drivers\afd.sys	Kernel Driver	No	No
	Yes	System	Running	OK	Normal
	Yes				
aic78u2	aic78u2	Not Available	Kernel Driver	No	No
	Disabled	Stopped	OK	Normal	No
aic78xx	aic78xx	Not Available	Kernel Driver	No	No
	Disabled	Stopped	OK	Normal	No
aliide	AliIde	Not Available	Kernel Driver	No	No
	Disabled	Stopped	OK	Normal	No
amdide	AmdIde	Not Available	Kernel Driver	No	No
	Disabled	Stopped	OK	Normal	No
arc	arc	Not Available	Kernel Driver	No	No
	Disabled	Stopped	OK	Normal	No
asyncmac	RAS Asynchronous Media Driver	c:\windows\system32\drivers\asyncmac.sys	Kernel Driver	No	No
	No	Manual	Stopped	OK	Normal
	No				
atapi	Standard IDE/ESDI Hard Disk Controller	c:\windows\system32\drivers\atapi.sys	Kernel Driver	No	No
	Yes	Boot	Running	OK	Normal
	Yes				
atdisk	Atdisk	Not Available	Kernel Driver	No	No
	Disabled	Stopped	OK	Ignore	No
atmarpc	ATM ARP Client Protocol	c:\windows\system32\drivers\atmarpc.sys	Kernel Driver	No	No
	No	Manual	Stopped	OK	Normal
	No				
audstub	Audio Stub Driver	c:\windows\system32\drivers\audstub.sys	Kernel Driver	Running	OK
	Kernel Driver	Yes	Manual	Running	OK
	Normal	No	Yes		
b06bdrv	Broadcom NetXtreme II VBD	c:\windows\system32\drivers\bxbvda.sys	Kernel Driver	Running	No
	Yes	Boot	Running	OK	Normal
	Yes				

beep Driver	Beep	c:\windows\system32\drivers\beep.sys	Kernel Driver	Running	OK	Normal	No
	Yes						
cdac15ba	CdaC15BA	c:\windows\system32\drivers\cdac15ba.sys	Kernel Driver	Running	OK		
	Kernel Driver	Yes	Auto	Running	OK		
	Normal	No	Yes				
cdad10ba	CdaD10BA	c:\windows\system32\drivers\cdad10ba.sys	Kernel Driver	Running	OK		
	Kernel Driver	Yes	Auto	Running	OK		
	Normal	No	Yes				
cdfs System Driver	Cdfs	c:\windows\system32\drivers\cdfs.sys	File	Running	OK	Normal	
	Yes	Disabled	Running	OK	Normal		
	No	Yes					
cdrom	CD-ROM Driver	c:\windows\system32\drivers\cdrom.sys	Kernel Driver	Running	OK		
	Kernel Driver	Yes	System	Running	OK		
	Normal	No	Yes				
changer	Changer	Not Available	Kernel Driver	No	No		
	System	Stopped	OK	Ignore	No	No	
clusdisk	Cluster Disk Driver	c:\windows\system32\drivers\clusdisk.sys	Kernel Driver	Running	OK		
	Kernel Driver	No	Disabled	Stopped	OK		
	Normal	No	No				
cmdide	CmdIde	Not Available	Kernel Driver	No	No		
	Disabled	Stopped	OK	Normal	No	No	
cpqcssm	cpqcssm	Not Available	Kernel Driver	No	No		
	Disabled	Stopped	OK	Normal	No	No	
crdisk	CRC Disk Filter Driver	c:\windows\system32\drivers\crdisk.sys	Kernel Driver	Running	OK	Normal	No
	Yes	Boot	Running	OK	Normal	No	
	Yes						
dfsdriver System Driver	DfsDriver	c:\windows\system32\drivers\dfs.sys	File	Running	OK	Normal	
	Yes	Boot	Running	OK	Normal		
	No	Yes					
disk	Disk Driver	c:\windows\system32\drivers\disk.sys	Kernel Driver	Running	OK		
	Kernel Driver	Yes	Boot	Running	OK		
	Normal	No	Yes				
dmboot Driver	dmboot	c:\windows\system32\drivers\dmboot.sys	Kernel Driver	Running	OK	Normal	No
	No	Disabled	Stopped	OK	Normal	No	
	No						
dmio	Logical Disk Manager Driver	c:\windows\system32\drivers\dmio.sys	Kernel Driver	Running	OK	Normal	No
	Yes	Boot	Running	OK	Normal	No	
	Yes						
dmload Driver	dmload	c:\windows\system32\drivers\dmload.sys	Kernel Driver	Running	OK	Normal	No
	Yes	Boot	Running	OK	Normal	No	
	Yes						
dpti2o	dpti2o	Not Available	Kernel Driver	No	No		
	Disabled	Stopped	OK	Normal	No	No	
elxstor	elxstor	Not Available	Kernel Driver	No	No		
	Disabled	Stopped	OK	Normal	No	No	
fastfat System Driver	Fastfat	c:\windows\system32\drivers\fastfat.sys	File	Running	OK	Normal	
	No	Disabled	Stopped	OK	Normal		
	No	No					
fdc	Floppy Disk Controller Driver	c:\windows\system32\drivers\fdc.sys	Kernel Driver	Running	OK	Normal	No
	Yes	Manual	Running	OK	Normal	No	
	Yes						
fips Driver	Fips	c:\windows\system32\drivers\fips.sys	Kernel Driver	Running	OK	Normal	No
	Yes	System	Running	OK	Normal	No	
	Yes						
flpydisk	Floppy Disk Driver	c:\windows\system32\drivers\flpydisk.sys	Kernel Driver	Running	OK		
	Kernel Driver	Yes	Manual	Running	OK		
	Normal	No	Yes				
fltmgr System Driver	FltMgr	c:\windows\system32\drivers\fltmgr.sys	File	Running	OK	Normal	
	Yes	Boot	Running	OK	Normal		
	No	Yes					
ftdisk	Volume Manager Driver	c:\windows\system32\drivers\ftdisk.sys	Kernel Driver	Running	OK	Normal	No
	Yes	Boot	Running	OK	Normal	No	
	Yes						
gpc	Generic Packet Classifier	c:\windows\system32\drivers\msgpc.sys	Kernel Driver	Running	OK	Normal	No
	Yes	Manual	Running	OK	Normal	No	
	Yes						

hidusb	Microsoft HID Class Driver c:\windows\system32\drivers\hidusb.sys	Kernel Driver	Yes	Manual	Running	OK	Ignore	No	mouclass	Mouse Class Driver Kernel Driver	c:\windows\system32\drivers\mouclass.sys	Yes	System	Running	OK					
hpciss	hpciss	Not Available	Kernel Driver	No	Disabled	Stopped	OK	Normal	No	No	Normal	No	Yes	mouhid	Mouse HID Driver Kernel Driver	c:\windows\system32\drivers\mouhid.sys	Yes	Manual	Running	OK
http Driver	HTTP c:\windows\system32\drivers\http.sys	Kernel Driver	Yes	Manual	Running	OK	Normal	No	mountmgr	Mount Point Manager Kernel Driver	c:\windows\system32\drivers\mountmgr.sys	Yes	Boot	Running	OK					
i2omgmt	i2omgmt	Not Available	Kernel Driver	No	System	Stopped	OK	Normal	No	No	mraid35x	mraid35x	Not Available	Kernel Driver	No					
i8042prt Driver	i8042prt c:\windows\system32\drivers\i8042prt.sys	Kernel Driver	No	System	Stopped	OK	Ignore	No	mrxdav	WebDav Client Redirector c:\windows\system32\drivers\mrxdav.sys	File System Driver	No	Manual	Stopped	OK	Normal	No			
iirsp	iirsp	Not Available	Kernel Driver	No	Disabled	Stopped	OK	Normal	No	No	mrxsvmb	MRXSMB c:\windows\system32\drivers\mrxsvmb.sys	File System Driver	Yes	System	Running	OK	Normal		
imapi	CD-Burning Filter Driver c:\windows\system32\drivers\imapi.sys	Kernel Driver	No	System	Stopped	OK	Normal	No	msfs	Msfs c:\windows\system32\drivers\msfs.sys	File System Driver	Yes	System	Running	OK	Normal				
intelide	IntelIde	Not Available	Kernel Driver	No	Disabled	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	
intelppm	Intel Processor Driver c:\windows\system32\drivers\intelppm.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			
ip6fw	IPv6 Windows Firewall Driver c:\windows\system32\drivers\ip6fw.sys	Kernel Driver	No	Manual	Stopped	OK	Normal	No	ndis	NDIS System Driver Kernel Driver	c:\windows\system32\drivers\ndis.sys	Yes	Boot	Running	OK					
ipfilterdriver	IP Traffic Filter Driver c:\windows\system32\drivers\ipfltdrv.sys	Kernel Driver	No	Manual	Stopped	OK	Normal	No	ndistapi	Remote Access NDIS TAPI Driver c:\windows\system32\drivers\ndistapi.sys	Kernel Driver	Yes	Manual	Running	OK	Normal	No			
ipinip	IP in IP Tunnel Driver c:\windows\system32\drivers\ipinip.sys	Kernel Driver	Yes	Manual	Running	OK	Normal	No	ndisui	NDIS Usermode I/O Protocol c:\windows\system32\drivers\ndisui.sys	Kernel Driver	Yes	Manual	Running	OK	Normal	No			
ipnat	IP Network Address Translator c:\windows\system32\drivers\ipnat.sys	Kernel Driver	No	Manual	Stopped	OK	Normal	No	ndiswan	Remote Access NDIS WAN Driver c:\windows\system32\drivers\ndiswan.sys	Kernel Driver	Yes	Manual	Running	OK	Normal	No			
ipsec	IPSEC driver c:\windows\system32\drivers\ipsec.sys	Kernel Driver	Yes	System	Running	OK	Normal	No	ndproxy	NDIS Proxy Kernel Driver	c:\windows\system32\drivers\ndproxy.sys	Yes	Manual	Running	OK					
isapnp	PnP ISA/EISA Bus Driver c:\windows\system32\drivers\isapnp.sys	Kernel Driver	Yes	Boot	Running	OK	Critical	No	netbios	NetBIOS Interface File System Driver	c:\windows\system32\drivers\netbios.sys	Yes	System	Running	OK					
kbdclass	Keyboard Class Driver c:\windows\system32\drivers\kbdclass.sys	Kernel Driver	Yes	System	Running	OK	Normal	No	netbt	NetBios over Tcpip Kernel Driver	c:\windows\system32\drivers\netbt.sys	Yes	System	Running	OK					
kbdhid	Keyboard HID Driver c:\windows\system32\drivers\kbdhid.sys	Kernel Driver	Yes	System	Running	OK	Ignore	No	nfrd960	nfrd960	Not Available	Kernel Driver	No							
ksecdd Driver	KSecDD c:\windows\system32\drivers\ksecdd.sys	Kernel Driver	Yes	Boot	Running	OK	Normal	No	npfs	Npfs c:\windows\system32\drivers\npfs.sys	File System Driver	Yes	System	Running	OK	Normal				
ksthunk	Kernel Streaming WOW64 Thunk Service c:\windows\system32\drivers\ksthunk.sys	Kernel Driver	Yes	Manual	Running	OK	Normal	No	ntfs	Ntfs c:\windows\system32\drivers\ntfs.sys	File System Driver	Yes	Disabled	Running	OK	Normal				
l2nd	Broadcom NetXtreme II BXND c:\windows\system32\drivers\bxd52a.sys	Kernel Driver	Yes	Manual	Running	OK	Normal	No	null Driver	Null c:\windows\system32\drivers\null.sys	Kernel Driver	Yes	System	Running	OK	Normal	No			
lp6nds35	lp6nds35	Not Available	Kernel Driver	No	Disabled	Stopped	OK	Normal	No	parport Driver	Parport c:\windows\system32\drivers\parport.sys	Kernel Driver	No	Manual	Stopped	OK	Ignore	No		
mmdd Driver	mnmdd c:\windows\system32\drivers\mmdd.sys	Kernel Driver	Yes	System	Running	OK	Ignore	No	partmgr	Partition Manager Kernel Driver	c:\windows\system32\drivers\partmgr.sys	Yes	Boot	Running	OK					
modem Driver	Modem c:\windows\system32\drivers\modem.sys	Kernel Driver	No	Manual	Stopped	OK	Ignore	No	pci	PCI Bus Driver Kernel Driver	c:\windows\system32\drivers\pci.sys	Yes	Boot	Running	OK					
			No						Critical	No	Yes									

pciide Driver	PCIIde Yes Yes	c:\windows\system32\drivers\pciide.sys	Kernel Normal No	Running OK	Yes	Normal No	Kernel No	simbad Simbad Disabled Stopped	Not Available OK	Kernel Driver Normal	No No
pcmcia Driver	Pcmcia No No	c:\windows\system32\drivers\pcmcia.sys	Kernel Normal No	Stopped OK	Yes	Normal No	Kernel No	srv System Driver No Yes	c:\windows\system32\drivers\srv.sys Manual Yes	Running OK	File Normal
pdcomp	PDCOMP	Not Available	Kernel Driver	Ignore	No	Normal	No	swenum Software Bus Driver Kernel Driver	c:\windows\system32\drivers\swenum.sys Yes	Manual Running	OK
pdframe	PDFRAME	Not Available	Kernel Driver	Ignore	No	Normal	No	symc8xx symc8xx	Not Available Disabled Stopped	Kernel Driver Normal	No No
pdreli	PDRELI	Not Available	Kernel Driver	Ignore	No	Normal	No	symmpi symmpi	Not Available Disabled Stopped	Kernel Driver Normal	No No
pdframe	PDRFRAME	Not Available	Kernel Driver	Ignore	No	Normal	No	sym_hi sym_hi	Not Available Disabled Stopped	Kernel Driver Normal	No No
percsas Driver	percsas Yes	c:\windows\system32\drivers\percsas.sys	Kernel Normal No	Running OK	Yes	Normal No	Kernel No	sym_u3 sym_u3	Not Available Disabled Stopped	Kernel Driver Normal	No No
pptpminiport	WAN Miniport (PPTP)							tcpip TCP/IP Protocol Driver			
		c:\windows\system32\drivers\raspppt.sys	Kernel Driver	Running	Yes	Normal	No	tdpipe TDPIPE	c:\windows\system32\drivers\tdpipe.sys	Kernel Driver	
ptilink	Direct Parallel Link Driver							tdtcp TDTCP	c:\windows\system32\drivers\tdtcp.sys	Kernel	
		c:\windows\system32\drivers\ptilink.sys	Kernel Driver	Running	Yes	Normal	No	termdd Terminal Device Driver			
ql2300	ql2300	Not Available	Kernel Driver	Ignore	No	Normal	No	c:\windows\system32\drivers\termdd.sys	Running	Kernel Driver	
rasacd	Remote Access Auto Connection Driver							toside TosIde	Not Available Disabled Stopped	Kernel Driver Normal	No No
		c:\windows\system32\drivers\rasacd.sys	Kernel Driver	Running	Yes	Normal	No	udfs Udfs	c:\windows\system32\drivers\udfs.sys	File	
rasl2tp	WAN Miniport (L2TP)							System Driver	No Disabled Stopped	OK	Normal
		c:\windows\system32\drivers\rasl2tp.sys	Kernel Driver	Running	Yes	Normal	No	ultra ultra	Not Available Disabled Stopped	Kernel Driver Normal	No No
raspppoe	Remote Access PPPOE Driver							update Microcode Update Driver			
		c:\windows\system32\drivers\raspppoe.sys	Kernel Driver	Running	Yes	Normal	No	c:\windows\system32\drivers\update.sys	Running	Kernel Driver	
raspti	Direct Parallel Kernel Driver							usbccgp Microsoft USB Generic Parent Driver			
		c:\windows\system32\drivers\raspti.sys	Kernel Driver	Running	Yes	Normal	No	c:\windows\system32\drivers\usbccgp.sys	Running	Kernel Driver	
rdbss System Driver	Rdbss	c:\windows\system32\drivers\rdbss.sys	File Normal	Running	Yes	Normal	No	Yes			
rdpcdd Driver	RDPCDD	c:\windows\system32\drivers\rdpcdd.sys	Kernel	Running	Yes	Normal	No	usbhci Microsoft USB 2.0 Enhanced Host Controller Miniport Driver	Running	Kernel Driver	
			Kernel	Running	Yes	Normal	No	c:\windows\system32\drivers\usbhci.sys	Running	Kernel Driver	
rdpdr	Terminal Server Device Redirector Driver							Yes			
		c:\windows\system32\drivers\rdpdr.sys	Kernel Driver	Running	Yes	Normal	No	usbhub USB2 Enabled Hub	c:\windows\system32\drivers\usbhub.sys	Kernel Driver	
rdpwd Driver	RDPWD	c:\windows\system32\drivers\rdpwd.sys	Kernel	Running	Yes	Normal	No	Kernel Driver	Yes Manual Running	OK	
			Kernel	Running	Yes	Normal	No	usbstor USB Mass Storage Driver			
redbook	Digital CD Audio Playback Filter Driver							c:\windows\system32\drivers\usbstor.sys	Running	Kernel Driver	
		c:\windows\system32\drivers\redbook.sys	Kernel Driver	Running	Yes	Normal	No	No			
secdrv	Security Driver							usbuhci Microsoft USB Universal Host Controller Miniport Driver			
		c:\windows\system32\drivers\secdrv.sys	Kernel Driver	Running	Yes	Normal	No	c:\windows\system32\drivers\usbuhci.sys	Running	Kernel Driver	
serenum	Serenum Filter Driver							Yes	Manual Running	OK	Normal No
		c:\windows\system32\drivers\serenum.sys	Kernel Driver	Running	Yes	Normal	No	vga vga	c:\windows\system32\drivers\vgapnp.sys	Kernel	
serial	Serial port driver							Driver	Manual Running	OK	Ignore No
		c:\windows\system32\drivers\serial.sys	Kernel Driver	Running	Yes	Normal	No	vgasave VGA Display Controller.			
sfloppy Driver	Sfloppy	c:\windows\system32\drivers\sfloppy.sys	Kernel	Running	Yes	Normal	No	c:\windows\system32\drivers\vga.sys	Running	Kernel Driver	
			Kernel	Running	Yes	Normal	No	No	System Stopped	OK	Ignore No
			Kernel	Running	Yes	Normal	No	viaide Vialde	Not Available Disabled Stopped	Kernel Driver Normal	No No
			Kernel	Running	Yes	Normal	No	volsnap Storage volumes	c:\windows\system32\drivers\volsnap.sys	Kernel Driver	
			Kernel	Running	Yes	Normal	No	Yes	Yes Boot Running	OK	

wanarp	Remote Access IP ARP Driver							volsnap	Not Available	LEGACYDRIVER	Not Available	
	c:\windows\system32\drivers\wanarp.sys		Kernel Driver						Not Available	Not Available	Not Available	
	Yes	Manual	Running	OK	Normal	No			Not Available	ROOT\LEGACY_VOLSNAPO\0000		
	Yes								Not Available	LEGACYDRIVER	Not Available	
wdica	WDICA	Not Available	Kernel Driver		No			TDTCP	Not Available	Not Available	Not Available	
	Manual	Stopped	OK	Ignore	No	No			Not Available	ROOT\LEGACY_TDTCP\0000		
wlbs	Network Load Balancing							TCP/IP Protocol Driver	Not Available	LEGACYDRIVER		
	c:\windows\system32\drivers\wlbs.sys		Kernel Driver						Not Available	Not Available	Not Available	
	No	Manual	Stopped	OK	Normal	No			Not Available	Not Available		
	No								ROOT\LEGACY_TCPIP\0000			
[Signed Drivers]												
	Device Name	Signed	Device Class	Driver Version				RDPWD	Not Available	LEGACYDRIVER	Not Available	
	Driver Date		Manufacturer	INF Name	Driver				Not Available	Not Available	Not Available	
	Name	Device ID							Not Available	ROOT\LEGACY_SECDRV\0000		
	Microsoft System Management BIOS Driver	Yes	SYSTEM						Not Available	LEGACYDRIVER	Not Available	
	5.2.3790.1830	10/1/2002	(Standard system devices)	machine.inf					Not Available	ROOT\LEGACY_RDPWD\0000		
	machine.inf		Not Available						Not Available	ROOT\LEGACY_RDPD\0000		
	ROOT\SYSTEM\0002											
	Microcode Update Device	Yes	SYSTEM	5.2.3790.1830				Remote Access Auto Connection Driver	Not Available			
	10/1/2002	(Standard system devices)	machine.inf						LEGACYDRIVER	Not Available	Not Available	
	Not Available		ROOT\SYSTEM\0001						Not Available	Not Available	Not Available	
	Not Available								ROOT\LEGACY_RASACD\0000			
	Plug and Play Software Device Enumerator	Yes	SYSTEM					Partition Manager	Not Available	LEGACYDRIVER	Not Available	
	5.2.3790.1830	10/1/2002	(Standard system devices)	machine.inf					Not Available	Not Available	Not Available	
	machine.inf		Not Available						Not Available	ROOT\LEGACY_PARTMGR\0000		
	ROOT\SYSTEM\0000								Not Available	LEGACYDRIVER	Not Available	
	Terminal Server Mouse Driver	Yes	SYSTEM	5.2.3790.1830				Null	Not Available	Not Available	Not Available	
	10/1/2002	(Standard system devices)	machine.inf						Not Available	Not Available	Not Available	
	Not Available		ROOT\RDP_MOUSE\0000						Not Available	ROOT\LEGACY_NULL\0000		
	Terminal Server Keyboard Driver	Yes	SYSTEM					NetBios over Tcpi	Not Available	LEGACYDRIVER	Not Available	
	5.2.3790.1830	10/1/2002	(Standard system devices)	machine.inf					Available	Not Available	Not Available	
	machine.inf		Not Available						Not Available	ROOT\LEGACY_NETBT\0000		
	ROOT\RDP_KEYBOARD\0000								Not Available	LEGACYDRIVER	Not Available	
	Terminal Server Device Redirector	Yes	SYSTEM						Not Available	Not Available	Not Available	
	5.2.3790.1830	10/1/2002	(Standard system devices)	machine.inf					Not Available	ROOT\LEGACY_NDPROXY\0000		
	machine.inf		Not Available						Not Available	LEGACYDRIVER	Not Available	
	Not Available		ROOT\RDPDR\0000						Not Available	Not Available	Not Available	
	Direct Parallel	Yes	NET	5.2.3790.1830	10/1/2002			NDIS Usermode I/O Protocol	Not Available	LEGACYDRIVER		
	Microsoft netrasa.inf	Not Available							Not Available	Not Available	Not Available	
	ROOT\MS_PTMINIPORT\0000								Not Available	ROOT\LEGACY_NDISUIO\0000		
	WAN Miniport (PPTP)	Yes	NET	5.2.3790.1830				Remote Access NDIS TAPI Driver	Not Available			
	10/1/2002	Microsoft netrasa.inf	Not Available						LEGACYDRIVER	Not Available	Not Available	
	ROOT\MS_PPTPMINIPORT\0000								Not Available	Not Available	Not Available	
	WAN Miniport (PPPOE)	Yes	NET	5.2.3790.1830					Not Available	ROOT\LEGACY_NDISTAPI\0000		
	10/1/2002	Microsoft netrasa.inf	Not Available						Not Available	LEGACYDRIVER	Not Available	
	ROOT\MS_PPPOEMINIPORT\0000								Not Available	Not Available	Not Available	
	WAN Miniport (IP)	Yes	NET	5.2.3790.1830	10/1/2002			mountmgr	Not Available	LEGACYDRIVER	Not Available	
	Microsoft netrasa.inf	Not Available							Not Available	Not Available	Not Available	
	ROOT\MS_NDISWANIP\0000								Not Available	ROOT\LEGACY_MOUNTMGR\0000		
	WAN Miniport (L2TP)	Yes	NET	5.2.3790.1830					Not Available	LEGACYDRIVER	Not Available	
	10/1/2002	Microsoft netrasa.inf	Not Available						Not Available	Not Available	Not Available	
	ROOT\MS_L2TPMINIPORT\0000								Not Available	ROOT\LEGACY_MNMDD\0000		
	Video Codecs	Yes	MEDIA	5.2.3790.1830	10/1/2002			ksecdd	Not Available	LEGACYDRIVER	Not Available	
	(Standard system devices)	wave.inf	Not Available						Not Available	Not Available	Not Available	
	ROOT\MEDIA\MS_MMVID								Not Available	ROOT\LEGACY_KSECDD\0000		
	Legacy Video Capture Devices	Yes	MEDIA	5.2.3790.1830				IPSEC driver	Not Available	LEGACYDRIVER	Not Available	
	10/1/2002	(Standard system devices)	wave.inf	Not Available					Available	Not Available	Not Available	
	Available		ROOT\MEDIA\MS_MMVCD						Not Available	ROOT\LEGACY_IPSEC\0000		
	Media Control Devices	Yes	MEDIA	5.2.3790.1830					Not Available	LEGACYDRIVER		
	10/1/2002	(Standard system devices)	wave.inf	Not Available					Not Available	Not Available	Not Available	
	Available		ROOT\MEDIA\MS_MMMCI						Not Available	LEGACYDRIVER		
	Legacy Audio Drivers	Yes	MEDIA	5.2.3790.1830	10/1/2002				Not Available	Not Available	Not Available	
	(Standard system devices)	wave.inf	Not Available						Not Available	ROOT\LEGACY_IPNAT\0000		
	ROOT\MEDIA\MS_MMDRV								Not Available	LEGACYDRIVER	Not Available	
	Audio Codecs	Yes	MEDIA	5.2.3790.1830	10/1/2002				Not Available	Not Available	Not Available	
	(Standard system devices)	wave.inf	Not Available						Not Available	LEGACYDRIVER		
	ROOT\MEDIA\MS_MMACM								Not Available	Not Available	Not Available	
	Remote Access IP ARP Driver	Not Available							Not Available	LEGACYDRIVER		
	Not Available	Not Available							Not Available	Not Available	Not Available	
	Not Available	Not Available							Not Available	LEGACYDRIVER	Not Available	
	ROOT\LEGACY_WANARP\0000								Not Available	Not Available	Not Available	
									Not Available	ROOT\LEGACY_GPC\0000		
									Not Available	LEGACYDRIVER	Not Available	
									Not Available	Not Available	Not Available	
									Not Available	ROOT\LEGACY_FIPS\0000		

dmload	Not Available	LEGACYDRIVER	Not Available	STORAGE\VOLUME\1&30A96598&0&SIGNATURE30F8BF08
	Not Available	Not Available	Not Available	OFFSET23507C1000LENGTHD6FF191000
	Not Available	ROOT\LEGACY_DMLOAD\0000	Generic volume	Yes VOLUME 5.2.3790.1830 10/1/2002
dmboot	Not Available	LEGACYDRIVER	Not Available	Microsoft volume.inf Not Available
	Not Available	Not Available	Not Available	STORAGE\VOLUME\1&30A96598&0&SIGNATURE30F8BF08
	Not Available	ROOT\LEGACY_DMBOOT\0000	Generic volume	Yes VOLUME 5.2.3790.1830 10/1/2002
CRC Disk Filter Driver	Not Available	LEGACYDRIVER	Not Available	Microsoft volume.inf Not Available
	Not Available	Not Available	Not Available	STORAGE\VOLUME\1&30A96598&0&SIGNATURE30F8BF08
	Not Available	ROOT\LEGACY_CRCDISK\0000	Volume Manager	Yes SYSTEM 5.2.3790.1830 10/1/2002
CdaD10BA	Not Available	LEGACYDRIVER	Not Available	(Standard system devices) machine.inf Not
Available	Not Available	Not Available	Not Available	ROOT\FTDISK\0000
	Not Available	ROOT\LEGACY_CDAD10BA\0000	Logical Disk Manager	Yes SYSTEM 5.2.3790.1830 10/1/2002
CdaC15BA	Not Available	LEGACYDRIVER	Not Available	(Standard system devices) machine.inf Not
Available	Not Available	Not Available	Not Available	ROOT\DMIO\0000
	Not Available	ROOT\LEGACY_CDAC15BA\0000	ACPI Fixed Feature Button	Yes SYSTEM 5.2.3790.1830
Beep	Not Available	LEGACYDRIVER	Not Available	10/1/2002 (Standard system devices) machine.inf
	Not Available	Not Available	Not Available	ACPI\FIXEDBUTTON\2&DABA3FF&0
	Not Available	ROOT\LEGACY_BEEP\0000	High precision event timer	Yes SYSTEM 5.2.3790.1830
AFD	Not Available	LEGACYDRIVER	Not Available	10/1/2002 (Standard system devices) machine.inf
	Not Available	Not Available	Not Available	ACPI\PNP0103\0
	Not Available	ROOT\LEGACY_AFD\0000	Motherboard resources	Yes SYSTEM 5.2.3790.1830
Generic volume	Yes	VOLUME 5.2.3790.1830	10/1/2002	10/1/2002 (Standard system devices) machine.inf
	Microsoft	volume.inf Not Available		Not Available ACPI\PNP0C02\0
		STORAGE\VOLUME\1&30A96598&0&SIGNATUREF4638DB	Secondary IDE Channel	Yes HDC 5.2.3790.1830
80FFSET23507C1000LENGTHD6FF191000	Generic volume	Yes VOLUME 5.2.3790.1830	10/1/2002	10/1/2002 (Standard IDE ATA/ATAPI controllers) mshdc.inf
	Microsoft	volume.inf Not Available		Not Available
		STORAGE\VOLUME\1&30A96598&0&SIGNATUREF4638DB	CD-ROM Drive	Yes CDROM 5.2.3790.1830 10/1/2002
80FFSET17D071A600LENGTDB800A6A00	Generic volume	Yes VOLUME 5.2.3790.1830	10/1/2002	(Standard CD-ROM drives) cdrom.inf Not Available
	Microsoft	volume.inf Not Available		IDE\CDROMHL-DT-ST_CD-ROM_GCR-
		STORAGE\VOLUME\1&30A96598&0&SIGNATUREF4638DB	8483B_____1.05_____5&41A3CB2&0&0.0.0	
80FFSET7E00LENGTH17D0712800	Generic volume	Yes VOLUME 5.2.3790.1830	10/1/2002	Primary IDE Channel
	Microsoft	volume.inf Not Available		Yes HDC 5.2.3790.1830 10/1/2002
		STORAGE\VOLUME\1&30A96598&0&SIGNATUREF4638DB	(Standard IDE ATA/ATAPI controllers)	mshdc.inf Not
90FFSET23D0EF1C00LENGTDB67EA60400	Generic volume	Yes VOLUME 5.2.3790.1830	10/1/2002	Available PCIIDE\IDECHANNEL\4&1D8A9C03&0&0
	Microsoft	volume.inf Not Available		Standard Dual Channel PCI IDE Controller
		STORAGE\VOLUME\1&30A96598&0&SIGNATUREF4638DB	Yes	HDC 5.2.3790.1830 10/1/2002
90FFSET23507C1000LENGTHH80730C00	Generic volume	Yes VOLUME 5.2.3790.1830	10/1/2002	(Standard IDE ATA/ATAPI controllers) mshdc.inf Not Available
	Microsoft	volume.inf Not Available		PCI\VEN_8086&DEV_269E&SUBSYS_01B11028&REV_09\3&
		STORAGE\VOLUME\1&30A96598&0&SIGNATUREF4638DB	61AAA01&0&F9	
90FFSET17D071A600LENGTDB800A6A00	Generic volume	Yes VOLUME 5.2.3790.1830	10/1/2002	System board
	Microsoft	volume.inf Not Available		Yes SYSTEM 5.2.3790.1830 10/1/2002
		STORAGE\VOLUME\1&30A96598&0&SIGNATUREF4638DB	(Standard system devices)	machine.inf Not
90FFSET7E00LENGTH17D0712800	Generic volume	Yes VOLUME 5.2.3790.1830	10/1/2002	Available ACPI\PI0001\5
	Microsoft	volume.inf Not Available		System board
		STORAGE\VOLUME\1&30A96598&0&SIGNATUREF4638DB	Yes	SYSTEM 5.2.3790.1830 10/1/2002
90FFSET17D071A600LENGTDB800A6A00	Generic volume	Yes VOLUME 5.2.3790.1830	10/1/2002	(Standard system devices) machine.inf Not
	Microsoft	volume.inf Not Available		Available ACPI\PNP0C01\0
		STORAGE\VOLUME\1&30A96598&0&SIGNATUREF4638DB	Communications Port	Yes PORTS 5.2.3790.1830 10/1/2002
90FFSET7E00LENGTH17D0712800	Generic volume	Yes VOLUME 5.2.3790.1830	10/1/2002	(Standard port types) mspports.inf Not Available
	Microsoft	volume.inf Not Available		ACPI\PNP0501\2
		STORAGE\VOLUME\1&30A96598&0&SIGNATUREF020F020	Communications Port	Yes PORTS 5.2.3790.1830 10/1/2002
OFFSETA0029CC00LENGTDF003EB200	Generic volume	Yes VOLUME 5.2.3790.1830	10/1/2002	(Standard port types) mspports.inf Not Available
	Microsoft	volume.inf Not Available		ACPI\PNP0501\1
		STORAGE\VOLUME\1&30A96598&0&SIGNATUREF020F020	Floppy disk drive	Yes FLOPPYDISK 5.2.3790.1830
OFFSET7E00LENGTFA00294E00	Generic volume	Yes VOLUME 5.2.3790.1830	10/1/2002	10/1/2002 (Standard floppy disk drives) floppydisk.inf
	Microsoft	volume.inf Not Available		Not Available
		STORAGE\VOLUME\1&30A96598&0&SIGNATUREF020F020	FDC\GENERIC_FLOPPY_DRIVE\5&33C0F973&0&0	
OFFSET7E00LENGTFA00294E00	Generic volume	Yes VOLUME 5.2.3790.1830	10/1/2002	Standard floppy disk controller
	Microsoft	volume.inf Not Available		Yes FDC 5.2.3790.1830
		STORAGE\VOLUME\1&30A96598&0&SIGNATURE8D560D5	10/1/2002	(Standard floppy disk controllers) fdcc.inf
10FFSET23507C1000LENGTHD6FF191000	Generic volume	Yes VOLUME 5.2.3790.1830	10/1/2002	Not Available ACPI\PNP0700\4&2AA4AD3D&0
	Microsoft	volume.inf Not Available		System timer
		STORAGE\VOLUME\1&30A96598&0&SIGNATURE8D560D5	Yes	SYSTEM 5.2.3790.1830 10/1/2002
10FFSET17D071A600LENGTDB800A6A00	Generic volume	Yes VOLUME 5.2.3790.1830	10/1/2002	(Standard system devices) machine.inf Not
	Microsoft	volume.inf Not Available		Available ACPI\PNP0100\4&2AA4AD3D&0
		STORAGE\VOLUME\1&30A96598&0&SIGNATURE8D560D5	System CMOS/real time clock	Yes SYSTEM 5.2.3790.1830
10FFSET7E00LENGTH17D0712800	Generic volume	Yes VOLUME 5.2.3790.1830	10/1/2002	10/1/2002 (Standard system devices) machine.inf
	Microsoft	volume.inf Not Available		Not Available ACPI\PNP0B00\4&2AA4AD3D&0
		STORAGE\VOLUME\1&30A96598&0&SIGNATURE8D560D5	System board	Yes SYSTEM 5.2.3790.1830 10/1/2002
10FFSET7E00LENGTH17D0712800	Generic volume	Yes VOLUME 5.2.3790.1830	10/1/2002	(Standard system devices) machine.inf Not
	Microsoft	volume.inf Not Available		Available ACPI\PNP0C01\2
		STORAGE\VOLUME\1&30A96598&0&SIGNATURE8D560D5	Programmable interrupt controller	Yes SYSTEM
10FFSET7E00LENGTH17D0712800	Generic volume	Yes VOLUME 5.2.3790.1830	10/1/2002	5.2.3790.1830 10/1/2002 (Standard system devices)
	Microsoft	volume.inf Not Available		machine.inf Not Available
		STORAGE\VOLUME\1&30A96598&0&SIGNATURE8D560D5	ACPI\PNP0000\4&2AA4AD3D&0	

Numeric data processor	Yes	SYSTEM	5.2.3790.1830		keyboard.inf	Not Available
10/1/2002 (Standard system devices)			machine.inf		HID\VID_0518&PID_0001&MI_007&176B4332&0&0000	
Not Available			ACPI\PNP0C04\4&2AA4AD3D&0		USB Human Interface Device	Yes HIDCLASS
Direct memory access controller	Yes	SYSTEM	5.2.3790.1830		5.2.3790.1830	10/1/2002 (Standard system devices)
10/1/2002 (Standard system devices)			machine.inf		input.inf	Not Available
Not Available			ACPI\PNP0200\4&2AA4AD3D&0		USB\VID_0518&PID_0001&MI_006&1DC73AF8&0&0000	
PCI standard ISA bridge	Yes	SYSTEM	5.2.3790.1830		USB Composite Device	Yes USB 5.2.3790.1830
10/1/2002 (Standard system devices)			machine.inf		10/1/2002 (Standard USB Host Controller)	usb.inf Not Available
Not Available			PCI\VEN_8086&DEV_2670&SUBSYS_00000000&REV_09\3&61AAA01&0&F8		Available	USB\VID_0518&PID_0001\5&3014DA89&0&1
Default Monitor	Yes	MONITOR	5.2.3790.1830		USB Root Hub	Yes USB 5.2.3790.1830 10/1/2002 (Standard USB Host Controller)
10/1/2002 (Standard monitor types)			monitor.inf		(Standard USB Host Controller)	usbport.inf Not Available
Not Available			DISPLAY\DEFAULT_MONITOR\5&EEED524&0&12345678&14&0D		Standard Universal PCI to USB Host Controller	Yes USB 5.2.3790.1830 10/1/2002 (Standard USB Host Controller)
Standard VGA Graphics Adapter	Yes	DISPLAY	5.2.3790.1830		usbport.inf Not Available	PCI\VEN_8086&DEV_2689&SUBSYS_01B11028&REV_09\3&61AAA01&0&E9
10/1/2002 (Standard display types)			display.inf	Not Available	USB Root Hub	Yes USB 5.2.3790.1830 10/1/2002 (Standard USB Host Controller)
Available			PCI\VEN_1002&DEV_515E&SUBSYS_01B11028&REV_02\4&2014205D&0&68F0		(Standard USB Host Controller)	usbport.inf Not Available
Intel(R) 82801 PCI Bridge - 244E	Yes	SYSTEM	5.2.3790.1830		USB\ROOT_HUB\4&1C492D05&0	
5.2.3790.1830	10/1/2002	Intel	machine.inf		Standard Universal PCI to USB Host Controller	Yes USB 5.2.3790.1830 10/1/2002 (Standard USB Host Controller)
Not Available			PCI\VEN_8086&DEV_244E&SUBSYS_00000000&REV_D9\3&61AAA01&0&F0		usbport.inf Not Available	PCI\VEN_8086&DEV_2688&SUBSYS_01B11028&REV_09\3&61AAA01&0&E8
Generic USB Hub	Yes	USB	5.2.3790.1830	10/1/2002	Broadcom BCM5708C NetXtreme II GigE (NDIS VBD Client)	Yes NET 2.6.14.0 4/3/2006 Broadcom Corporation
(Generic USB Hub)	usb.inf	Not Available			oem3.inf	Not Available
USB\VID_04B4&PID_6560\5&6F526B7&0&7					B06BDRV\L2ND&PCI_164C14E4&SUBSYS_01B11028&REV_11\6&3100A6D6&0&20050500	
USB Root Hub	Yes	USB	5.2.3790.1830	10/1/2002	Broadcom BCM5708C NetXtreme II GigE	Yes SYSTEM 2.6.17.0 4/21/2006 Broadcom Corporation oem5.inf Not Available
(Standard USB Host Controller)	usbport.inf	Not Available			Available	PCI\VEN_14E4&DEV_164C&SUBSYS_01B11028&REV_11\5&2EADD4B0&0&0000E0
USB\ROOT_HUB20\4&25F3EE70&0					PCI standard PCI-to-PCI bridge	Yes SYSTEM 5.2.3790.1830 10/1/2002 (Standard system devices)
Standard Enhanced PCI to USB Host Controller	Yes	USB	5.2.3790.1830	10/1/2002 (Standard USB Host Controller)	usbport.inf	Not Available
usbport.inf	Not Available				PCI\VEN_1166&DEV_0103&SUBSYS_00000000&REV_C2\4&187919FE&0&00E0	
PCI\VEN_8086&DEV_268C&SUBSYS_01B11028&REV_09\3&61AAA01&0&EF					PCI standard PCI-to-PCI bridge	Yes SYSTEM 5.2.3790.1830 10/1/2002 (Standard system devices)
USB Root Hub	Yes	USB	5.2.3790.1830	10/1/2002	usbport.inf	Not Available
(Standard USB Host Controller)	usbport.inf	Not Available			PCI\VEN_8086&DEV_2690&SUBSYS_00000000&REV_09\3&61AAA01&0&E0	
USB\ROOT_HUB\4&1C386FEF&0					PCI standard host CPU bridge	Yes SYSTEM 5.2.3790.1830 10/1/2002 (Standard system devices)
Standard Universal PCI to USB Host Controller	Yes	USB	5.2.3790.1830	10/1/2002 (Standard USB Host Controller)	usbport.inf	Not Available
usbport.inf	Not Available				PCI\VEN_8086&DEV_25F6&SUBSYS_00000000&REV_12\3&61AAA01&0&B0	
PCI\VEN_8086&DEV_268B&SUBSYS_01B11028&REV_09\3&61AAA01&0&EB					PCI standard host CPU bridge	Yes SYSTEM 5.2.3790.1830 10/1/2002 (Standard system devices)
USB Root Hub	Yes	USB	5.2.3790.1830	10/1/2002	usbport.inf	Not Available
(Standard USB Host Controller)	usbport.inf	Not Available			PCI\VEN_8086&DEV_25F5&SUBSYS_00000000&REV_12\3&61AAA01&0&A8	
USB\ROOT_HUB\4&2DD355BC&0					PCI standard host CPU bridge	Yes SYSTEM 5.2.3790.1830 10/1/2002 (Standard system devices)
Standard Universal PCI to USB Host Controller	Yes	USB	5.2.3790.1830	10/1/2002 (Standard USB Host Controller)	usbport.inf	Not Available
usbport.inf	Not Available				PCI\VEN_8086&DEV_25F3&SUBSYS_00000000&REV_12\3&61AAA01&0&98	
PCI\VEN_8086&DEV_268A&SUBSYS_01B11028&REV_09\3&61AAA01&0&EA					PCI standard host CPU bridge	Yes SYSTEM 5.2.3790.1830 10/1/2002 (Standard system devices)
HID-compliant consumer control device	Yes	HIDCLASS	5.2.3790.1830		usbport.inf	Not Available
5.2.3790.1830	10/1/2002	Microsoft	hidserv.inf	Not Available	PCI\VEN_8086&DEV_25F0&SUBSYS_00000000&REV_12\3&61AAA01&0&82	
Available					PCI standard host CPU bridge	Yes SYSTEM 5.2.3790.1830 10/1/2002 (Standard system devices)
HID\VID_0518&PID_0001&MI_01&COL03\7&3B4280F4&0&002					usbport.inf	Not Available
HID-compliant device	Yes	HIDCLASS	5.2.3790.1830		PCI\VEN_8086&DEV_25F1&SUBSYS_00000000&REV_12\3&61AAA01&0&88	
10/1/2002 (Standard system devices)			input.inf	Not Available	PCI standard host CPU bridge	Yes SYSTEM 5.2.3790.1830 10/1/2002 (Standard system devices)
Available					usbport.inf	Not Available
HID\VID_0518&PID_0001&MI_01&COL02\7&3B4280F4&0&001					PCI\VEN_8086&DEV_25F0&SUBSYS_00000000&REV_12\3&61AAA01&0&80	
HID-compliant mouse	Yes	MOUSE	5.2.3790.1830	10/1/2002	Microsoft	msmouse.inf Not Available
Microsoft	msmouse.inf	Not Available			HID\VID_0518&PID_0001&MI_01&COL01\7&3B4280F4&0&000	
HID\VID_0518&PID_0001&MI_01&COL01\7&3B4280F4&0&000					USB Human Interface Device	Yes HIDCLASS 5.2.3790.1830 10/1/2002 (Standard system devices)
USB Human Interface Device	Yes	HIDCLASS	5.2.3790.1830	10/1/2002 (Standard system devices)	input.inf	Not Available
5.2.3790.1830	10/1/2002				USB\VID_0518&PID_0001&MI_01\6&1DC73AF8&0&0001	
input.inf	Not Available				HID Keyboard Device	Yes KEYBOARD 5.2.3790.1830 10/1/2002 (Standard keyboards)
USB\VID_0518&PID_0001&MI_01\6&1DC73AF8&0&0001						
HID Keyboard Device	Yes	KEYBOARD	5.2.3790.1830	10/1/2002 (Standard keyboards)		
5.2.3790.1830	10/1/2002					

PCI\VEN_8086&DEV_25F0&SUBSYS_00000000&REV_12\3&61AAA01&0&81
 PCI standard host CPU bridge Yes SYSTEM 5.2.3790.1830
 10/1/2002 (Standard system devices) machine.inf
 Not Available
 PCI\VEN_8086&DEV_25F0&SUBSYS_00000000&REV_12\3&61AAA01&0&80
 PCI standard PCI-to-PCI bridge Yes SYSTEM 5.2.3790.1830
 10/1/2002 (Standard system devices) machine.inf
 Not Available
 PCI\VEN_8086&DEV_25E7&SUBSYS_00000000&REV_12\3&61AAA01&0&38
 PCI standard PCI-to-PCI bridge Yes SYSTEM 5.2.3790.1830
 10/1/2002 (Standard system devices) machine.inf
 Not Available
 PCI\VEN_8086&DEV_0372&SUBSYS_00000000&REV_00\4&149DD53B&0&0230
 DELL PERC RAID Virtual Device No SYSTEM 1.20.0.64
 12/9/2005 DELL oem0.inf Not Available
 SCSI\OTHER&VEN__RAID&PROD__DUMMYDEVICE&RE
 V_0001\6&1BE1250F&0&1400
 Disk drive Yes DISKDRIVE 5.2.3790.1830 10/1/2002
 (Standard disk drives) disk.inf Not Available
 SCSI\DISK&VEN_DELL&PROD_PERC_5/E_ADAPTER&REV
 _1.00\6&1BE1250F&0&110
 Disk drive Yes DISKDRIVE 5.2.3790.1830 10/1/2002
 (Standard disk drives) disk.inf Not Available
 SCSI\DISK&VEN_DELL&PROD_PERC_5/E_ADAPTER&REV
 _1.00\6&1BE1250F&0&100
 DELL PERC 5/E Adapter RAID Controller No SCSIADAPTER
 1.20.0.64 12/9/2005 DELL oem1.inf Not Available
 PCI\VEN_1028&DEV_0015&SUBSYS_1F011028&REV_00\5&376DDE58&0&700030
 PCI standard PCI-to-PCI bridge Yes SYSTEM 5.2.3790.1830
 10/1/2002 (Standard system devices) machine.inf
 Not Available
 PCI\VEN_8086&DEV_0370&SUBSYS_00000000&REV_00\4&149DD53B&0&0030
 PCI standard PCI-to-PCI bridge Yes SYSTEM 5.2.3790.1830
 10/1/2002 (Standard system devices) machine.inf
 Not Available
 PCI\VEN_8086&DEV_25F9&SUBSYS_00000000&REV_12\3&61AAA01&0&30
 PCI standard PCI-to-PCI bridge Yes SYSTEM 5.2.3790.1830
 10/1/2002 (Standard system devices) machine.inf
 Not Available
 PCI\VEN_8086&DEV_0372&SUBSYS_00000000&REV_00\4&28CEA4F8&0&0228
 DELL PERC RAID Virtual Device No SYSTEM 1.20.0.64
 12/9/2005 DELL oem0.inf Not Available
 SCSI\OTHER&VEN__RAID&PROD__DUMMYDEVICE&RE
 V_0001\6&107D05B&0&1400
 Disk drive Yes DISKDRIVE 5.2.3790.1830 10/1/2002
 (Standard disk drives) disk.inf Not Available
 SCSI\DISK&VEN_DELL&PROD_PERC_5/I&REV_1.00\6&107
 D05B&0&100
 DELL PERC 5/i Integrated RAID Controller No SCSIADAPTER
 1.20.0.64 12/9/2005 DELL oem1.inf Not Available
 PCI\VEN_1028&DEV_0015&SUBSYS_1F031028&REV_00\5&22FD9970&0&700028
 PCI standard PCI-to-PCI bridge Yes SYSTEM 5.2.3790.1830
 10/1/2002 (Standard system devices) machine.inf
 Not Available
 PCI\VEN_8086&DEV_0370&SUBSYS_00000000&REV_00\4&28CEA4F8&0&0028
 PCI standard PCI-to-PCI bridge Yes SYSTEM 5.2.3790.1830
 10/1/2002 (Standard system devices) machine.inf
 Not Available
 PCI\VEN_8086&DEV_25E5&SUBSYS_00000000&REV_12\3&61AAA01&0&28
 PCI standard PCI-to-PCI bridge Yes SYSTEM 5.2.3790.1830
 10/1/2002 (Standard system devices) machine.inf
 Not Available

PCI\VEN_8086&DEV_0372&SUBSYS_00000000&REV_00\4&201440C3&0&0220
 DELL PERC RAID Virtual Device No SYSTEM 1.20.0.64
 12/9/2005 DELL oem0.inf Not Available
 SCSI\OTHER&VEN__RAID&PROD__DUMMYDEVICE&RE
 V_0001\6&2DAC0A12&0&1400
 Disk drive Yes DISKDRIVE 5.2.3790.1830 10/1/2002
 (Standard disk drives) disk.inf Not Available
 SCSI\DISK&VEN_DELL&PROD_PERC_5/E_ADAPTER&REV
 _1.00\6&2DAC0A12&0&110
 Disk drive Yes DISKDRIVE 5.2.3790.1830 10/1/2002
 (Standard disk drives) disk.inf Not Available
 SCSI\DISK&VEN_DELL&PROD_PERC_5/E_ADAPTER&REV
 _1.00\6&2DAC0A12&0&100
 DELL PERC 5/E Adapter RAID Controller No SCSIADAPTER
 1.20.0.64 12/9/2005 DELL oem1.inf Not Available
 PCI\VEN_1028&DEV_0015&SUBSYS_1F011028&REV_00\5&20524F73&0&700020
 PCI standard PCI-to-PCI bridge Yes SYSTEM 5.2.3790.1830
 10/1/2002 (Standard system devices) machine.inf
 Not Available
 PCI\VEN_8086&DEV_0370&SUBSYS_00000000&REV_00\4&201440C3&0&0220
 PCI standard PCI-to-PCI bridge Yes SYSTEM 5.2.3790.1830
 10/1/2002 (Standard system devices) machine.inf
 Not Available
 PCI\VEN_8086&DEV_25E4&SUBSYS_00000000&REV_12\3&61AAA01&0&20
 PCI standard PCI-to-PCI bridge Yes SYSTEM 5.2.3790.1830
 10/1/2002 (Standard system devices) machine.inf
 Not Available
 PCI\VEN_8086&DEV_25E3&SUBSYS_00000000&REV_12\3&61AAA01&0&18
 PCI standard PCI-to-PCI bridge Yes SYSTEM 5.2.3790.1830
 10/1/2002 (Standard system devices) machine.inf
 Not Available
 PCI\VEN_8086&DEV_350C&SUBSYS_00000000&REV_01\4&3667122&0&0310
 PCI standard PCI-to-PCI bridge Yes SYSTEM 5.2.3790.1830
 10/1/2002 (Standard system devices) machine.inf
 Not Available
 PCI\VEN_8086&DEV_3514&SUBSYS_00000000&REV_01\5&2D9FD309&0&080010
 Broadcom BCM5708C NetXtreme II GigE (NDIS VBD Client) Yes
 NET 2.6.14.0 4/3/2006 Broadcom Corporation
 oem3.inf Not Available
 B06BDRV\L2ND&PCI_164C14E4&SUBSYS_01B11028&REV_
 11\8&2EA87DA4&0&20050900
 Broadcom BCM5708C NetXtreme II GigE Yes SYSTEM 2.6.17.0
 4/21/2006 Broadcom Corporation oem5.inf Not
 Available
 PCI\VEN_14E4&DEV_164C&SUBSYS_01B11028&REV_11\7
 &1DF4CEC7&0&0000000010
 PCI standard PCI-to-PCI bridge Yes SYSTEM 5.2.3790.1830
 10/1/2002 (Standard system devices) machine.inf
 Not Available
 PCI\VEN_1166&DEV_0103&SUBSYS_00000000&REV_C2\6&6336DE7&0&00000010
 PCI standard PCI-to-PCI bridge Yes SYSTEM 5.2.3790.1830
 10/1/2002 (Standard system devices) machine.inf
 Not Available
 PCI\VEN_8086&DEV_3510&SUBSYS_00000000&REV_01\5&2D9FD309&0&000010
 PCI standard PCI-to-PCI bridge Yes SYSTEM 5.2.3790.1830
 10/1/2002 (Standard system devices) machine.inf
 Not Available
 PCI\VEN_8086&DEV_3500&SUBSYS_00000000&REV_01\4&3667122&0&0010
 PCI standard PCI-to-PCI bridge Yes SYSTEM 5.2.3790.1830
 10/1/2002 (Standard system devices) machine.inf
 Not Available
 PCI\VEN_8086&DEV_25E2&SUBSYS_00000000&REV_12\3&61AAA01&0&10

```

PCI standard host CPU bridge Yes SYSTEM 5.2.3790.1830
10/1/2002 (Standard system devices) machine.inf
Not Available
PCI\VEN_8086&DEV_25C0&SUBSYS_00000000&REV_12\3&
61AAA01&0&00
PCI bus Yes SYSTEM 5.2.3790.1830 10/1/2002 (Standard
system devices) machine.inf Not Available
ACPI\PNP0A03\2&DABA3FF&0
Intel Processor Yes PROCESSOR 5.2.3790.1830
10/1/2002 Intel cpu.inf Not Available
ACPI\GENUINEINTEL_-_EM64T_FAMILY_6_MODEL_15_3
Intel Processor Yes PROCESSOR 5.2.3790.1830
10/1/2002 Intel cpu.inf Not Available
ACPI\GENUINEINTEL_-_EM64T_FAMILY_6_MODEL_15_2
Intel Processor Yes PROCESSOR 5.2.3790.1830
10/1/2002 Intel cpu.inf Not Available
ACPI\GENUINEINTEL_-_EM64T_FAMILY_6_MODEL_15_1
Intel Processor Yes PROCESSOR 5.2.3790.1830
10/1/2002 Intel cpu.inf Not Available
ACPI\GENUINEINTEL_-_EM64T_FAMILY_6_MODEL_15_0
Microsoft ACPI-Compliant System Yes SYSTEM
5.2.3790.1830 10/1/2002 Microsoft acpi.inf Not
Available ACPI_HAL\PNP0C08\0
ACPI Multiprocessor x64-based PC Yes COMPUTER
5.2.3790.1830 10/1/2002 (Standard computers) hal.inf
Not Available ROOT\ACPI_HAL\0000
Not Available Not Available Not Available Not
Available Not Available Not Available Not Available
Not Available HTREE\ROOT\0

```

[Environment Variables]

```

Variable Value User Name
ClusterLog C:\WINDOWS\Cluster\cluster.log
<SYSTEM>
ComSpec %SystemRoot%\system32\cmd.exe <SYSTEM>
FP_NO_HOST_CHECK NO <SYSTEM>
NUMBER_OF_PROCESSORS 4 <SYSTEM>
OS Windows_NT <SYSTEM>
Path
%SystemRoot%\system32;%SystemRoot%;%SystemRoot%\Syste
m32\Wbem;C:\Program Files (x86)\Microsoft SQL
Server\80\Tools\Binn\;C:\Program Files\Microsoft SQL
Server\90\Tools\bin\;C:\Program Files (x86)\Microsoft SQL
Server\90\Tools\bin\;C:\Program Files (x86)\Microsoft SQL
Server\90\DTS\Binn\;C:\Program Files (x86)\Microsoft SQL
Server\90\Tools\Binn\VSShell\Common7\IDE\;C:\Program Files\Microsoft
SQL Server\MSSQL.1\MSSQL\Binn;. <SYSTEM>
PATHEXT
.COM;.EXE;.BAT;.CMD;.VBS;.VBE;.JS;.JSE;.WSF;.WSH
<SYSTEM>
PROCESSOR_ARCHITECTURE AMD64 <SYSTEM>
PROCESSOR_IDENTIFIER EM64T Family 6 Model 15 Stepping 4,
GenuineIntel <SYSTEM>
PROCESSOR_LEVEL 6 <SYSTEM>
PROCESSOR_REVISION 0f04 <SYSTEM>
TEMP %SystemRoot%\TEMP <SYSTEM>
TMP %SystemRoot%\TEMP <SYSTEM>
windir %SystemRoot% <SYSTEM>
TEMP %USERPROFILE%\Local Settings\Temp NT
AUTHORITY\SYSTEM
TMP %USERPROFILE%\Local Settings\Temp NT
AUTHORITY\SYSTEM
TEMP %USERPROFILE%\Local Settings\Temp NT
AUTHORITY\LOCAL SERVICE
TMP %USERPROFILE%\Local Settings\Temp NT
AUTHORITY\LOCAL SERVICE
TEMP %USERPROFILE%\Local Settings\Temp NT
AUTHORITY\NETWORK SERVICE
TMP %USERPROFILE%\Local Settings\Temp NT
AUTHORITY\NETWORK SERVICE
TEMP %USERPROFILE%\Local Settings\Temp
PE2900\Administrator

```

```

TMP %USERPROFILE%\Local Settings\Temp
PE2900\Administrator

```

[Print Jobs]

Document	Size	Owner	Notify	Status	Time Submitted
Job ID	Priority	Parameters	Driver	Pages Printed	Print Processor
Start Time	Until Time	Elapsed Time			
Host Print Queue		Data Type	Name		

[Network Connections]

Local Name	Remote Name	Type	Status	User Name
------------	-------------	------	--------	-----------

[Running Tasks]

Name	Path	Process ID	Priority	Min Working Set	Max Working Set
Working Set	Start Time	Version	Size	File Date	
system idle process	Not Available	Not Available	0	0	Not Available
Available	Not Available	Not Available	Not Available	Not Available	Not Available
system	Not Available	4	8	0	1413120
smss.exe	Not Available	388	11	204800	1413120
	6/23/2006 1:52 AM	Not Available	Not Available	Not Available	Not Available
csrss.exe	Not Available	512	13	Not Available	Not Available
	6/23/2006 1:52 AM	Not Available	Not Available	Not Available	Not Available
winlogon.exe	c:\windows\system32\winlogon.exe			544	
13	204800	1413120	6/23/2006 1:52 AM		
5.2.3790.1830 (srv03_sp1_rtm.050324-1447)				901.00 KB	
(922,624 bytes)	3/25/2005 6:00 AM				
services.exe	c:\windows\system32\services.exe			604	
9	204800	1413120	6/23/2006 1:52 AM		
5.2.3790.1830 (srv03_sp1_rtm.050324-1447)				216.50 KB	
(221,696 bytes)	3/25/2005 6:00 AM				
lsass.exe	c:\windows\system32\lsass.exe	616	9	204800	
1413120	6/23/2006 1:52 AM	5.2.3790.1830			
(srv03_sp1_rtm.050324-1447)	14.00 KB (14,336 bytes)			3/25/2005	
6:00 AM					
svchost.exe	c:\windows\system32\svchost.exe			788	
8	204800	1413120	6/23/2006 1:52 AM		
5.2.3790.1830 (srv03_sp1_rtm.050324-1447)				24.50 KB	
(25,088 bytes)	3/25/2005 6:00 AM				
svchost.exe	Not Available	876	8	Not Available	Not Available
Available	Not Available	6/23/2006 1:52 AM	Not Available	Not Available	Not Available
svchost.exe	Not Available	960	8	Not Available	Not Available
Available	Not Available	6/23/2006 1:52 AM	Not Available	Not Available	Not Available
svchost.exe	Not Available	1012	8	Not Available	Not Available
Available	Not Available	6/23/2006 1:52 AM	Not Available	Not Available	Not Available
svchost.exe	c:\windows\system32\svchost.exe			1028	
8	204800	1413120	6/23/2006 1:52 AM		
5.2.3790.1830 (srv03_sp1_rtm.050324-1447)				24.50 KB	
(25,088 bytes)	3/25/2005 6:00 AM				
spoolsv.exe	c:\windows\system32\spoolsv.exe			1296	
8	204800	1413120	6/23/2006 1:52 AM		
5.2.3790.1830 (srv03_sp1_rtm.050324-1447)				107.00 KB	
(109,568 bytes)	3/25/2005 6:00 AM				
msdtc.exe	Not Available	1320	8	Not Available	Not Available
Not Available	6/23/2006 1:52 AM	Not Available	Not Available	Not Available	Not Available
svchost.exe	c:\windows\system32\svchost.exe			1456	
8	204800	1413120	6/23/2006 1:52 AM		
5.2.3790.1830 (srv03_sp1_rtm.050324-1447)				24.50 KB	
(25,088 bytes)	3/25/2005 6:00 AM				
inetinfo.exe	c:\windows\system32\inetrv\inetinfo.exe			1548	
8	204800	1413120	6/23/2006 1:52 AM		

6.0.3790.1830 (srv03_sp1_rtm.050324-1447)	17.50 KB	advapi32	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	1.00 MB	
(17,920 bytes)	6/16/2006 9:34 AM	(1,051,136 bytes)	3/25/2005 6:00 AM	Microsoft Corporation	
svchost.exe	Not Available	1596	8	Not Available	
Available	Not Available	6/23/2006 1:52 AM	Not Available		
Not Available	Not Available	Not Available	Not Available		
svchost.exe	c:\windows\system32\svchost.exe	1988			
8	204800	1413120	6/23/2006 1:52 AM		
5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	24.50 KB	crypt32	5.131.3790.1830 (srv03_sp1_rtm.050324-1447)	1.36 MB	
(25,088 bytes)	3/25/2005 6:00 AM	(1,428,992 bytes)	3/25/2005 6:00 AM	Microsoft Corporation	
svchost.exe	c:\windows\system32\svchost.exe	336			
8	204800	1413120	6/23/2006 1:52 AM		
5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	24.50 KB	msasn1	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	152.50 KB	
(25,088 bytes)	3/25/2005 6:00 AM	(156,160 bytes)	3/25/2005 6:00 AM	Microsoft Corporation	
wmiprvse.exe	Not Available	1656	8	Not Available	
Available	Not Available	6/23/2006 1:53 AM	Not Available		
Not Available	Not Available	Not Available	Not Available		
csrss.exe	Not Available	1916	13	Not Available	
Not Available	6/23/2006 1:54 AM	Not Available	Not Available		
Not Available	Not Available	Not Available	Not Available		
winlogon.exe	c:\windows\system32\winlogon.exe	236			
13	204800	1413120	6/23/2006 1:54 AM		
5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	901.00 KB	nddeapi	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	25.00 KB	
(922,624 bytes)	3/25/2005 6:00 AM	(25,600 bytes)	3/25/2005 6:00 AM	Microsoft Corporation	
rdpclip.exe	c:\windows\system32\rdpclip.exe	620	8	204800	
1413120	6/23/2006 1:54 AM	5.2.3790.1830			
(srv03_sp1_rtm.050324-1447)	99.00 KB (101,376 bytes)			6/16/2006 9:19 AM	
explorer.exe	c:\windows\explorer.exe	2064	8		
204800	1413120	6/23/2006 1:54 AM	6.00.3790.1830		
(srv03_sp1_rtm.050324-1447)	1.30 MB (1,364,480 bytes)			3/25/2005 6:00 AM	
cmd.exe	c:\windows\system32\cmd.exe	2288	8	204800	
1413120	6/23/2006 1:55 AM	5.2.3790.1830			
(srv03_sp1_rtm.050324-1447)	538.50 KB (551,424 bytes)			3/25/2005 6:00 AM	
sqlservr.exe	c:\program files\microsoft sql				
server\mssql\bin\sqlservr.exe	2332	13	204800		
1413120	6/23/2006 1:55 AM	2005.090.2047.00		37.44 MB	
(39,263,520 bytes)	4/14/2006 11:59 AM				
logon.scr	Not Available	696	4	Not Available	
Not Available	6/23/2006 2:02 AM	Not Available	Not Available		
Not Available	Not Available	Not Available	Not Available		
stepmaster.exe	c:\program files (x86)\stepmaster\stepmaster.exe				
2788	8	204800	1413120	6/23/2006 6:53 AM	
2.05.0005	1.92 MB (2,015,285 bytes)			6/16/2006 10:52 AM	
cmd.exe	c:\windows\system32\cmd.exe	3496	8	204800	
1413120	6/23/2006 7:44 AM	5.2.3790.1830			
(srv03_sp1_rtm.050324-1447)	538.50 KB (551,424 bytes)			3/25/2005 6:00 AM	
helpctr.exe	c:\windows\pchealth\helpctr\binaries\helpctr.exe	3228			
8	204800	1413120	6/23/2006 7:55 AM		
5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	1.30 MB				
(1,363,456 bytes)	6/16/2006 9:20 AM				
helpsvc.exe	c:\windows\pchealth\helpctr\binaries\helpsvc.exe				
4048	8	204800	1413120	6/23/2006 7:55 AM	
5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	1.52 MB				
(1,591,296 bytes)	6/16/2006 9:20 AM				
wmiprvse.exe	Not Available	4064	8	Not Available	
Available	Not Available	6/23/2006 7:55 AM	Not Available		
Not Available	Not Available	Not Available	Not Available		
[Loaded Modules]					
Name	Version	Size	File Date	Manufacturer	Path
winlogon	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	901.00 KB			
(922,624 bytes)	3/25/2005 6:00 AM	Microsoft Corporation			
	c:\windows\system32\winlogon.exe				
ntdll	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	1.20 MB			
(1,257,472 bytes)	3/25/2005 6:00 AM	Microsoft Corporation			
	c:\windows\system32\ntdll.dll				
kernel32	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	1.43 MB			
(1,500,160 bytes)	3/25/2005 6:00 AM	Microsoft Corporation			
	c:\windows\system32\kernel32.dll				
shlwapi	6.00.3790.1830 (srv03_sp1_rtm.050324-1447)	606.50 KB			
(621,056 bytes)	3/25/2005 6:00 AM	Microsoft Corporation			
	c:\windows\system32\shlwapi.dll				
sfc	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	6.00 KB			
(6,144 bytes)	3/25/2005 6:00 AM	Microsoft Corporation			
	c:\windows\system32\sfc.dll				
sfc_os	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	183.50 KB			
(187,904 bytes)	3/25/2005 6:00 AM	Microsoft Corporation			
	c:\windows\system32\sfc_os.dll				

wintrust	5.131.3790.1830 (srv03_sp1_rtm.050324-1447)	297.50 KB	xpsp2res	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	2.77 MB
(304,640 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(2,899,456 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\wintrust.dll			c:\windows\system32\xpsp2res.dll	
imagehlp	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	57.50 KB	wbemsvc	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	58.00 KB
(58,880 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(59,392 bytes)	6/16/2006 9:19 AM Microsoft Corporation	
	c:\windows\system32\imagehlp.dll			c:\windows\system32\wbem\wbemsvc.dll	
ole32	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	2.43 MB	fastprox	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	866.50 KB
(2,543,616 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(887,296 bytes)	6/16/2006 9:19 AM Microsoft Corporation	
	c:\windows\system32\ole32.dll			c:\windows\system32\wbem\fastprox.dll	
comctl32	6.0 (srv03_sp1_rtm.050324-1447)	1.51 MB (1,584,128 bytes)	msvcpx60	7.0.3790.1830 (srv03_sp1_rtm.050324-1447)	919.50 KB
	6/16/2006 4:11 AM Microsoft Corporation		(941,568 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\winsxs\amd64_microsoft.windows.common-controls_6595b64144ccf1df_6.0.3790.1830_x-ww_aced72af\comctl32.dll			c:\windows\system32\msvcpx60.dll	
winscard	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	230.00 KB	ntdsapi	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	127.50 KB
(235,520 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(130,560 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\winscard.dll			c:\windows\system32\ntdsapi.dll	
wtsapi32	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	29.00 KB	dnsapi	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	297.50 KB
(29,696 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(304,640 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\wtsapi32.dll			c:\windows\system32\dnsapi.dll	
winmm	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	303.50 KB	services	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	216.50 KB
(310,784 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(221,696 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\winmm.dll			c:\windows\system32\services.exe	
sxs	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	1.91 MB	ncobjapi	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	80.00 KB
(2,003,968 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(81,920 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\sxs.dll			c:\windows\system32\ncobjapi.dll	
shell32	6.00.3790.1830 (srv03_sp1_rtm.050324-1447)	10.01 MB	scesrv	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	594.50 KB
(10,492,416 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(608,768 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\shell32.dll			c:\windows\system32\scesrv.dll	
rsaenh	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	241.96 KB	authz	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	167.00 KB
(247,768 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(171,008 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\rsaenh.dll			c:\windows\system32\authz.dll	
wldap32	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	390.00 KB	umpnpmgr	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	205.00 KB
(399,360 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(209,920 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\wldap32.dll			c:\windows\system32\umpnpmgr.dll	
cscdll	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	151.50 KB	eventlog	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	127.00 KB
(155,136 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(130,048 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\cscdll.dll			c:\windows\system32\eventlog.dll	
dimsntfy	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	28.00 KB	lsass	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	14.00 KB
(28,672 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(14,336 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\dimsntfy.dll			c:\windows\system32\lsass.exe	
wlnotify	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	148.00 KB	lsasrv	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	1.50 MB
(151,552 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(1,568,256 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\wlnotify.dll			c:\windows\system32\lsasrv.dll	
mpr	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	115.00 KB	samlib	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	69.00 KB
(117,760 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(70,656 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\mpr.dll			c:\windows\system32\samlib.dll	
oleaut32	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	1.06 MB (1,116,160 bytes)	samsrv	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	1.01 MB
6:00 AM Microsoft Corporation			(1,059,328 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\oleaut32.dll			c:\windows\system32\samsrv.dll	
winspool	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	247.00 KB	cryptdll	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	47.00 KB
(252,928 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(48,128 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\winspool.drv			c:\windows\system32\cryptdll.dll	
comctl32	5.82 (srv03_sp1_rtm.050324-1447)	934.50 KB (956,928 bytes)	msprivs	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	47.50 KB
	6/16/2006 4:11 AM Microsoft Corporation		(48,640 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\winsxs\amd64_microsoft.windows.common-controls_6595b64144ccf1df_5.82.3790.1830_x-ww_4d792d2a\comctl32.dll			c:\windows\system32\msprivs.dll	
uxtheme	6.00.3790.1830 (srv03_sp1_rtm.050324-1447)	494.50 KB	kerberos	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	698.00 KB
(506,368 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(714,752 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\uxtheme.dll			c:\windows\system32\kerberos.dll	
clbcatq	2001.12.4720.1830 (srv03_sp1_rtm.050324-1447)	865.00 KB	msv1_0	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	253.00 KB
(885,760 bytes)	6/16/2006 9:19 AM Microsoft Corporation		(259,072 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\clbcatq.dll			c:\windows\system32\msv1_0.dll	
comres	2001.12.4720.1830 (srv03_sp1_rtm.050324-1447)	779.50 KB	iphlpapi	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	177.00 KB
(798,208 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(181,248 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\comres.dll			c:\windows\system32\iphlpapi.dll	
wbemprox	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	38.00 KB	netlogon	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	666.00 KB
(38,912 bytes)	6/16/2006 9:19 AM Microsoft Corporation		(681,984 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\wbem\wbemprox.dll			c:\windows\system32\netlogon.dll	
wbemcomn	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	524.00 KB (536,576 bytes)	w32time	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	400.50 KB
Corporation	3/25/2005 6:00 AM Microsoft Corporation		(410,112 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\wbem\wbemcomn.dll			c:\windows\system32\w32time.dll	
				schannel	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)
				(253,952 bytes)	3/25/2005 6:00 AM Microsoft Corporation
					c:\windows\system32\schannel.dll

wdigest	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	130.50 KB	wzcsvc	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	492.00 KB
(133,632 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(503,808 bytes)	3/24/2005 11:35 AM Microsoft Corporation	
	c:\windows\system32\wdigest.dll			c:\windows\system32\wzcsvc.dll	
rassfm	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	36.00 KB	rtutils	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	66.00 KB
(36,864 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(67,584 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\rassfm.dll			c:\windows\system32\rtutils.dll	
kdcsvc	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	409.00 KB	wmi	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	5.50 KB
(418,816 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(5,632 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\kdcsvc.dll			c:\windows\system32\wmi.dll	
ntdsa	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	2.81 MB	dhcpcsvc	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	219.00 KB
(2,948,096 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(224,256 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\ntdsa.dll			c:\windows\system32\dhcpcsvc.dll	
esent	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	2.26 MB	atl	3.05.2284 96.50 KB (98,816 bytes)	3/25/2005 6:00 AM
(2,366,976 bytes)	3/25/2005 6:00 AM Microsoft Corporation			Microsoft Corporation	c:\windows\system32\atl.dll
	c:\windows\system32\esent.dll		rastls	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	236.50 KB
ntdsatq	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	51.00 KB	(242,176 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
(52,224 bytes)	3/25/2005 6:00 AM Microsoft Corporation			c:\windows\system32\rastls.dll	
	c:\windows\system32\ntdsatq.dll		cryptui	5.131.3790.1830 (srv03_sp1_rtm.050324-1447)	705.50 KB
msock	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	478.00 KB	(722,432 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
(489,472 bytes)	3/25/2005 6:00 AM Microsoft Corporation			c:\windows\system32\cryptui.dll	
	c:\windows\system32\msock.dll		mprapi	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	154.50 KB
scecli	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	308.00 KB	(158,208 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
(315,392 bytes)	3/25/2005 6:00 AM Microsoft Corporation			c:\windows\system32\mprapi.dll	
	c:\windows\system32\scecli.dll		activeds	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	348.50 KB
ws03res	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	794.00 KB	(356,864 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
(813,056 bytes)	3/25/2005 6:00 AM Microsoft Corporation			c:\windows\system32\activeds.dll	
	c:\windows\system32\ws03res.dll		adslidpc	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	240.50 KB
ipsevcs	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	358.50 KB	(246,272 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
(367,104 bytes)	3/25/2005 6:00 AM Microsoft Corporation			c:\windows\system32\adslidpc.dll	
	c:\windows\system32\ipsevcs.dll		credui	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	202.00 KB
oakley	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	372.50 KB	(206,848 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
(381,440 bytes)	3/25/2005 6:00 AM Microsoft Corporation			c:\windows\system32\credui.dll	
	c:\windows\system32\oakley.dll		rasapi32	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	410.00 KB
winipsec	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	52.50 KB	(419,840 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
(53,760 bytes)	3/25/2005 6:00 AM Microsoft Corporation			c:\windows\system32\rasapi32.dll	
	c:\windows\system32\winipsec.dll		rasman	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	95.50 KB
pstorsvc	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	36.00 KB	(97,792 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
(36,864 bytes)	3/25/2005 6:00 AM Microsoft Corporation			c:\windows\system32\rasman.dll	
	c:\windows\system32\pstorsvc.dll		tapi32	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	332.50 KB
hnetcfg	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	561.00 KB	(340,480 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
(574,464 bytes)	3/25/2005 6:00 AM Microsoft Corporation			c:\windows\system32\tapi32.dll	
	c:\windows\system32\hnetcfg.dll		raschap	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	141.00 KB
wshtcpip	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	29.00 KB	(144,384 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
(29,696 bytes)	3/25/2005 6:00 AM Microsoft Corporation			c:\windows\system32\raschap.dll	
	c:\windows\system32\wshtcpip.dll		schedsvc	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	308.50 KB
psbase	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	124.00 KB	(315,904 bytes)	6/16/2006 9:20 AM Microsoft Corporation	
(126,976 bytes)	3/25/2005 6:00 AM Microsoft Corporation			c:\windows\system32\schedsvc.dll	
	c:\windows\system32\psbase.dll		msidle	6.00.3790.1830 (srv03_sp1_rtm.050324-1447)	9.00 KB
dssenh	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	226.96 KB	(9,216 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
(232,408 bytes)	3/25/2005 6:00 AM Microsoft Corporation			c:\windows\system32\msidle.dll	
	c:\windows\system32\dssenh.dll		wkssvc	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	221.00 KB
wlbcctrl	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	137.50 KB	(226,304 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
(140,800 bytes)	3/25/2005 6:00 AM Microsoft Corporation			c:\windows\system32\wkssvc.dll	
	c:\windows\system32\wlbcctrl.dll		wiarpc	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	57.00 KB
w3ssl	6.0.3790.1830 (srv03_sp1_rtm.050324-1447)	21.00 KB	(58,368 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
(21,504 bytes)	3/25/2005 6:00 AM Microsoft Corporation			c:\windows\system32\wiarpc.dll	
	c:\windows\system32\w3ssl.dll		aelupsvc	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	31.50 KB
strmfilt	6.0.3790.1830 (srv03_sp1_rtm.050324-1447)	131.50 KB	(32,256 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
(134,656 bytes)	3/25/2005 6:00 AM Microsoft Corporation			c:\windows\system32\aelupsvc.dll	
	c:\windows\system32\strmfilt.dll		apphelp	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	241.00 KB
httpapi	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	36.50 KB	(246,784 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
(37,376 bytes)	3/25/2005 6:00 AM Microsoft Corporation			c:\windows\system32\apphelp.dll	
	c:\windows\system32\httpapi.dll		cryptsvc	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	114.00 KB
svchost	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	24.50 KB	(116,736 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
(25,088 bytes)	3/25/2005 6:00 AM Microsoft Corporation			c:\windows\system32\cryptsvc.dll	
	c:\windows\system32\svchost.exe		certcli	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	372.00 KB
rpss	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	672.00 KB	(380,928 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
(688,128 bytes)	3/25/2005 6:00 AM Microsoft Corporation			c:\windows\system32\certcli.dll	
	c:\windows\system32\rpss.dll		vssapi	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	1.26 MB
ntmarta	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	222.50 KB	(1,320,960 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
(227,840 bytes)	3/25/2005 6:00 AM Microsoft Corporation			c:\windows\system32\vssapi.dll	
	c:\windows\system32\ntmarta.dll				

es	2001.12.4720.1830 (srv03_sp1_rtm.050324-1447)	357.00 KB	wmiprvsd	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	743.00 KB
(365,568 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(760,832 bytes)	6/16/2006 9:19 AM Microsoft Corporation	
	c:\windows\system32\es.dll			c:\windows\system32\wbem\wmiprvsd.dll	
pchsvc	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	76.00 KB	wbemess	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	532.50 KB
(77,824 bytes)	6/16/2006 9:20 AM Microsoft Corporation		(545,280 bytes)	6/16/2006 9:19 AM Microsoft Corporation	
	c:\windows\pchealth\helpctr\binaries\pchsvc.dll			c:\windows\system32\wbem\wbemess.dll	
hidserv	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	24.00 KB	ncprov	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	73.00 KB
(24,576 bytes)	6/16/2006 4:18 AM Microsoft Corporation		(74,752 bytes)	6/16/2006 9:19 AM Microsoft Corporation	
	c:\windows\system32\hidserv.dll			c:\windows\system32\wbem\ncprov.dll	
hid	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	33.00 KB	netman	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	457.00 KB
(33,792 bytes)	3/24/2005 11:18 AM Microsoft Corporation		(467,968 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\hid.dll			c:\windows\system32\netman.dll	
dmserver	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	36.50 KB	netshell	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	2.32 MB
(37,376 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(2,437,120 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\dmserver.dll			c:\windows\system32\netshell.dll	
srvsvc	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	156.50 KB	clusapi	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	127.00 KB
(160,256 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(130,048 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\srvsvc.dll			c:\windows\system32\clusapi.dll	
sens	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	63.50 KB	wininet	6.00.3790.1830 (srv03_sp1_rtm.050324-1447)	1.13 MB
(65,024 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(1,186,304 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\sens.dll			c:\windows\system32\wininet.dll	
seclogon	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	27.50 KB	wzcsapi	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	49.00 KB
(28,160 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(50,176 bytes)	3/24/2005 11:35 AM Microsoft Corporation	
	c:\windows\system32\seclogon.dll			c:\windows\system32\wzcsapi.dll	
trkwks	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	177.50 KB	rasdlg	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	859.50 KB
(181,760 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(880,128 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\trkwks.dll			c:\windows\system32\rasdlg.dll	
wmisvc	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	227.00 KB	rasadhlp	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	12.00 KB
(232,448 bytes)	6/16/2006 9:19 AM Microsoft Corporation		(12,288 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\wbem\wmisvc.dll			c:\windows\system32\rasadhlp.dll	
wuauerv	5.7.3790.1830 (srv03_sp1_rtm.050324-1447)	12.00 KB	ntlsapi	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	11.00 KB
(12,288 bytes)	6/16/2006 9:20 AM Microsoft Corporation		(11,264 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\wuauerv.dll			c:\windows\system32\ntlsapi.dll	
wuaueng	5.7.3790.1830 (srv03_sp1_rtm.050324-1447)	2.17 MB	spoolsv	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	107.00 KB
(2,270,720 bytes)	6/16/2006 9:20 AM Microsoft Corporation		(109,568 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\wuaueng.dll			c:\windows\system32\spoolsv.exe	
advpack	6.00.3790.1830 (srv03_sp1_rtm.050324-1447)	146.00 KB	spoolss	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	163.00 KB
(149,504 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(166,912 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\advpack.dll			c:\windows\system32\spoolss.dll	
cabinet	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	138.50 KB	localspl	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	730.50 KB
(141,824 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(748,032 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\cabinet.dll			c:\windows\system32\localspl.dll	
mspatcha	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	48.00 KB	cnbjmon	5.2.3790.1224 (dnsvr\skatari).040514-1058	63.00 KB (64,512 bytes)
(49,152 bytes)	3/25/2005 6:00 AM Microsoft Corporation			3/24/2005 11:15 AM Microsoft Corporation	
	c:\windows\system32\mspachta.dll			c:\windows\system32\cnbjmon.dll	
shfolder	6.00.3790.1830 (srv03_sp1_rtm.050324-1447)	34.00 KB	pjlmon	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	25.50 KB
(34,816 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(26,112 bytes)	3/24/2005 11:22 AM Microsoft Corporation	
	c:\windows\system32\shfolder.dll			c:\windows\system32\pjlmon.dll	
winhttp	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	508.50 KB	tcpmon	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	91.00 KB
(520,704 bytes)	6/16/2006 4:11 AM Microsoft Corporation		(93,184 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\winsxs\amd64_microsoft.windows.winhttp_6595b64144ccf1df_5.1.3790.1830_x-ww_a61ef4db\winhttp.dll			c:\windows\system32\tcpmon.dll	
browser	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	125.50 KB	wsnmp32	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	67.50 KB
(128,512 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(69,120 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\browser.dll			c:\windows\system32\wsnmp32.dll	
comsvcs	2001.12.4720.1830 (srv03_sp1_rtm.050324-1447)	2.06 MB	tcpmib	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	25.00 KB
(2,156,544 bytes)	6/16/2006 9:19 AM Microsoft Corporation		(25,600 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\comsvcs.dll			c:\windows\system32\tcpmib.dll	
netrap	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	26.00 KB	wsock32	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	24.50 KB
(26,624 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(25,088 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\netrap.dll			c:\windows\system32\wsock32.dll	
wbemcore	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	1.24 MB	mgmtapi	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	22.50 KB
(1,299,968 bytes)	6/16/2006 9:19 AM Microsoft Corporation		(23,040 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\wbem\wbemcore.dll			c:\windows\system32\mgmtapi.dll	
esscli	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	626.50 KB	snmpapi	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	31.50 KB
(641,536 bytes)	6/16/2006 9:19 AM Microsoft Corporation		(32,256 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\wbem\esscli.dll			c:\windows\system32\snmpapi.dll	
wmiutils	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	171.00 KB	usbmon	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	28.50 KB
(175,104 bytes)	6/16/2006 9:19 AM Microsoft Corporation		(29,184 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\wbem\wmiutils.dll			c:\windows\system32\usbmon.dll	
repdrvfs	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	353.50 KB	winnr	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	30.00 KB
(361,984 bytes)	6/16/2006 9:19 AM Microsoft Corporation		(30,720 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\wbem\repdrvfs.dll			c:\windows\system32\winnr.dll	

wshqos	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	33.50 KB	icaapi	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	27.50 KB
(34,304 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(28,160 bytes)	6/16/2006 9:19 AM Microsoft Corporation	
	c:\windows\system32\wshqos.dll			c:\windows\system32\icaapi.dll	
win32spl	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	167.00 KB	mstlsapi	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	187.00 KB
(171,008 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(191,488 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\win32spl.dll			c:\windows\system32\mstlsapi.dll	
inetpp	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	148.50 KB	rdpwsx	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	170.13 KB
(152,064 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(174,216 bytes)	6/16/2006 9:19 AM Microsoft Corporation	
	c:\windows\system32\inetpp.dll			c:\windows\system32\rdpwsx.dll	
icmp	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	3.50 KB	rdpsnd	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	25.00 KB
(3,584 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(25,600 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\icmp.dll			c:\windows\system32\rdpsnd.dll	
ersvc	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	31.00 KB	scredir	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	38.50 KB
(31,744 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(39,424 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\ersvc.dll			c:\windows\system32\scredir.dll	
inetinfo	6.0.3790.1830 (srv03_sp1_rtm.050324-1447)	17.50 KB	cscui	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	441.00 KB
(17,920 bytes)	6/16/2006 9:34 AM Microsoft Corporation		(451,584 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\inetinfo.exe			c:\windows\system32\cscui.dll	
iisutil	6.0.3790.1830 (srv03_sp1_rtm.050324-1447)	316.50 KB	msacm32	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	31.00 KB
(324,096 bytes)	6/16/2006 9:34 AM Microsoft Corporation		(31,744 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\iisutil.dll			c:\windows\system32\msacm32.drv	
rpref	6.0.3790.1830 (srv03_sp1_rtm.050324-1447)	4.50 KB	msacm32	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	112.00 KB
(4,608 bytes)	6/16/2006 9:34 AM Microsoft Corporation		(114,688 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\inetrv\rpref.dll			c:\windows\system32\msacm32.dll	
iisrtl	6.0.3790.1830 (srv03_sp1_rtm.050324-1447)	225.00 KB	imaadp32	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	24.00 KB
(230,400 bytes)	6/16/2006 9:34 AM Microsoft Corporation		(24,576 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\iisrtl.dll			c:\windows\system32\imaadp32.acm	
iisadmin	6.0.3790.1830 (srv03_sp1_rtm.050324-1447)	30.00 KB	msadp32	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	23.50 KB
(30,720 bytes)	6/16/2006 9:34 AM Microsoft Corporation		(24,064 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\inetrv\iisadmin.dll			c:\windows\system32\msadp32.acm	
coadmin	6.0.3790.1830 (srv03_sp1_rtm.050324-1447)	100.50 KB	msg711	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	13.50 KB
(102,912 bytes)	6/16/2006 9:34 AM Microsoft Corporation		(13,824 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\inetrv\coadmin.dll			c:\windows\system32\msg711.acm	
admwprox	6.0.3790.1830 (srv03_sp1_rtm.050324-1447)	66.00 KB	msgsm32	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	34.50 KB
(67,584 bytes)	6/16/2006 9:34 AM Microsoft Corporation		(35,328 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\admwprox.dll			c:\windows\system32\msgsm32.acm	
iisfcg	6.0.3790.1830 (srv03_sp1_rtm.050324-1447)	1.24 MB	tssoft32	1.01 13.50 KB (13,824 bytes)	3/25/2005 6:00 AM
(1,298,432 bytes)	6/16/2006 9:34 AM Microsoft Corporation		DSP GROUP, INC.	c:\windows\system32\tssoft32.acm	
	c:\windows\system32\inetrv\iisfcg.dll				
metadata	6.0.3790.1830 (srv03_sp1_rtm.050324-1447)	342.00 KB	tsd32	1.03 24.50 KB (25,088 bytes)	3/25/2005 6:00 AM
(350,208 bytes)	6/16/2006 9:34 AM Microsoft Corporation		DSP GROUP, INC.	c:\windows\system32\tsd32.dll	
	c:\windows\system32\inetrv\metadata.dll				
msxml3	8.70.1104.0 2.04 MB (2,141,184 bytes)	3/25/2005	printui	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	928.50 KB
6:00 AM	Microsoft Corporation		(950,784 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\msxml3.dll			c:\windows\system32\printui.dll	
svcext	6.0.3790.1830 (srv03_sp1_rtm.050324-1447)	60.50 KB	cfgmgr32	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	18.00 KB
(61,952 bytes)	6/16/2006 9:34 AM Microsoft Corporation		(18,432 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\inetrv\svcext.dll			c:\windows\system32\cfgmgr32.dll	
security	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	6.00 KB	rdpclip	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	99.00 KB
(6,144 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(101,376 bytes)	6/16/2006 9:19 AM Microsoft Corporation	
	c:\windows\system32\security.dll			c:\windows\system32\rdpclip.exe	
iismap	6.0.3790.1830 (srv03_sp1_rtm.050324-1447)	97.00 KB	urlmon	6.00.3790.1830 (srv03_sp1_rtm.050324-1447)	1.02 MB
(99,328 bytes)	6/16/2006 9:34 AM Microsoft Corporation		(1,074,176 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\iismap.dll			c:\windows\system32\urlmon.dll	
wamreg	6.0.3790.1830 (srv03_sp1_rtm.050324-1447)	78.50 KB	explorer	6.00.3790.1830 (srv03_sp1_rtm.050324-1447)	1.30 MB
(80,384 bytes)	6/16/2006 9:34 AM Microsoft Corporation		(1,364,480 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\inetrv\wamreg.dll			c:\windows\explorer.exe	
iisw3adm	6.0.3790.1830 (srv03_sp1_rtm.050324-1447)	305.00 KB	browseui	6.00.3790.1830 (srv03_sp1_rtm.050324-1447)	1.53 MB
(312,320 bytes)	6/16/2006 9:34 AM Microsoft Corporation		(1,601,536 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\inetrv\iisw3adm.dll			c:\windows\system32\browseui.dll	
w3cache	6.0.3790.1830 (srv03_sp1_rtm.050324-1447)	27.50 KB	shdocvw	6.00.3790.1830 (srv03_sp1_rtm.050324-1447)	2.30 MB
(28,160 bytes)	6/16/2006 9:34 AM Microsoft Corporation		(2,416,128 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\inetrv\w3cache.dll			c:\windows\system32\shdocvw.dll	
w3tp	6.0.3790.1830 (srv03_sp1_rtm.050324-1447)	16.00 KB	themeui	6.00.3790.1830 (srv03_sp1_rtm.050324-1447)	530.50 KB
(16,384 bytes)	6/16/2006 9:34 AM Microsoft Corporation		(543,232 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\inetrv\w3tp.dll			c:\windows\system32\themeui.dll	
lonsint	6.0.3790.1830 (srv03_sp1_rtm.050324-1447)	17.50 KB	msimg32	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	6.50 KB
(17,920 bytes)	6/16/2006 9:34 AM Microsoft Corporation		(6,656 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\inetrv\lonsint.dll			c:\windows\system32\msimg32.dll	
termsrv	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	354.50 KB	linkinfo	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	30.00 KB
(363,008 bytes)	6/16/2006 9:19 AM Microsoft Corporation		(30,720 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\termsrv.dll			c:\windows\system32\linkinfo.dll	
			ntshrui	6.00.3790.1830 (srv03_sp1_rtm.050324-1447)	184.00 KB
			(188,416 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
				c:\windows\system32\ntshrui.dll	

webcheck	6.00.3790.1830 (srv03_sp1_rtm.050324-1447)	439.00 KB	mtxclu	2001.12.4720.1830 (srv03_sp1_rtm.050324-1447)	141.50 KB
(449,536 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(144,896 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\webcheck.dll			c:\windows\system32\mtxclu.dll	
stobject	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	142.50 KB	resutils	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	98.50 KB
(145,920 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(100,864 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\stobject.dll			c:\windows\system32\resutils.dll	
batmeter	6.00.3790.1830 (srv03_sp1_rtm.050324-1447)	41.50 KB	sqlncli	2005.090.2047.00	2.72 MB (2,854,744 bytes)
(42,496 bytes)	3/25/2005 6:00 AM Microsoft Corporation		11:59 AM Microsoft Corporation	c:\windows\system32\sqlncli.dll	4/14/2006
	c:\windows\system32\batmeter.dll			comdlg32	6.00.3790.1830 (srv03_sp1_rtm.050324-1447)
powrprof	6.00.3790.1830 (srv03_sp1_rtm.050324-1447)	32.50 KB	(457,216 bytes)	3/25/2005 6:00 AM Microsoft Corporation	446.50 KB
(33,280 bytes)	3/25/2005 6:00 AM Microsoft Corporation			c:\windows\system32\comdlg32.dll	
	c:\windows\system32\powrprof.dll		sqlnclir	2005.090.1399.00	201.21 KB (206,040 bytes)
drprov	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	24.00 KB	10/14/2005 2:31 PM Microsoft Corporation	c:\windows\system32\sqlnclir.rll	
(24,576 bytes)	3/25/2005 6:00 AM Microsoft Corporation		StepMaster	2.05.0005	1.92 MB (2,015,285 bytes)
ntlanman	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	71.50 KB	10:52 AM Microsoft Corporation	c:\program files	6/16/2006
(73,216 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(x86)\stepmaster\stepmaster.exe		
	c:\windows\system32\ntlanman.dll		wow64	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	245.00 KB
netui0	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	130.00 KB	(250,880 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
(133,120 bytes)	3/25/2005 6:00 AM Microsoft Corporation			c:\windows\system32\wow64.dll	
	c:\windows\system32\netui0.dll		wow64win	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	280.00 KB
netui1	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	338.50 KB	(286,720 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
(346,624 bytes)	3/25/2005 6:00 AM Microsoft Corporation			c:\windows\system32\wow64win.dll	
	c:\windows\system32\netui1.dll		wow64cpu	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	18.50 KB
davclnt	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	38.00 KB	(18,944 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
(38,912 bytes)	3/25/2005 6:00 AM Microsoft Corporation			c:\windows\system32\wow64cpu.dll	
	c:\windows\system32\davclnt.dll		helpctr	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	1.30 MB
shdoclc	6.00.3790.1830 (srv03_sp1_rtm.050324-1447)	589.50 KB	(1,363,456 bytes)	6/16/2006 9:20 AM Microsoft Corporation	
(603,648 bytes)	3/25/2005 6:00 AM Microsoft Corporation			c:\windows\pchealth\helpctr\binaries\helpctr.exe	
	c:\windows\system32\shdoclc.dll		hcappres	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	7.50 KB
browselc	6.00.3790.1830 (srv03_sp1_rtm.050324-1447)	63.00 KB	(7,680 bytes)	6/16/2006 9:20 AM Microsoft Corporation	
(64,512 bytes)	3/25/2005 6:00 AM Microsoft Corporation			c:\windows\pchealth\helpctr\binaries\hcappres.dll	
	c:\windows\system32\browselc.dll		its	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	208.00 KB
mydocs	6.00.3790.1830 (srv03_sp1_rtm.050324-1447)	101.00 KB	(212,992 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
(103,424 bytes)	3/25/2005 6:00 AM Microsoft Corporation			c:\windows\system32\its.dll	
	c:\windows\system32\mydocs.dll		pchshell	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	155.00 KB
cmd	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	538.50 KB	(158,720 bytes)	6/16/2006 9:20 AM Microsoft Corporation	
(551,424 bytes)	3/25/2005 6:00 AM Microsoft Corporation			c:\windows\pchealth\helpctr\binaries\pchshell.dll	
	c:\windows\system32\cmd.exe		mlang	6.00.3790.1830 (srv03_sp1_rtm.050324-1447)	686.00 KB
sqlservr	2005.090.2047.00	37.44 MB (39,263,520 bytes)	(702,464 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
11:59 AM Microsoft Corporation	c:\program files\microsoft sql			c:\windows\system32\mlang.dll	
server\mssql.1\mssql\bin\sqlservr.exe			mshtml	6.00.3790.1830 (srv03_sp1_rtm.050324-1447)	5.65 MB
msvcr80	8.00.50727.42	803.50 KB (822,784 bytes)	(5,928,448 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
11:26 PM Microsoft Corporation	c:\windows\winsxs\amd64_microsoft.vc80.crt_1fc8b3b9a1e18e3b			c:\windows\system32\mshtml.dll	
_8.0.50727.42_x-ww_3fea50ad\msvcr80.dll			msls31	3.10.349.0	357.00 KB (365,568 bytes)
msvcp80	8.00.50727.42	1.05 MB (1,097,728 bytes)	9/22/2005	Microsoft Corporation	c:\windows\system32\msls31.dll
11:28 PM Microsoft Corporation	c:\windows\winsxs\amd64_microsoft.vc80.crt_1fc8b3b9a1e18e3b			msimtf	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)
_8.0.50727.42_x-ww_3fea50ad\msvcp80.dll				(389,632 bytes)	3/25/2005 6:00 AM Microsoft Corporation
opends60	2005.090.1399.00	22.21 KB (22,744 bytes)		c:\windows\system32\msimtf.dll	
10/14/2005 2:31 PM Microsoft Corporation	c:\program		msctf	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	617.50 KB
files\microsoft sql server\mssql.1\mssql\bin\opends60.dll			(632,320 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
instapi	2005.090.1399.00	40.71 KB (41,688 bytes)		c:\windows\system32\msctf.dll	
10/14/2005 2:23 PM Microsoft Corporation	c:\program		jscrip	5.6.0.8827	974.50 KB (997,888 bytes)
files\microsoft sql server\90\shared\instapi.dll			Microsoft Corporation	c:\windows\system32\jscrip	3/25/2005 6:00 AM
sqllevn70	2005.090.2047.00	1.58 MB (1,652,512 bytes)		imm32	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)
11:53 AM Microsoft Corporation	c:\program files\microsoft sql		(212,992 bytes)	3/25/2005 6:00 AM Microsoft Corporation	208.00 KB
server\mssql.1\mssql\bin\resources\1033\sqllevn70.rll				c:\windows\system32\imm32.dll	
sqlos	2005.090.1399.00	15.71 KB (16,088 bytes)		mshtml	6.00.3790.1830 (srv03_sp1_rtm.050324-1447)
10/14/2005 2:35 PM Microsoft Corporation	c:\program		(927,232 bytes)	3/25/2005 6:00 AM Microsoft Corporation	905.50 KB
files\microsoft sql server\mssql.1\mssql\bin\sqlos.dll				c:\windows\system32\mshtml.dll	
mscoree	2.0.50727.42 (RTM.050727-4200)	441.00 KB (451,584 bytes)		vbscript	5.6.0.8827
9/22/2005 11:37 PM Microsoft Corporation	c:\windows\system32\mscoree.dll		(662,016 bytes)	3/25/2005 6:00 AM	Microsoft Corporation
				Microsoft Corporation	c:\windows\system32\vbscript.dll
xolehlp	2001.12.4720.1830 (srv03_sp1_rtm.050324-1447)	10.50 KB		msinfo	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)
(10,752 bytes)	6/16/2006 9:19 AM Microsoft Corporation			(651,264 bytes)	6/16/2006 9:20 AM Microsoft Corporation
	c:\windows\system32\xolehlp.dll		mfc42u	6.50.9146.0	1.39 MB (1,462,272 bytes)
msdtcprx	2001.12.4720.1830 (srv03_sp1_rtm.050324-1447)	805.50 KB	6:00 AM Microsoft Corporation	c:\windows\system32\mfc42u.dll	3/25/2005
(824,832 bytes)	6/16/2006 9:19 AM Microsoft Corporation			riched32	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)
	c:\windows\system32\msdtcprx.dll		(7,168 bytes)	3/25/2005 6:00 AM Microsoft Corporation	7.00 KB
				c:\windows\system32\riched32.dll	
			riched20	5.31.23.1224	1.10 MB (1,157,120 bytes)
			6:00 AM Microsoft Corporation	3/25/2005	
				c:\windows\system32\riched20.dll	

helpsvc 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 1.52 MB
 (1,591,296 bytes) 6/16/2006 9:20 AM Microsoft Corporation
 c:\windows\pchealth\helpctr\binaries\helpsvc.exe

[Services]

Display Name	Name	State	Start Mode	Service Type
Application Experience	Lookup Service	Auto	Share Process	AeLookupSvc
Alerter	Alerter	Stopped	Disabled	Share Process
Application Layer Gateway Service	ALG	Stopped	Manual	Own Process
Application Management Process	AppMgmt	Stopped	Manual	Share
ASP.NET State Service	aspnet_state	Stopped	Manual	Own Process
Windows Audio	AudioSrv	Stopped	Disabled	Share Process
Background Intelligent Transfer Service	BITS	Stopped	Manual	Share Process
Computer Browser	Browser	Running	Auto	Share Process
Indexing Service	CiSvc	Stopped	Disabled	Share Process
ClipBook	ClipSrv	Stopped	Disabled	Own Process
.NET Runtime Optimization Service v2.0.50727_X86	clr_optimization_v2.0.50727_32	Stopped	Manual	Own
.NET Runtime Optimization Service v2.0.50727_x64	clr_optimization_v2.0.50727_64	Stopped	Manual	Own
COM+ System Application	COMSysApp	Stopped	Manual	Own Process
Cryptographic Services	CryptSvc	Running	Auto	Share
DCOM Server Process Launcher	DcomLaunch	Running	Auto	Share Process
Distributed File System	Dfs	Stopped	Manual	Own
DHCP Client	Dhcp	Running	Auto	Share Process
Logical Disk Manager Administrative Service	dmadmin	Stopped	Manual	Share Process
Logical Disk Manager dmserver	dmserver	Running	Auto	Share Process

Process	Path	Running	Auto	Share
DNS Client	Dnscache	Running	Auto	Share Process
Error Reporting Service	ERSvc	Running	Auto	Share
Event Log	Eventlog	Running	Auto	Share Process
COM+ Event System	EventSystem	Running	Auto	Share
Help and Support	helpsvc	Running	Auto	Share Process
HID Input Service	HidServ	Running	Auto	Share Process
HTTP SSL	HTTPFilter	Running	Manual	Share Process
IAS Jet Database Access	IASJet	Stopped	Manual	Share
IIS Admin Service	IISADMIN	Running	Auto	Share
IMAPI CD-Burning COM Service	ImapiService	Stopped	Manual	Share
Intersite Messaging	IsmServ	Stopped	Disabled	Own Process
Kerberos Key Distribution Center	kdc	Stopped	Disabled	Share Process
Server	lanmanserver	Running	Auto	Share Process
Workstation	lanmanworkstation	Running	Auto	Share
License Logging	LicenseService	Stopped	Disabled	Own
TCP/IP NetBIOS Helper	LmHosts	Running	Auto	Share
Messenger	Messenger	Stopped	Disabled	Share Process
NetMeeting Remote Desktop Sharing	mnmsrvc	Stopped	Disabled	Own Process
Distributed Transaction Coordinator	MSDTC	Running	Auto	Share
Windows Installer	MSIServer	Stopped	Manual	Share Process
SQL Server (MSSQLSERVER)	MSSQLSERVER	Stopped	Manual	Own Process
SQL Server Active Directory Helper	MSSQLServerADHelper	Stopped	Disabled	Own Process
Network DDE	NetDDE	Stopped	Disabled	Share Process

Network DDE	DSDMNetDDEdsdm	Stopped	Disabled	Share	System Event Notification	SENS	Running	Auto	Share
Process	c:\windows\system32\netdde.exe	Normal	LocalSystem		Process	c:\windows\system32\svchost.exe -k netsvcs	Normal	LocalSystem	0
Net Logon	Netlogon	Stopped	Manual	Share Process	Windows Firewall/Internet Connection Sharing (ICS)	SharedAccess	Stopped	Disabled	Share Process
	c:\windows\system32\lsass.exe	Normal	LocalSystem		Process	c:\windows\system32\svchost.exe -k netsvcs	Normal	LocalSystem	0
Network Connections	Netman	Running	Manual	Share Process	Shell Hardware Detection	ShellHWDetection	Running	Auto	
	c:\windows\system32\svchost.exe	-k netsvcs	Normal	LocalSystem	Share Process	c:\windows\system32\svchost.exe -k netsvcs	Ignore	LocalSystem	0
Network Location Awareness (NLA)	Nla	Running	Manual		Print Spooler	Spooler	Running	Auto	Own Process
Share Process	c:\windows\system32\svchost.exe	-k netsvcs	Normal	LocalSystem	Process	c:\windows\system32\spoolsv.exe	Normal	LocalSystem	0
File Replication	NtFrs	Stopped	Manual	Own Process	SQL Server Browser	SQLBrowser	Stopped	Disabled	Own Process
	c:\windows\system32\ntfrs.exe	Ignore	LocalSystem		Process	"c:\program files (x86)\microsoft sql server\90\shared\sqlbrowser.exe"	Normal	LocalSystem	0
NT LM Security Support Provider	NtLmSsp	Stopped	Manual		SQL Server Agent (MSSQLSERVER)	SQLSERVERAGENT	Stopped	Manual	Own Process
Share Process	c:\windows\system32\lsass.exe	Normal	LocalSystem	0	files\microsoft sql server\mssql.1\mssql\bin\sqlagent90.exe" -i mssqlserver	Normal	LocalSystem	0	
Removable Storage	NtmsSvc	Stopped	Manual	Share Process	SQL Server VSS Writer	SQLWriter	Stopped	Manual	Own Process
	c:\windows\system32\svchost.exe	-k netsvcs	Normal	LocalSystem	Process	"c:\program files\microsoft sql server\90\shared\sqlwriter.exe"	Normal	LocalSystem	0
Office Source Engine	ose	Stopped	Manual	Own Process	Windows Image Acquisition (WIA)	stisvc	Stopped	Disabled	
"c:\program files (x86)\common files\microsoft shared\source engine\ose.exe"	Normal	LocalSystem	0		Share Process	c:\windows\system32\svchost.exe -k imgsvc	Normal	NT AUTHORITY\LocalService	0
Plug and Play	PlugPlay	Running	Auto	Share Process	Microsoft Software Shadow Copy Provider	swprv	Stopped	Manual	Own Process
	c:\windows\system32\services.exe	Normal	LocalSystem	0	Process	c:\windows\system32\svchost.exe -k swprv	Normal	LocalSystem	0
IPSEC Services	PolicyAgent	Running	Auto	Share Process	Performance Logs and Alerts	SysmonLog	Stopped	Auto	Own Process
Process	c:\windows\system32\lsass.exe	Normal	LocalSystem	0	Normal	NT Authority\NetworkService	0		
Protected Storage	ProtectedStorage	Running	Auto	Share Process	Telephony	TapiSrv	Stopped	Manual	Share Process
Process	c:\windows\system32\lsass.exe	Normal	LocalSystem	0		c:\windows\system32\svchost.exe -k tapisrv	Normal	LocalSystem	0
Remote Access Auto Connection Manager	RasAuto	Stopped	Manual		Terminal Services	TermService	Running	Manual	Share Process
Share Process	c:\windows\system32\svchost.exe	-k netsvcs	Normal	LocalSystem	Process	c:\windows\system32\svchost.exe -k termsvcs	Normal	LocalSystem	0
Remote Access Connection Manager	RasMan	Stopped	Manual		Themes	Themes	Stopped	Disabled	Share Process
Share Process	c:\windows\system32\svchost.exe	-k netsvcs	Normal	LocalSystem		c:\windows\system32\svchost.exe -k netsvcs	Normal	LocalSystem	0
Remote Desktop Help Session Manager	RDSessMgr	Stopped	Manual	Own Process	Telnet	TlntSvr	Stopped	Disabled	Own Process
	c:\windows\system32\sessmgr.exe	Normal	LocalSystem	0		c:\windows\system32\tlntsvr.exe	Normal	NT AUTHORITY\LocalService	0
Routing and Remote Access	RemoteAccess	Stopped	Disabled	Share Process	Distributed Link Tracking Server	TrkSvr	Stopped	Disabled	Share Process
Share Process	c:\windows\system32\svchost.exe	-k netsvcs	Normal	LocalSystem	Process	c:\windows\system32\svchost.exe -k netsvcs	Normal	LocalSystem	0
Remote Registry	RemoteRegistry	Running	Auto	Share Process	Distributed Link Tracking Client	TrkWks	Running	Auto	Share Process
Process	c:\windows\system32\svchost.exe	-k regsvc	Normal	NT AUTHORITY\LocalService	Process	c:\windows\system32\svchost.exe -k netsvcs	Normal	LocalSystem	0
Remote Procedure Call (RPC) Locator	RpcLocator	Stopped	Manual	Own Process	Terminal Services Session Directory	Tssdis	Stopped	Disabled	Own Process
	c:\windows\system32\locator.exe	Normal	NT AUTHORITY\NetworkService	0	Process	c:\windows\system32\tssdis.exe	Normal	LocalSystem	0
Remote Procedure Call (RPC)	RpcSs	Running	Auto	Share Process	Windows User Mode Driver Framework	UMWdf	Stopped	Manual	Own Process
Process	c:\windows\system32\svchost.exe	-k rpcss	Normal	NT AUTHORITY\NetworkService	Process	c:\windows\system32\wdmfrg.exe	Normal	NT AUTHORITY\LocalService	0
Resultant Set of Policy Provider	RSOPProv	Stopped	Manual	Share Process	Uninterruptible Power Supply	UPS	Stopped	Manual	Own Process
Process	c:\windows\system32\rsopprov.exe	Normal	LocalSystem	0	Process	c:\windows\system32\ups.exe	Normal	NT AUTHORITY\LocalService	0
Special Administration Console Helper	sacsvr	Stopped	Manual	Share Process	Virtual Disk Service	vds	Stopped	Manual	Own Process
Share Process	c:\windows\system32\svchost.exe	-k netsvcs	Normal	LocalSystem		c:\windows\system32\vds.exe	Normal	LocalSystem	0
Security Accounts Manager	SamSs	Running	Auto	Share Process	Volume Shadow Copy	VSS	Stopped	Manual	Own Process
Process	c:\windows\system32\lsass.exe	Normal	LocalSystem	0	Process	c:\windows\system32\vssvc.exe	Normal	LocalSystem	0
Smart Card	SCardSvr	Stopped	Manual	Share Process	Windows Time	W32Time	Running	Auto	Share Process
	c:\windows\system32\scardsvr.exe	Ignore	NT AUTHORITY\LocalService	0		c:\windows\system32\svchost.exe -k local service	Normal	NT AUTHORITY\LocalService	0
Task Scheduler	Schedule	Running	Auto	Share Process	World Wide Web Publishing Service	W3SVC	Running	Auto	Share Process
	c:\windows\system32\svchost.exe	-k netsvcs	Normal	LocalSystem	Share Process	c:\windows\system32\svchost.exe -k iissvc	Normal	LocalSystem	0
Secondary Logon	seclogon	Running	Auto	Share Process					
	c:\windows\system32\svchost.exe	-k netsvcs	Ignore	LocalSystem					

```

WebClient WebClient Stopped Disabled Share Process
c:\windows\system32\svchost.exe -k localservice Normal
NT AUTHORITY\LocalService 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
Portable Media Serial Number Service WmdmPmSN Stopped
Manual Share Process
c:\windows\system32\svchost.exe -k netsvcs Normal
LocalSystem 0
Windows Management Instrumentation Driver Extensions Wmi
Stopped Manual Share Process
c:\windows\system32\svchost.exe -k netsvcs Normal
LocalSystem 0
WMI Performance Adapter WmiApSrv Stopped Manual
Own Process c:\windows\system32\wbem\wmiapsrv.exe
Normal LocalSystem 0
Automatic Updates wuauerv Running Auto Share Process
c:\windows\system32\svchost.exe -k netsvcs Normal
LocalSystem 0
Wireless Configuration WZCSVC Running Auto Share
Process c:\windows\system32\svchost.exe -k netsvcs Normal
LocalSystem 0
Network Provisioning Service xmlprov Stopped Manual Share
Process c:\windows\system32\svchost.exe -k netsvcs Normal
LocalSystem 0

```

[Program Groups]

```

Group Name Name User Name
Accessories Default User:Accessories Default User
Accessories\Accessibility Default User:Accessories\Accessibility
Default User
Accessories\Entertainment Default User:Accessories\Entertainment
Default User
Startup Default User:Startup Default User
Accessories All Users:Accessories All Users
Accessories\Accessibility All Users:Accessories\Accessibility
All Users
Accessories\Communications All Users:Accessories\Communications
All Users
Accessories\Entertainment All Users:Accessories\Entertainment
All Users
Accessories\System Tools All Users:Accessories\System Tools
All Users
Administrative Tools All Users:Administrative Tools All Users
Microsoft SQL Server 2005 All Users:Microsoft SQL Server 2005
All Users
Microsoft SQL Server 2005\Analysis Services All Users:Microsoft
SQL Server 2005\Analysis Services All Users
Microsoft SQL Server 2005\Configuration Tools All Users:Microsoft
SQL Server 2005\Configuration Tools All Users
Microsoft SQL Server 2005\Performance Tools All Users:Microsoft
SQL Server 2005\Performance Tools All Users
Startup All Users:Startup All Users
Accessories NT AUTHORITY\SYSTEM:Accessories NT
AUTHORITY\SYSTEM
Accessories\Accessibility NT
AUTHORITY\SYSTEM:Accessories\Accessibility NT
AUTHORITY\SYSTEM
Accessories\Entertainment NT
AUTHORITY\SYSTEM:Accessories\Entertainment NT
AUTHORITY\SYSTEM
Startup NT AUTHORITY\SYSTEM:Startup NT
AUTHORITY\SYSTEM
Accessories PE2900\Administrator:Accessories
PE2900\Administrator

```

```

Accessories\Accessibility
PE2900\Administrator:Accessories\Accessibility
PE2900\Administrator
Accessories\Entertainment
PE2900\Administrator:Accessories\Entertainment
PE2900\Administrator
Administrative Tools PE2900\Administrator:Administrative Tools
PE2900\Administrator
Startup PE2900\Administrator:Startup PE2900\Administrator

```

[Startup Programs]

Program	Command	User Name	Location
desktop	desktop.ini	NT AUTHORITY\SYSTEM	Startup
desktop	desktop.ini	PE2900\Administrator	Startup
desktop	desktop.ini	.DEFAULT	Startup
desktop	desktop.ini	All Users	Common Startup

[OLE Registration]

Object	Local Server
Sound (OLE2)	sndrec32.exe
Media Clip	mplay32.exe
Video Clip	mplay32.exe /avi
MIDI Sequence	mplay32.exe /mid
Sound	Not Available
Media Clip	Not Available
WordPad Document	"%programfiles%\windows nt\accessories\wordpad.exe"
Bitmap Image	mspaint.exe

[Windows Error Reporting]

Time	Type	Details
------	------	---------

[Internet Settings]

[Internet Explorer]

[Following are sub-categories of this main category]
[Summary]

Item	Value
Version	6.0.3790.1830
Build	63790.1830
Application Path	C:\Program Files\Internet Explorer
Language	English (United States)
Active Printer	Not Available
Cipher Strength	128-bit
Content Advisor	Disabled
IEAK Install	No

[File Versions]

File	Version	Size	Date	Path	Company
actxprxy.dll		6.0.3790.1830		221 KB	3/25/2005 7:00:00
AM		C:\WINDOWS\system32			Microsoft Corporation
actxprxy.dll		6.0.3790.1830		221 KB	3/25/2005 7:00:00
AM		Microsoft Corporation			
advpack.dll		6.0.3790.1830		146 KB	3/25/2005 7:00:00
AM		C:\WINDOWS\system32			Microsoft Corporation
advpack.dll		6.0.3790.1830		146 KB	3/25/2005 7:00:00
AM		Microsoft Corporation			
asctrls.ocx	6.0.3790.1830		147 KB	3/25/2005 7:00:00	AM
				C:\WINDOWS\system32	Microsoft Corporation
asctrls.ocx	6.0.3790.1830		147 KB	3/25/2005 7:00:00	AM
				Microsoft Corporation	
browsecl.dll		6.0.3790.1830		63 KB	3/25/2005 7:00:00
AM		C:\WINDOWS\system32			Microsoft Corporation

browsecl.dll	6.0.3790.1830	63 KB	3/25/2005 7:00:00 AM	mshtml.dll	6.0.3790.1830	5,790 KB	3/25/2005 7:00:00 AM
	Microsoft Corporation					Microsoft Corporation	
browseui.dll	6.0.3790.1830	1,564 KB	3/25/2005 7:00:00 AM	mshtml.tlb	6.0.3790.1830	1,320 KB	3/25/2005 7:00:00 AM
	C:\WINDOWS\system32	Microsoft Corporation			C:\WINDOWS\system32	Microsoft Corporation	
browseui.dll	6.0.3790.1830	1,564 KB	3/25/2005 7:00:00 AM	mshtml.tlb	6.0.3790.1830	1,320 KB	3/25/2005 7:00:00 AM
	Microsoft Corporation					Microsoft Corporation	
cdfview.dll	6.0.3790.1830	216 KB	3/25/2005 7:00:00 AM	mshtml.dll	6.0.3790.1830	906 KB	3/25/2005 7:00:00 AM
	C:\WINDOWS\system32	Microsoft Corporation			C:\WINDOWS\system32	Microsoft Corporation	
cdfview.dll	6.0.3790.1830	216 KB	3/25/2005 7:00:00 AM	mshtml.dll	6.0.3790.1830	906 KB	3/25/2005 7:00:00 AM
	Microsoft Corporation					Microsoft Corporation	
comctl32.dll	5.82.3790.1830	935 KB	3/25/2005 7:00:00 AM	mshtml.dll	6.0.3790.1830	56 KB	3/25/2005 7:00:00 AM
	C:\WINDOWS\system32	Microsoft Corporation			C:\WINDOWS\system32	Microsoft Corporation	
comctl32.dll	5.82.3790.1830	935 KB	3/25/2005 7:00:00 AM	mshtml.dll	6.0.3790.1830	56 KB	3/25/2005 7:00:00 AM
	Microsoft Corporation					Microsoft Corporation	
dxtmsft.dll	6.3.3790.1830	320 KB	3/25/2005 7:00:00 AM	msident.dll	6.0.3790.1830	69 KB	3/25/2005 7:00:00 AM
	C:\WINDOWS\system32	Microsoft Corporation			C:\WINDOWS\system32	Microsoft Corporation	
dxtmsft.dll	6.3.3790.1830	320 KB	3/25/2005 7:00:00 AM	msident.dll	6.0.3790.1830	69 KB	3/25/2005 7:00:00 AM
	Microsoft Corporation					Microsoft Corporation	
dxtmsft.dll	6.3.3790.1830	549 KB	3/25/2005 7:00:00 AM	msidntld.dll	6.0.3790.1830	16 KB	3/25/2005 7:00:00 AM
	C:\WINDOWS\system32	Microsoft Corporation			C:\WINDOWS\system32	Microsoft Corporation	
dxtmsft.dll	6.3.3790.1830	549 KB	3/25/2005 7:00:00 AM	msidntld.dll	6.0.3790.1830	16 KB	3/25/2005 7:00:00 AM
	Microsoft Corporation					Microsoft Corporation	
iecont.dll	<File Missing>	Not Available	Not Available	msieftpl.dll	6.0.3790.1830	369 KB	3/25/2005 7:00:00 AM
	Not Available	Not Available			C:\WINDOWS\system32	Microsoft Corporation	
iecont.dll	<File Missing>	Not Available	Not Available	msieftpl.dll	6.0.3790.1830	369 KB	3/25/2005 7:00:00 AM
	Not Available	Not Available				Microsoft Corporation	
iedkcs32.dll	16.0.3790.1830	417 KB	3/25/2005 7:00:00 AM	msrating.dll	6.0.3790.1830	240 KB	3/25/2005 7:00:00 AM
	C:\WINDOWS\system32	Microsoft Corporation			C:\WINDOWS\system32	Microsoft Corporation	
iedkcs32.dll	16.0.3790.1830	417 KB	3/25/2005 7:00:00 AM	msrating.dll	6.0.3790.1830	240 KB	3/25/2005 7:00:00 AM
	Microsoft Corporation					Microsoft Corporation	
iepeers.dll	6.0.3790.1830	361 KB	3/25/2005 7:00:00 AM	mstime.dll	6.0.3790.1830	878 KB	3/25/2005 7:00:00 AM
	C:\WINDOWS\system32	Microsoft Corporation			C:\WINDOWS\system32	Microsoft Corporation	
iepeers.dll	6.0.3790.1830	361 KB	3/25/2005 7:00:00 AM	mstime.dll	6.0.3790.1830	878 KB	3/25/2005 7:00:00 AM
	Microsoft Corporation					Microsoft Corporation	
iesetup.dll	6.0.3790.1830	71 KB	3/25/2005 7:00:00 AM	occache.dll	6.0.3790.1830	126 KB	3/25/2005 7:00:00 AM
	C:\WINDOWS\system32	Microsoft Corporation			C:\WINDOWS\system32	Microsoft Corporation	
iesetup.dll	6.0.3790.1830	71 KB	3/25/2005 7:00:00 AM	occache.dll	6.0.3790.1830	126 KB	3/25/2005 7:00:00 AM
	Microsoft Corporation					Microsoft Corporation	
ieunit.inf	Not Available	24 KB	3/25/2005 7:00:00 AM	proctexe.ocx	<File Missing>	Not Available	Not Available
	C:\WINDOWS\system32	Not Available			Available	Not Available	Not Available
ieunit.inf	Not Available	24 KB	3/25/2005 7:00:00 AM	sendmail.dll	6.0.3790.1830	64 KB	3/25/2005 7:00:00 AM
	Not Available				C:\WINDOWS\system32	Microsoft Corporation	
ieexplore.exe	6.0.3790.1830	94 KB	3/25/2005 7:00:00 AM	sendmail.dll	6.0.3790.1830	64 KB	3/25/2005 7:00:00 AM
	C:\Program Files\Internet Explorer	Microsoft Corporation				Microsoft Corporation	
imgutil.dll	6.0.3790.1830	61 KB	3/25/2005 7:00:00 AM	shdoclc.dll	6.0.3790.1830	590 KB	3/25/2005 7:00:00 AM
	C:\WINDOWS\system32	Microsoft Corporation			C:\WINDOWS\system32	Microsoft Corporation	
imgutil.dll	6.0.3790.1830	61 KB	3/25/2005 7:00:00 AM	shdoclc.dll	6.0.3790.1830	590 KB	3/25/2005 7:00:00 AM
	Microsoft Corporation					Microsoft Corporation	
inetpl.cpl	6.0.3790.1830	428 KB	3/25/2005 7:00:00 AM	shdocvw.dll	6.0.3790.1830	2,360 KB	3/25/2005 7:00:00 AM
	C:\WINDOWS\system32	Microsoft Corporation			C:\WINDOWS\system32	Microsoft Corporation	
inetpl.cpl	6.0.3790.1830	428 KB	3/25/2005 7:00:00 AM	shdocvw.dll	6.0.3790.1830	2,360 KB	3/25/2005 7:00:00 AM
	Microsoft Corporation					Microsoft Corporation	
inetplc.dll	6.0.3790.1830	110 KB	3/25/2005 7:00:00 AM	shfolder.dll	6.0.3790.1830	34 KB	3/25/2005 7:00:00 AM
	C:\WINDOWS\system32	Microsoft Corporation			C:\WINDOWS\system32	Microsoft Corporation	
inetplc.dll	6.0.3790.1830	110 KB	3/25/2005 7:00:00 AM	shfolder.dll	6.0.3790.1830	34 KB	3/25/2005 7:00:00 AM
	Microsoft Corporation					Microsoft Corporation	
inseng.dll	6.0.3790.1830	147 KB	3/25/2005 7:00:00 AM	shlwapi.dll	6.0.3790.1830	607 KB	3/25/2005 7:00:00 AM
	C:\WINDOWS\system32	Microsoft Corporation			C:\WINDOWS\system32	Microsoft Corporation	
inseng.dll	6.0.3790.1830	147 KB	3/25/2005 7:00:00 AM	shlwapi.dll	6.0.3790.1830	607 KB	3/25/2005 7:00:00 AM
	Microsoft Corporation					Microsoft Corporation	
mlang.dll	6.0.3790.1830	686 KB	3/25/2005 7:00:00 AM	tdc.ocx	1.3.0.3130 91 KB	3/25/2005 7:00:00 AM	
	C:\WINDOWS\system32	Microsoft Corporation			C:\WINDOWS\system32	Microsoft Corporation	
mlang.dll	6.0.3790.1830	686 KB	3/25/2005 7:00:00 AM	tdc.ocx	1.3.0.3130 91 KB	3/25/2005 7:00:00 AM	
	Microsoft Corporation					Microsoft Corporation	
msencode.dll	<File Missing>	Not Available	Not Available	url.dll	6.0.3790.1830	40 KB	3/25/2005 7:00:00 AM
	Available	Not Available	Not Available		C:\WINDOWS\system32	Microsoft Corporation	
mshta.exe	6.0.3790.1830	38 KB	3/25/2005 7:00:00 AM	url.dll	6.0.3790.1830	40 KB	3/25/2005 7:00:00 AM
	C:\WINDOWS\system32	Microsoft Corporation				Microsoft Corporation	
mshta.exe	6.0.3790.1830	38 KB	3/25/2005 7:00:00 AM	urlmon.dll	6.0.3790.1830	1,049 KB	3/25/2005 7:00:00 AM
	Microsoft Corporation				C:\WINDOWS\system32	Microsoft Corporation	
mshtml.dll	6.0.3790.1830	5,790 KB	3/25/2005 7:00:00 AM	urlmon.dll	6.0.3790.1830	1,049 KB	3/25/2005 7:00:00 AM
	C:\WINDOWS\system32	Microsoft Corporation				Microsoft Corporation	

webcheck.dll	6.0.3790.1830	439 KB	3/25/2005 7:00:00 AM	Restricted sites	Custom
webcheck.dll	C:\WINDOWS\system32	Microsoft Corporation			
webcheck.dll	6.0.3790.1830	439 KB	3/25/2005 7:00:00 AM		
wininet.dll	6.0.3790.1830	1,159 KB	3/25/2005 7:00:00 AM		
wininet.dll	C:\WINDOWS\system32	Microsoft Corporation			
wininet.dll	6.0.3790.1830	1,159 KB	3/25/2005 7:00:00 AM		
	Microsoft Corporation				

[Connectivity]

Item	Value
Connection Preference	Never dial

LAN Settings

AutoConfigProxy	wininet.dll
AutoProxyDetectMode	Enabled
AutoConfigURL	
Proxy	Disabled
ProxyServer	
ProxyOverride	

[Cache]

[Following are sub-categories of this main category]

[Summary]

Item	Value
Page Refresh Type	Automatic
Temporary Internet Files Folder	C:\Documents and Settings\Administrator\Local Settings\Temporary Internet Files
Total Disk Space	Not Available
Available Disk Space	Not Available
Maximum Cache Size	Not Available
Available Cache Size	Not Available

[List of Objects]

Program File	Status	CodeBase
No cached object information available		

[Content]

[Following are sub-categories of this main category]

[Summary]

Item	Value
Content Advisor	Disabled

[Personal Certificates]

Issued To	Issued By	Validity	Signature	Algorithm
No personal certificate information available				

[Other People Certificates]

Issued To	Issued By	Validity	Signature	Algorithm
No other people certificate information available				

[Publishers]

Name
No publisher information available

[Security]

Zone	Security Level
My Computer	Custom
Local intranet	Custom
Trusted sites	Custom
Internet	High

Appendix A

Appendix A

Appendix B: Database Build Scripts

Appendix B

```
SIZE = 60000MB,  
FILEGROWTH = 0)
```

```
-- CreateDatabase  
-- for use with StepMaster  
-- Uses FileGroups
```

```
-- Drop the existing database
```

```
if exists (select name from sysdatabases where name =  
'%DBNAME%')  
drop database %DBNAME%
```

```
CREATE DATABASE %DBNAME%  
ON PRIMARY
```

```
( NAME = %DBNAME%_root,  
FILENAME = "C:\%DBNAME%_root.mdf",  
SIZE = 7MB,  
FILEGROWTH = 0),
```

```
FILEGROUP LINEITEM_FG
```

```
( NAME = %DBNAME%_li_1,  
FILENAME = "F:",  
SIZE = 97524MB,  
FILEGROWTH = 0),
```

```
( NAME = %DBNAME%_li_2,  
FILENAME = "G:",  
SIZE = 97524MB,  
FILEGROWTH = 0),
```

```
( NAME = %DBNAME%_li_3,  
FILENAME = "H:",  
SIZE = 97524MB,  
FILEGROWTH = 0),
```

```
( NAME = %DBNAME%_li_4,  
FILENAME = "I:",  
SIZE = 97524MB,  
FILEGROWTH = 0),
```

```
FILEGROUP GENERAL_FG
```

```
( NAME = %DBNAME%_gen_1,  
FILENAME = "J:",  
SIZE = 46944MB,  
FILEGROWTH = 0),
```

```
( NAME = %DBNAME%_gen_2,  
FILENAME = "K:",  
SIZE = 46944MB,  
FILEGROWTH = 0),
```

```
( NAME = %DBNAME%_gen_3,  
FILENAME = "L:",  
SIZE = 46944MB,  
FILEGROWTH = 0),
```

```
( NAME = %DBNAME%_gen_4,  
FILENAME = "M:",  
SIZE = 46944MB,  
FILEGROWTH = 0)
```

```
LOG ON
```

```
( NAME = %DBNAME%_log,  
FILENAME = "E:",
```

```
-- File: CREATETABLES.SQL  
-- Microsoft TPC-H Benchmark Kit Ver. 1.00  
-- Copyright Microsoft, 1999  
--
```

```
create table PART
```

```
(P_PARTKEY int not null,  
P_TYPE varchar(25) not null,  
P_SIZE int not null,  
P_BRAND char(10) not null,  
P_NAME varchar(55) not null,  
P_CONTAINER char(10) not null,  
P_MFGR char(25) not null,  
P_RETAILPRICE float not null,  
P_COMMENT varchar(23) not null)
```

```
on GENERAL_FG
```

```
create table SUPPLIER
```

```
(S_SUPPKEY int not null,  
S_NATIONKEY int not null,  
S_NAME char(25) not null,  
S_ADDRESS varchar(40) not null,  
S_PHONE char(15) not null,  
S_ACCTBAL float not null,  
S_COMMENT varchar(101) not null)
```

```
on GENERAL_FG
```

```
create table PARTSUPP
```

```
(PS_PARTKEY int not null,  
PS_SUPPKEY int not null,  
PS_SUPPLYCOST float not null,  
PS_AVAILQTY int not null,  
PS_COMMENT varchar(199) not null)
```

```
on GENERAL_FG
```

```
create table CUSTOMER
```

```
(C_CUSTKEY int not null,  
C_MKTSEGMENT char(10) not null,  
C_NATIONKEY int not null,  
C_NAME varchar(25) not null,  
C_ADDRESS varchar(40) not null,  
C_PHONE char(15) not null,  
C_ACCTBAL float not null,  
C_COMMENT varchar(117) not null)
```

```
on GENERAL_FG
```

```
create table ORDERS
```

```
(O_ORDERDATE datetime not null,  
O_ORDERKEY bigint not null,  
O_CUSTKEY int not null,  
O_ORDERPRIORITY char(15) not null,  
O_SHIPPRIORITY int not null,  
O_CLERK char(15) not null,  
O_ORDERSTATUS char(1) not null,
```


Appendix B

```
O_TOTALPRICE      float      not null,
O_COMMENT         varchar(79)  not null)
on GENERAL_FG

create table LINEITEM
(L_SHIPDATE       datetime not null,
L_ORDERKEY       bigint      not null,
L_DISCOUNT      float      not null,
L_EXTENDEDPRICE  float      not null,
L_SUPPKEY        int         not null,
L_QUANTITY       float      not null,
L_RETURNFLAG     char(1)    not null,
L_PARTKEY        int         not null,
L_LINestatus     char(1)    not null,
L_TAX            float      not null,
L_COMMITDATE     datetime not null,
L_RECEIPTDATE    datetime not null,
L_SHIPMODE       char(10)  not null,
L_LINENUMBER     int         not null,
L_SHIPINSTRUCT   char(25)  not null,
L_COMMENT        varchar(44) not null)
on LINEITEM_FG

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 GENERAL_FG

create table REGION
(R_REGIONKEY      int         not null,
R_NAME           char(25)  not null,
R_COMMENT        varchar(152) not null)
on GENERAL_FG

-- File:  CREATEINDEXESSTREAM2.SQL
--        Microsoft TPC-H Benchmark Kit Ver. 1.00
--        Copyright Microsoft, 1999
--

create index S_NATIONKEY_IDX
on SUPPLIER(S_NATIONKEY)
with fillfactor=100, SORT_IN_TEMPDB
on GENERAL_FG

alter table CUSTOMER add constraint PK_C_CUSTKEY
primary key (C_CUSTKEY)
ON GENERAL_FG

alter table PARTSUPP add constraint
PK_PS_PARTKEY_PS_SUPPKEY primary key
(PS_PARTKEY, PS_SUPPKEY)
ON GENERAL_FG

create clustered index O_ORDERDATE_CLUIDX
on ORDERS(O_ORDERDATE)
with FILLFACTOR=95, SORT_IN_TEMPDB
on GENERAL_FG

alter table ORDERS add constraint PK_O_ORDERKEY
primary key (O_ORDERKEY)
WITH (FILLFACTOR = 95)
ON GENERAL_FG

-- File:  CREATEINDEXESSTREAM2.SQL
--        Microsoft TPC-H Benchmark Kit Ver. 1.00
--        Copyright Microsoft, 1999
--

create index PS_SUPPKEY_IDX
on PARTSUPP(PS_SUPPKEY)
with fillfactor=100, SORT_IN_TEMPDB
on GENERAL_FG

create clustered index L_SHIPDATE_CLUIDX
on LINEITEM(L_SHIPDATE)
with FILLFACTOR=95, SORT_IN_TEMPDB
on GENERAL_FG

create index L_ORDERKEY_IDX
on LINEITEM(L_ORDERKEY)
with FILLFACTOR=95, SORT_IN_TEMPDB
on GENERAL_FG

create index N_REGIONKEY_IDX
on NATION(N_REGIONKEY)
with fillfactor=100, SORT_IN_TEMPDB
on GENERAL_FG

create index L_PARTKEY_IDX
on LINEITEM(L_PARTKEY)
with FILLFACTOR=95, SORT_IN_TEMPDB
on GENERAL_FG

alter table PART add constraint PK_P_PARTKEY primary
key (P_PARTKEY)
ON GENERAL_FG

-- create FK
```

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```
alter table SUPPLIER add constraint FK_S_NATIONKEY
foreign key (S_NATIONKEY) references
NATION(N_NATIONKEY)

alter table PARTSUPP add constraint FK_PS_PARTKEY
foreign key (PS_PARTKEY) references
PART(P_PARTKEY)

alter table PARTSUPP add constraint FK_PS_SUPPKEY
foreign key (PS_SUPPKEY) references
SUPPLIER(S_SUPPKEY)

alter table CUSTOMER add constraint FK_C_NATIONKEY
foreign key (C_NATIONKEY) references NATION
(N_NATIONKEY)

alter table ORDERS add constraint FK_O_CUSTKEY foreign
key (O_CUSTKEY) references CUSTOMER
(C_CUSTKEY)

alter table NATION add constraint FK_N_REGIONKEY
foreign key (N_REGIONKEY) references REGION
(R_REGIONKEY)

alter table LINEITEM add constraint FK_L_ORDERKEY
foreign key (L_ORDERKEY) references ORDERS
(O_ORDERKEY)

alter table LINEITEM add constraint FK_L_PARTKEY
foreign key (L_PARTKEY) references PART
(P_PARTKEY)

alter table LINEITEM add constraint FK_L_SUPPKEY
foreign key (L_SUPPKEY) references SUPPLIER
(S_SUPPKEY)

alter table LINEITEM add constraint
FK_L_PARTKEY_SUPPKEY foreign key
(L_PARTKEY,L_SUPPKEY) references
PARTSUPP(PS_PARTKEY, PS_SUPPKEY)

-- Drop the LOAD_FG

ALTER DATABASE %DBNAME% REMOVE FILE
%DBNAME%_load1
go
ALTER DATABASE %DBNAME% REMOVE FILE
%DBNAME%_load2
go
ALTER DATABASE %DBNAME% REMOVE FILE
%DBNAME%_load3
go
ALTER DATABASE %DBNAME% REMOVE FILE
%DBNAME%_load4
go
ALTER DATABASE %DBNAME% REMOVE FILE
%DBNAME%_load5

go
ALTER DATABASE %DBNAME% REMOVE FILE
%DBNAME%_load6
go
ALTER DATABASE %DBNAME% REMOVE FILE
%DBNAME%_load7
go
ALTER DATABASE %DBNAME% REMOVE FILE
%DBNAME%_load8
go
ALTER DATABASE %DBNAME% REMOVE FILE
%DBNAME%_load9
go
ALTER DATABASE %DBNAME% REMOVE FILE
%DBNAME%_load10
go
ALTER DATABASE %DBNAME% REMOVE FILE
%DBNAME%_load11
go
ALTER DATABASE %DBNAME% REMOVE FILE
%DBNAME%_load12
go
ALTER DATABASE %DBNAME% REMOVE FILE
%DBNAME%_load13
go
ALTER DATABASE %DBNAME% REMOVE FILE
%DBNAME%_load14
go
ALTER DATABASE %DBNAME% REMOVE FILE
%DBNAME%_load15
go
ALTER DATABASE %DBNAME% REMOVE FILE
%DBNAME%_load16
go
ALTER DATABASE %DBNAME% REMOVE
FILEGROUP LOAD_FG
Go

-- File:  CREATEBACKUPDEVICES.SQL
--        Microsoft TPC-H Benchmark Kit Ver. 2.00
--        Copyright Microsoft, 1999
--
if exists (select name from sysdevices where name =
'BackupDev1')
        exec sp_dropdevice BackupDev1
GO

if exists (select name from sysdevices where name =
'BackupDev2')
        exec sp_dropdevice BackupDev2
GO

if exists (select name from sysdevices where name =
'BackupDev3')
        exec sp_dropdevice BackupDev3
GO
```

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```
if exists (select name from sysdevices where name =
'BackupDev4')
```

```
    exec sp_dropdevice BackupDev4
```

```
GO
```

```
sp_addumpdevice 'disk', 'BackupDev1', 'T:\TPCHbackup1'
```

```
GO
```

```
sp_addumpdevice 'disk', 'BackupDev2', 'U:\TPCHbackup2'
```

```
GO
```

```
sp_addumpdevice 'disk', 'BackupDev3', 'Z:\TPCHbackup3'
```

```
GO
```

```
--      File:      BACKUPDATABASE.SQL
--              Microsoft TPC-H Benchmark Kit Version
2.00
--              Copyright Microsoft, 1999
--
```

```
backup database %DBNAME% to BackupDev1,
BackupDev2, BackupDev3 with init, stats=10
```

```
--      File:      RESTOREDATABASE.SQL
--              Microsoft TPC-H Benchmark Kit Version
2.00
--              Copyright Microsoft, 1999
--
```

```
restore database tpch from BackupDev1, BackupDev2,
BackupDev3 with replace, stats=1
```

```
--
-- Copyright (c) 1999-2000 Intel Corporation
--
-- MoveTemp.sql
```

```
alter database tempdb modify file
(name='tempdev',filename='T:\TempdB.mdf')
```

```
alter database tempdb modify file
(name='templog',filename='T:\Templog.ldf')
```

```
--
-- Copyright (c) 1999-2000 Intel Corporation
--
-- AddTemp.sql
```

```
alter database tempdb modify file
(name=tempdev, filename='T:\TempdB.mdf,size=30000mb)
alter database tempdb modify file
(name=templog, filename='T:\Templog.ldf,size=30000mb)
alter database tempdb add file
```

```
(name=tempdev2, filename='U:\tempdev_2',size=15000mb),
(name=tempdev3, filename='U:\tempdev_3',size=15000mb),
(name=tempdev4, filename='U:\tempdev_4',size=15000mb),
(name=tempdev5, filename='U:\tempdev_5',size=15000mb),
(name=tempdev6, filename='X:\tempdev_6',size=15000mb),
(name=tempdev7, filename='X:\tempdev_7',size=15000mb),
(name=tempdev8, filename='X:\tempdev_8',size=15000mb),
(name=tempdev9, filename='Z:\tempdev_9',size=15000mb),
(name=tempdev10,
filename='Z:\tempdev_10',size=15000mb),
(name=tempdev11, filename='Z:\tempdev_11',size=15000mb)
```

```
-- Drop the LOAD_FG
```

```
ALTER DATABASE %DBNAME% REMOVE FILE
%DBNAME%_load1
```

```
go
```

```
ALTER DATABASE %DBNAME% REMOVE FILE
%DBNAME%_load2
```

```
go
```

```
ALTER DATABASE %DBNAME% REMOVE FILE
%DBNAME%_load3
```

```
go
```

```
ALTER DATABASE %DBNAME% REMOVE FILE
%DBNAME%_load4
```

```
go
```

```
ALTER DATABASE %DBNAME% REMOVE FILE
%DBNAME%_load5
```

```
go
```

```
ALTER DATABASE %DBNAME% REMOVE FILE
%DBNAME%_load6
```

```
go
```

```
ALTER DATABASE %DBNAME% REMOVE FILE
%DBNAME%_load7
```

```
go
```

```
ALTER DATABASE %DBNAME% REMOVE FILE
%DBNAME%_load8
```

```
go
```

```
ALTER DATABASE %DBNAME% REMOVE FILE
%DBNAME%_load9
```

```
go
```

```
ALTER DATABASE %DBNAME% REMOVE FILE
%DBNAME%_load10
```

```
go
```

```
ALTER DATABASE %DBNAME% REMOVE FILE
%DBNAME%_load11
```

```
go
```

```
ALTER DATABASE %DBNAME% REMOVE FILE
%DBNAME%_load12
```

```
go
```

```
ALTER DATABASE %DBNAME% REMOVE FILE
%DBNAME%_load13
```

```
go
```

```
ALTER DATABASE %DBNAME% REMOVE FILE
%DBNAME%_load14
```

```
go
```

Appendix B

```
ALTER DATABASE %DBNAME% REMOVE FILE  
%DBNAME%_load15  
go  
ALTER DATABASE %DBNAME% REMOVE FILE  
%DBNAME%_load16  
go  
ALTER DATABASE %DBNAME% REMOVE  
FILEGROUP LOAD_FG  
go
```

Appendix C: ACID Scripts

Appendix C

```

-- ACID_DUR_TRAN.SQL
--
-- TPC-H Version 1.01 ACID Transaction
--
-- Implemented trunc(x,2) as ROUND(x,2,1) See SQL Server
7.0 Online Documentation
--

if exists ( select name from sysobjects where name =
'acid_dur_tran_com' )
    drop procedure acid_dur_tran_com
go

create proc acid_dur_tran_com
    @o_key      int,
    @l_key      int,
    @delta      int
as
declare @ototal    money,
        @new_ototal money,
        @quantity  money,
        @extprice  money,
        @new_extprice money,
        @pkey      int,
        @skey      int,
        @tax       money,
        @disc      money,
        @cost      money,
        @rprice    money

begin
    begin tran T

        select @ototal =
O_TOTALPRICE
        from ORDERS
        where O_ORDERKEY = @o_key

        select @quantity =
L_QUANTITY,
        @extprice =
L_EXTENDEDPRICE,
        @pkey = L_PARTKEY,
        @skey = L_SUPPKEY,
        @tax = L_TAX,
        @disc = L_DISCOUNT
        from LINEITEM
        where L_ORDERKEY = @o_key and
L_LINENUMBER =
@l_key

        select @ototal = @ototal -
ROUND((ROUND((@extprice * (1 - @disc)),2,1) * (1 +
@tax)),2,1),
        @rprice =
ROUND((@extprice/@quantity),2,1),
        @cost =
ROUND((@rprice * @delta),2,1),
        @new_extprice = @extprice +
@cost,
        @new_ototal =
ROUND((@new_extprice * (1.0 - @disc)),2,1),
        @new_ototal =
ROUND((@new_ototal * (1.0 + @tax)),2,1),
        @new_ototal = @ototal +
@new_ototal

        update LINEITEM
        set L_EXTENDEDPRICE =
@new_extprice,
        L_QUANTITY = @quantity +
@delta
        where L_ORDERKEY = @o_key and
L_LINENUMBER =
@l_key

        update ORDERS
        set O_TOTALPRICE =
@new_ototal
        where O_ORDERKEY = @o_key

        insert into HISTORY_DUR values(
            @pkey,
            @skey,
            @l_key,
            @delta,
            getdate())

-- ACID BEGIN
-- Wait to ensure that transactions are in flight
waitfor DELAY '00:00:02'
print ''
print 'Timestamp before commit:'
select convert(char(30), getdate(),9)
-- ACID END

        commit transaction T

        select @rprice 'RPrice',
        @quantity 'Quantity',
        @tax 'Tax',
        @disc 'Discount',
        @extprice 'Extended Price',
        @ototal 'Total'

    end
go

-- File: ACID_HIST.SQL

```

Appendix C

```

-- Microsoft TPC-H Benchmark Kit Ver. 2.00
-- Copyright Microsoft, 1999
-- Purpose: Creates HISTORY tables for TPC-H ACID tests
--
if exists ( select name from sysobjects where name =
'HISTORY_ACI' )
    drop table HISTORY_ACI

create table HISTORY_ACI
(
    H_P_KEY          int,
    H_S_KEY          int,
    H_O_KEY          int,
    H_L_KEY          int,
    H_DELTA          tinyint,
    H_DATE_T        datetime
)

GO

if exists ( select name from sysobjects where name =
'HISTORY_DUR' )
    drop table HISTORY_DUR

create table HISTORY_DUR
(
    H_P_KEY          int,
    H_S_KEY          int,
    H_O_KEY          int,
    H_L_KEY          int,
    H_DELTA          tinyint,
    H_DATE_T        datetime
)

GO
-- File: ACID_table.SQL
-- Microsoft TPC-H Benchmark Kit Version
2.00
-- Copyright Microsoft, 1998
--
-- Purpose: This script creates a table (acid_values) that
will contain
-- a set of random values to be use for the
ACID tests of
-- the TPC-H benchmark. The table is
populated by a call to a
-- stored procedure. The ACID procedures
read this table
-- to guarantee random and valid input. This
table includes a unique
-- clustered index to guarantee that all values
are unique
-- for each stage of the ACI tests. If an
attempt is made to insert
-- a value that currently exists in the table, the
insert errors out and
-- the values are recalculated and another
insert is attempted.
--
-- Check for pre-existing table
if exists ( select name from sysobjects where name =
'acid_values' )
    drop table acid_values

create table acid_values(
acid_testchar(25),
acid_o_key      int,
acid_l_key      int,
acid_delta      tinyint,
acid_part       int,
acid_supp       int,
seq_num         int)

create unique clustered index acid_values_c1
on acid_values(acid_test,acid_o_key,acid_l_key)

-- ACID_TRAN.SQL
--
-- TPC-H Version 1.01 ACID Transaction
--
-- Implemented trunc(x,2) as ROUND(x,2,1) See SQL Server
7.0 Online Documentation
--
if exists ( select name from sysobjects where name =
'acid_tran_com' )
    drop procedure acid_tran_com

go

create proc acid_tran_com
        @o_key      int,
        @l_key      int,
        @delta      int
as
declare @ototal    money,
        @new_ototal money,
        @quantity  money,
        @extprice  money,
        @new_extprice money,
        @pkey      int,
        @skey      int,
        @tax       money,
        @disc      money,
        @cost      money,
        @rprice    money

begin
    begin tran T
        select @ototal =
O_TOTALPRICE
        from ORDERS
        where O_ORDERKEY = @o_key

```

Appendix C

```

select @quantity = @ototal 'Total'
L_QUANTITY,
@extprice =
end
L_EXTENDEDPRICE,
@pkey = L_PARTKEY, go
@skey = L_SUPPKEY,
@tax = L_TAX,
@disc = L_DISCOUNT -- File: ACID_VALUES.SQL
from LINEITEM -- Microsoft TPC-H Benchmark Kit Version
where L_ORDERKEY = @o_key and 2.00
L_LINENUMBER = -- Copyright Microsoft, 1999
--
@l_key -- Purpose: This script creates a stored procedure that,
-- when called with the
-- number of desired streams, will populate the
-- acid_values table.
-- The ACID procedures read this table to
-- guarantee random and valid input.
-- This table includes a unique clustered index
-- to guarantee that all values
-- are unique for each stage of the ACI tests.
-- If an attempt is made to insert
-- a value that currently exists in the table, the
-- insert errors out and
-- the values are recalculated and another
-- insert is attempted.
--
-- The first 10 rows, seq_num, are for
-- atomicity and isolation. The remaining
-- x * 200 rows are for consistency and
-- durability, where x is the number of streams desired.
--
if exists ( select name from sysobjects where name =
'tpch_acid_values' )
drop procedure tpch_acid_values
go
create proc tpch_acid_values @num_streams int
as
declare @acid_test char(25),
@rand_o_key int,
@rand_l_key int,
@rand_deltatinyint,
@rand_part_key int,
@rand_supp_key int,
@cnt int,
@multiplier int,
@counter int,
@found_one tinyint,
@cons_rows int
-- set initial values for loop controls
select @found_one = 0,
@counter = 1,
@cnt = 0,
@cons_rows = @num_streams * 200
select @rprice 'RPrice',
@quantity 'Quantity',
@tax 'Tax',
@disc 'Discount',
@extprice 'Extended Price',
@new_extprice = @extprice +
@cost,
@new_ototal =
ROUND((@new_extprice * (1.0 - @disc)),2,1),
@new_ototal =
ROUND((@new_ototal * (1.0 + @tax)),2,1),
@new_ototal = @ototal +
update LINEITEM
set L_EXTENDEDPRICE =
@new_extprice,
L_QUANTITY = @quantity +
@delta
where L_ORDERKEY = @o_key and
L_LINENUMBER =
@l_key
update ORDERS
set O_TOTALPRICE =
@new_ototal
where O_ORDERKEY = @o_key
insert into HISTORY_ACI values( @pkey,
@skey,
@o_key,
@l_key,
@delta,
getdate())
commit transaction T

```


Appendix C

```

--      loop to populate table for ACID
while (@counter <= (@cons_rows + 10))
begin
    --      Set ACI test name based on counter
    select @acid_test = case @counter
        when 1 then 'Atomicity_Commit'
        when 2 then 'Atomicity_Rollback'
        when 3 then 'Isolation 1'
        when 4 then 'Isolation 2'
        when 5 then 'Isolation 3'
        when 6 then 'Isolation 3'
        when 7 then 'Isolation 4'
        when 8 then 'Isolation 4'
        when 9 then 'Isolation 5'
        when 10 then 'Isolation 6'
        else 'Consistency_Durability'
    end

    --      loop here until valid values of O_KEY and L_KEY
    are found
    while (@found_one = 0)
    begin
        select @rand_o_key = ROUND((RAND()+
(RAND())*10),0,1)

        select @multiplier
        = case @rand_o_key
            when 0 then 1
            when 1 then 10
            when 2 then 100
            when 3 then 1000
            when 4 then 10000
            when 5 then 100000
            when 6 then 10000
            when 7 then 1000
            when 8 then 100
            when 9 then 10
            when 10 then 1
        end

        if (@counter = 9)
        begin
            while (@cnt =
0)
            begin
                @rand_part_key = ROUND(((RAND() *
                (@multiplier+9))/5),0)

                select
                @cnt = count(*)
                from
                PARTSUPP
                WHERE
                PS_PARTKEY = @rand_part_key
                end
                set
                rowcount @cnt

                select
                @rand_supp_key= PS_SUPPKEY
                from
                PARTSUPP
                where
                PS_PARTKEY = @rand_part_key
                set
                rowcount 0
            end
            else
            begin
                select
                @rand_part_key = 0,
                @rand_supp_key = 0
                end
                select @rand_o_key
                = ROUND((RAND() * @multiplier),0,1)
                select @cnt
                = (count(*) + 1)/2
                from LINEITEM
                where L_ORDERKEY
                = @rand_o_key

                if (@cnt > 0) select
                @found_one = 1
                end
                set rowcount @cnt

                select TOP 1
                @rand_l_key = L_LINENUMBER
                from LINEITEM
                where L_ORDERKEY = @rand_o_key
                set rowcount 0

                select @rand_delta = (RAND()*100)

                --      Insert @rand_o_key, @rand_o_key, and
                @rand_delta into acid_values table
            end
        end
    end
end

```

Appendix C

```
insert into acid_values
values(@acid_test,
      @rand_o_key,
      @rand_l_key,
      @rand_delta,
      @rand_part_key,
      @rand_supp_key,
      @counter)

-- If a duplicate was found, repeat the search for valid
keys
-- @error 2601 indicates an attempt to insert a duplicate
if (@@error = 2601)
begin
    select @counter
    = @counter,
    @found_one
    = 0,
    @cnt
    = 0
end
else
begin
    select @counter
    = @counter + 1,
    @found_one
    = 0,
    @cnt
    = 0
end
end

-- File: CLEANUP.SQL
-- Microsoft TPC-H Benchmark Kit Ver. 2.00
-- Copyright Microsoft, 1998

if exists ( select name from sysobjects where name =
'HISTORY_ACI' )
drop table HISTORY_ACI
go

if exists ( select name from sysobjects where name =
'HISTORY_DUR' )
drop table HISTORY_DUR
go

if exists ( select name from sysobjects where name =
'acid_values' )
drop table acid_values
go
```

```
if exists ( select name from sysobjects where name =
'acid_tran_com' )
drop procedure acid_tran_com
go

if exists ( select name from sysobjects where name =
'tran_w_com' )
drop procedure tran_w_com
go

if exists ( select name from sysobjects where name =
'tran_w_rb' )
drop procedure tran_w_rb
go

if exists ( select name from sysobjects where name =
'iso3_ver' )
drop procedure iso3_ver
go

if exists ( select name from sysobjects where name =
'iso5_parts' )
drop procedure iso5_parts
go

if exists ( select name from sysobjects where name =
'iso_query' )
drop procedure iso_query
go

-- File: CONS_TRAN.SQL
-- Microsoft TPC-H Benchmark Kit Ver. 2.00
-- Copyright Microsoft, 1999

if exists ( select name from sysobjects where name =
'cons_tran' )
drop procedure cons_tran
go

create proc cons_tran @counter int
as

declare @acid_test char(25),
        @rand_o_key int,
        @rand_l_key int,
        @rand_delta tinyint

-- Get random values based on the counter passed to the
stored proc
select @rand_o_key = acid_o_key,
        @rand_l_key = acid_l_key,
        @rand_delta = acid_delta
from acid_values
where acid_test= "Consistency_Durability" and
seq_num = @counter
```

Appendix C

```

select  "Random Values Used",
        @rand_o_key "@RAND_O_KEY",
        @rand_l_key "@RAND_L_KEY",
        @rand_delta "@RAND_DELTA",
        @counter  "SEQ NUMBER"

exec    acid_tran_com  @rand_o_key,
                    @rand_l_key,
                    @rand_delta

go
-- File:  DUR_TRAN.SQL
-- Microsoft TPC-H Benchmark Kit Ver. 2.00
-- Copyright Microsoft, 1999

if exists ( select name from sysobjects where name = 'dur_tran'
)
        drop procedure dur_tran

go

create proc dur_tran      @counter      int

as

declare @acid_test      char(25),
        @rand_o_key     int,
        @rand_l_key     int,
        @rand_delta     tinyint

-- Get random values based on the counter passed to the
stored proc
select  @rand_o_key     = acid_o_key,
        @rand_l_key     = acid_l_key,
        @rand_delta     = acid_delta

from    acid_values
where   acid_test= "Consistency_Durability" and
        seq_num        = @counter

select  "Random Values Used",
        @rand_o_key "@RAND_O_KEY",
        @rand_l_key "@RAND_L_KEY",
        @rand_delta "@RAND_DELTA",
        @counter  "SEQ NUMBER"

exec    acid_dur_tran_com      @rand_o_key,
                              @rand_l_key,
                              @rand_delta

go
-- iso34_tran_w_com.sql
--
-- TPC-H Version 1.01 ACID Transaction
--
-- Implemented trunc(x,2) as ROUND(x,2,1) See SQL Server
7.0 Online Documentation
--

```

```

if exists ( select name from sysobjects where name =
'iso34_tran_w_com' )
        drop procedure iso34_tran_w_com

go

create proc iso34_tran_w_com
        @o_key      int,
        @l_key      int,
        @delta      int

as

declare @ototal      money,
        @new_ototal  money,
        @quantity     money,
        @extprice     money,
        @new_extprice money,
        @pkey         int,
        @skey         int,
        @tax          money,
        @disc         money,
        @cost         money,
        @rprice       money

begin

        begin tran T

--        ACID CODE BEGIN
print " "
print "TPC-H ACID Transaction Start:"
select convert(char(30), getdate(),9)
print " "
print "O_TOTALPRICE from Orders Table before updates:"
select  O_TOTALPRICE
from    ORDERS
where   O_ORDERKEY = @o_key
print " "
--        ACID CODE END

        select  @ototal      =
O_TOTALPRICE
        from    ORDERS
        where   O_ORDERKEY = @o_key

--        ACID CODE BEGIN
print " "
print "Data from LINEITEM before updates:"
select  L_QUANTITY  'L_QUANTITY',
        L_EXTENDEDPRICE 'L_EXTENDEDPRICE',
        L_PARTKEY    'L_PARTKEY',
        L_SUPPKEY    'L_SUPPKEY',
        L_TAX        'L_TAX',
        L_DISCOUNT  'L_DISCOUNT'
from    LINEITEM
where   L_ORDERKEY = @o_key and
        L_LINENUMBER = @l_key

print " "
--        ACID CODE END

```

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```

select  @quantity      =
L_QUANTITY,
        @extprice      =
L_EXTENDEDPRICE,
        @pkey          = L_PARTKEY,
        @skey          = L_SUPPKEY,
        @tax           = L_TAX,
        @disc          = L_DISCOUNT
from    LINEITEM
where   L_ORDERKEY = @o_key and
        L_LINENUMBER =
@l_key

select  @ototal        = @ototal -
ROUND((ROUND((@extprice * (1 - @disc)),2,1) * (1 +
@tax)),2,1),
        @rprice        =
ROUND((@extprice/@quantity),2,1),
        @cost           =
ROUND((@rprice * @delta),2,1),
        @new_extprice  = @extprice +
@cost,
        @new_ototal    =
ROUND((@new_extprice * (1.0 - @disc)),2,1),
        @new_ototal    =
ROUND((@new_ototal * (1.0 + @tax)),2,1),
        @new_ototal    = @ototal +
@new_extprice,
        L_QUANTITY     = @quantity +
@delta
where   L_ORDERKEY = @o_key and
        L_LINENUMBER =
@l_key

update  ORDERS
set     O_TOTALPRICE =
@new_ototal
where   O_ORDERKEY = @o_key

insert into HISTORY_ACI values( @pkey,
                                @skey,
                                @o_key,
                                @l_key,
                                @delta,
                                getdate())

-- ACID CODE BEGIN
begin
print " "
print "Timestamp before commit of ACID transaction:"
select convert(char(30), getdate(), 9)
print " "
-- ACID CODE END

commit transaction T

-- ACID CODE BEGIN
print " "
print "Timestamp after commit of ACID transaction:"
select convert(char(30), getdate(), 9)
print " "
print "O_TOTALPRICE from Orders Table after commit:"
select  O_TOTALPRICE
from    ORDERS
where   O_ORDERKEY = @o_key
print " "
print "Data from LINEITEM after commit:"
select  L_QUANTITY  'L_QUANTITY',
        L_EXTENDEDPRICE 'L_EXTENDEDPRICE',
        L_PARTKEY    'L_PARTKEY',
        L_SUPPKEY    'L_SUPPKEY',
        L_TAX        'L_TAX',
        L_DISCOUNT  'L_DISCOUNT'
from    LINEITEM
where   L_ORDERKEY = @o_key and
        L_LINENUMBER = @l_key
print " "
print "Row from HISTORY:"
select  *
from    HISTORY_ACI
where   H_O_KEY = @o_key and
        H_L_KEY = @l_key
print " "
print "TPC-H ACID Transaction End:"
select convert(char(30), getdate(),9)
print " "
-- ACID CODE END

select  @rprice 'RPrice',
        @quantity 'Quantity',
        @tax 'Tax',
        @disc 'Discount',
        @extprice 'Extended Price',
        @ototal 'Total'

end

go

-- iso5_parts.sql
--
-- TPC-H Version 1.01 ACID Transaction
--
if exists ( select name from sysobjects where name =
'iso5_parts' )
drop procedure iso5_parts

go

```

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```

create proc iso5_parts
    @ps_partkey1 int,
    @ps_suppkey1 int
as
begin
    begin tran P

--      ACID CODE BEGIN
print " "
print "TPC-H ACID Transaction Start:"
select convert(char(30), getdate(),9)
print " "
print "Read from PARTSUPP Table:"
--      ACID CODE END

        select *
        from PARTSUPP
        where PS_PARTKEY = @ps_partkey1
and
        PS_SUPPKEY = @ps_suppkey1

        commit transaction P

--      ACID CODE BEGIN
print " "
print "Timestamp after Read/Commit from PARTSUPP
table:"
select convert(char(30), getdate(),9)
print " "
--      ACID CODE END

end

go

-- tran_w_com.sql
--
-- TPC-H Version 1.01 ACID Transaction
--
-- Implemented trunc(x,2) as ROUND(x,2,1) See SQL Server
7.0 Online Documentation
--

if exists ( select name from sysobjects where name =
'iso6_tran_w_com' )
    drop procedure iso6_tran_w_com
go

create proc iso6_tran_w_com
    @o_key int,
    @l_key int,
    @delta int
as
declare @ototal money,
        @new_ototal money,
        @quantity money,
        @extprice money,
        @new_extprice money,
        @pkey int,
        @skey int,
        @tax money,
        @disc money,
        @cost money,
        @rprice money

begin
    begin tran T

--      ACID CODE BEGIN
print " "
print "TPC-H ACID Transaction Start:"
select convert(char(30), getdate(),9)
print " "
print "O_TOTALPRICE from Orders Table before updates:"
select O_TOTALPRICE
from ORDERS
where O_ORDERKEY = @o_key
print " "
--      ACID CODE END

        select @ototal =
O_TOTALPRICE
        from ORDERS
        where O_ORDERKEY = @o_key

--      ACID CODE BEGIN
print " "
print "Data from LINEITEM before updates:"
select L_QUANTITY 'L_QUANTITY',
        L_EXTENDEDPRICE 'L_EXTENDEDPRICE',
        L_PARTKEY 'L_PARTKEY',
        L_SUPPKEY 'L_SUPPKEY',
        L_TAX 'L_TAX',
        L_DISCOUNT 'L_DISCOUNT'
from LINEITEM
where L_ORDERKEY = @o_key and
L_LINENUMBER = @l_key
print " "
--      ACID CODE END

        select @quantity =
L_QUANTITY,
        @extprice =
L_EXTENDEDPRICE,
        @pkey = L_PARTKEY,
        @skey = L_SUPPKEY,
        @tax = L_TAX,
        @disc = L_DISCOUNT
        from LINEITEM
        where L_ORDERKEY = @o_key and

```

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```

                L_LINENUMBER      =
@l_key

        select  @ototal            = @ototal -
ROUND((ROUND((@extprice * (1 - @disc)),2,1) * (1 +
@tax)),2,1),
                @rprice           =
ROUND((@extprice/@quantity),2,1),
                @cost              =
ROUND((@rprice * @delta),2,1),
                @new_extprice      = @extprice +
@cost,
                @new_ototal        =
ROUND((@new_extprice * (1.0 - @disc)),2,1),
                @new_ototal        =
ROUND((@new_ototal * (1.0 + @tax)),2,1),
                @new_ototal        = @ototal +
@new_ototal

        update  LINEITEM
set          L_EXTENDEDPRICE      =
@new_extprice,
                L_QUANTITY         = @quantity +
@delta
where       L_ORDERKEY = @o_key and
                L_LINENUMBER      =
@l_key

        update  ORDERS
set          O_TOTALPRICE         =
@new_ototal
where       O_ORDERKEY = @o_key

        insert into HISTORY_ACI values( @pkey,
                                        @skey,
                                        @o_key,
                                        @l_key,
                                        @delta,
                                        getdate())

--      ACID CODE BEGIN
begin
print " "
print "Timestamp before commit of ACID transaction:"
select convert(char(30), getdate(), 9)
print " "
--      ACID CODE END

        commit transaction T

--      ACID CODE BEGIN
print " "
print "Timestamp after commit of ACID transaction:"
select convert(char(30), getdate(), 9)
print " "
print "O_TOTALPRICE from Orders Table after commit:"
select  O_TOTALPRICE
from    ORDERS
where   O_ORDERKEY = @o_key
print " "
print "Data from LINEITEM after commit:"
select  L_QUANTITY  'L_QUANTITY',
        L_EXTENDEDPRICE 'L_EXTENDEDPRICE',
        L_PARTKEY    'L_PARTKEY',
        L_SUPPKEY    'L_SUPPKEY',
        L_TAX        'L_TAX',
        L_DISCOUNT  'L_DISCOUNT'
from    LINEITEM
where   L_ORDERKEY = @o_key and
        L_LINENUMBER = @l_key
print " "
print "Row from HISTORY:"
select  *
from    HISTORY_ACI
where   H_O_KEY = @o_key and
        H_L_KEY = @l_key
print " "
print "TPC-H ACID Transaction End:"
select convert(char(30), getdate(),9)
print " "
end
--      ACID CODE END

        select  @rprice 'RPrice',
                @quantity 'Quantity',
                @tax 'Tax',
                @disc 'Discount',
                @extprice 'Extended Price',
                @ototal 'Total'

end

go

-- ACIDQ.SQL
--
-- TPC-H Version 1.01 ACID Query
--
-- Implemented trunc(x,2) as (cast(x*100) as int / 100)
--

if exists ( select name from sysobjects where name =
'iso_query' )
        drop procedure iso_query
go

create proc iso_query          @o_key          int
as

--      ACID CODE BEGIN
print " "
print "Start Time for TPC-H ACID Query:"
select convert(char(30),getdate(),9)

```

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```

print " "
print "TPC-H Query Data"
--      ACID CODE END

select  SUM(ROUND((ROUND((L_EXTENDEDPRI
(1 - L_DISCOUNT)),2,1) * (1 + L_TAX)),2,1))
from    LINEITEM
where   L_ORDERKEY = @o_key

--      ACID CODE BEGIN
print " "
print "End Time for TPC-H ACID Query:"
select  convert(char(30),getdate(),9)
print " "
--      ACID CODE END

go
-- tran_w_com.sql
--
-- TPC-H Version 1.01 ACID Transaction
--
-- Implemented trunc(x,2) as ROUND(x,2,1) See SQL Server
7.0 Online Documentation
--

if exists ( select name from sysobjects where name =
'tran_w_com' )
        drop procedure tran_w_com
go

create proc tran_w_com
        @o_key      int,
        @l_key      int,
        @delta      int
as
declare  @ototal    money,
        @new_ototal money,
        @quantity   money,
        @extprice   money,
        @new_extprice money,
        @pkey       int,
        @skey       int,
        @tax        money,
        @disc       money,
        @cost       money,
        @rprice     money

begin
        begin tran T

--      ACID CODE BEGIN
print " "
print "TPC-H ACID Transaction Start:"
select  convert(char(30), getdate(),9)
print " "
print "O_TOTALPRICE from Orders Table before updates:"
select  O_TOTALPRICE
from    ORDERS
where   O_ORDERKEY = @o_key

print " "
print "Data from LINEITEM before updates:"
select  L_QUANTITY  'L_QUANTITY',
        L_EXTENDEDPRI 'L_EXTENDEDPRI',
        L_PARTKEY    'L_PARTKEY',
        L_SUPPKEY    'L_SUPPKEY',
        L_TAX        'L_TAX',
        L_DISCOUNT  'L_DISCOUNT'
from    LINEITEM
where   L_ORDERKEY = @o_key and
        L_LINENUMBER = @l_key

print " "
--      ACID CODE END

        select  @quantity      =
L_QUANTITY,
                @extprice     =
L_EXTENDEDPRI,
                @pkey         = L_PARTKEY,
                @skey         = L_SUPPKEY,
                @tax          = L_TAX,
                @disc         = L_DISCOUNT
        from    LINEITEM
        where   L_ORDERKEY = @o_key and
                L_LINENUMBER =
                @l_key

        select  @ototal      = @ototal -
ROUND((ROUND((@extprice * (1 - @disc)),2,1) * (1 +
@tax)),2,1),
                @rprice     =
ROUND((@extprice/@quantity),2,1),
                @cost       =
ROUND((@rprice * @delta),2,1),
                @new_extprice = @extprice +
                @cost,
                @new_ototal =
ROUND((@new_extprice * (1.0 - @disc)),2,1),
                @new_ototal =
ROUND((@new_ototal * (1.0 + @tax)),2,1),
                @new_ototal = @ototal +
                @new_ototal

        update  LINEITEM
        set     L_EXTENDEDPRI =
                @new_extprice,
                L_QUANTITY  = @quantity +
                @delta
        where   L_ORDERKEY = @o_key and

```

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```

@l_key          L_LINENUMBER      =      select convert(char(30), getdate(),9)
                                                    print " "
                                                    end
                                                    --      ACID CODE END

update  ORDERS
set     O_TOTALPRICE      =

@new_ototal

where   O_ORDERKEY = @o_key

insert into HISTORY_ACI values( @pkey,
                                @skey,

                                @o_key,

                                @l_key,
                                @delta,

                                getdate())

--      ACID CODE BEGIN
begin
print " "
print "Timestamp before commit delay of ACID transaction:"
select convert(char(30), getdate(), 9)
print " "
waitfor delay "00:00:20"
print "Timestamp after commit delay of ACID transaction:"
select convert(char(30), getdate(), 9)
print " "
--      ACID CODE END

commit transaction T

--      ACID CODE BEGIN
print " "
print "Timestamp after commit of ACID transaction:"
select convert(char(30), getdate(), 9)
print " "
print "O_TOTALPRICE from Orders Table after commit:"
select  O_TOTALPRICE
from    ORDERS
where   O_ORDERKEY = @o_key
print " "
print "Data from LINEITEM after commit:"
select  L_QUANTITY  'L_QUANTITY',
        L_EXTENDEDPRICE 'L_EXTENDEDPRICE',
        L_PARTKEY   'L_PARTKEY',
        L_SUPPKEY   'L_SUPPKEY',
        L_TAX       'L_TAX',
        L_DISCOUNT 'L_DISCOUNT'
from    LINEITEM
where   L_ORDERKEY = @o_key and
        L_LINENUMBER      = @l_key
print " "
print "Row from HISTORY:"
select  *
from    HISTORY_ACI
where   H_O_KEY = @o_key and
        H_L_KEY      = @l_key
print " "
print "TPC-H ACID Transaction End:"

-- tran_w_rb.sql
--
-- TPC-H Version 1.01 ACID Transaction
--
-- Implemented trunc(x,2) as ROUND(x,2,1) See SQL Server
7.0 Online Documentation
--
if exists ( select name from sysobjects where name =
'tran_w_rb' )
drop procedure tran_w_rb
go

create proc tran_w_rb
        @o_key      int,
        @l_key      int,
        @delta      int
as
declare @ototal      money,
        @new_ototal  money,
        @quantity    money,
        @extprice    money,
        @new_extprice money,
        @pkey        int,
        @skey        int,
        @tax         money,
        @disc        money,
        @cost        money,
        @rprice      money

begin
begin tran T

--      ACID CODE BEGIN
print " "
print "TPC-H ACID Transaction Start:"
select convert(char(30), getdate(),9)
print " "
print "O_TOTALPRICE from Orders Table before updates:"
select  O_TOTALPRICE
from    ORDERS

```


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```

where O_ORDERKEY = @o_key
print " "
-- ACID CODE END

select @ototal =
O_TOTALPRICE
from ORDERS
where O_ORDERKEY = @o_key

-- ACID CODE BEGIN
print " "
print "Data from LINEITEM before updates:"
select L_QUANTITY 'L_QUANTITY',
       L_EXTENDEDPRICE 'L_EXTENDEDPRICE',
       L_PARTKEY 'L_PARTKEY',
       L_SUPPKEY 'L_SUPPKEY',
       L_TAX 'L_TAX',
       L_DISCOUNT 'L_DISCOUNT'
from LINEITEM
where L_ORDERKEY = @o_key and
      L_LINENUMBER = @l_key
print " "
-- ACID CODE END

select @quantity =
L_QUANTITY,
       @extprice =
L_EXTENDEDPRICE,
       @pkey = L_PARTKEY,
       @skey = L_SUPPKEY,
       @tax = L_TAX,
       @disc = L_DISCOUNT
from LINEITEM
where L_ORDERKEY = @o_key and
      L_LINENUMBER =
@l_key

select @ototal = @ototal -
ROUND((ROUND((@extprice * (1 - @disc)),2,1) * (1 +
@tax)),2,1),
       @rprice =
ROUND((@extprice/@quantity),2,1),
       @cost =
ROUND((@rprice * @delta),2,1),
       @new_extprice = @extprice +
@cost,
       @new_ototal =
ROUND((@new_extprice * (1.0 - @disc)),2,1),
       @new_ototal =
ROUND((@new_ototal * (1.0 + @tax)),2,1),
       @new_ototal = @ototal +

update LINEITEM
set L_EXTENDEDPRICE =
@new_extprice,
      L_QUANTITY = @quantity +
@delta
where L_ORDERKEY = @o_key and

```

```

L_LINENUMBER =
@l_key

update ORDERS
set O_TOTALPRICE =
@new_ototal
where O_ORDERKEY = @o_key

insert into HISTORY_ACI values( @pkey,
                               @skey,
                               @o_key,
                               @l_key,
                               @delta,
                               getdate())

-- ACID CODE BEGIN
begin
print " "
print "Timestamp before rollback delay of ACID transaction
(T1):"
select convert(char(30), getdate(), 9)
print " "
waitfor delay "00:00:20"
print "Timestamp after rollback delay of ACID transaction
(T1):"
select convert(char(30), getdate(), 9)
print " "
-- ACID CODE END

rollback transaction T

-- ACID CODE BEGIN
print " "
print "Timestamp after rollback of ACID transaction (T1):"
select convert(char(30), getdate(), 9)
print " "
print "O_TOTALPRICE from Orders Table after rollback:"
select O_TOTALPRICE
from ORDERS
where O_ORDERKEY = @o_key
print " "
print "Data from LINEITEM after rollback:"
select L_QUANTITY 'L_QUANTITY',
       L_EXTENDEDPRICE 'L_EXTENDEDPRICE',
       L_PARTKEY 'L_PARTKEY',
       L_SUPPKEY 'L_SUPPKEY',
       L_TAX 'L_TAX',
       L_DISCOUNT 'L_DISCOUNT'
from LINEITEM
where L_ORDERKEY = @o_key and
      L_LINENUMBER = @l_key

print " "
print "Row from HISTORY:"
select *
from HISTORY_ACI
where H_O_KEY = @o_key and
      H_L_KEY = @l_key

```

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```
print " "
print " "
print "TPC-H ACID Transaction End:"
select convert(char(30), getdate(),9)
print " "
end
-- ACID CODE END

select @rprice 'RPrice',
       @quantity 'Quantity',
       @tax 'Tax',
       @disc 'Discount',
       @extprice 'Extended Price',
       @ototal 'Total'

end

go

-- File: ISOL1_1.SQL
-- Microsoft TPC-H Benchmark Kit Ver. 2.00
-- Copyright Microsoft, 1999

declare @acid_test char(25),
        @rand_o_key int,
        @rand_l_key int,
        @rand_delta tinyint

select @rand_o_key = acid_o_key,
       @rand_l_key = acid_l_key,
       @rand_delta = acid_delta
from acid_values
where acid_test= 'Isolation 1'

select 'Random Values Used',
       @rand_o_key '@RAND_O_KEY',
       @rand_l_key '@RAND_L_KEY',
       @rand_delta '@RAND_DELTA'

exec tran_w_com @rand_o_key,
               @rand_l_key,
               @rand_delta

GO

-- File: ISOL1_2.SQL
-- Microsoft TPC-H Benchmark Kit Ver. 2.00
-- Copyright Microsoft, 1998

-- ACID CODE BEGIN
-- Wait for 5 seconds to allow ISOL1_1 to execute
WAITFOR DELAY '00:00:05'
-- ACID CODE END

declare @acid_test char(25),
        @rand_o_key int
```

```
select @rand_o_key = acid_o_key
from acid_values
where acid_test= 'Isolation 1'

select 'Random Values Used',
       @rand_o_key '@RAND_O_KEY'

exec iso_query @rand_o_key
GO

-- File: ISOL2_1.SQL
-- Microsoft TPC-H Benchmark Kit Ver. 2.00
-- Copyright Microsoft, 1999

declare @acid_test char(25),
        @rand_o_key int,
        @rand_l_key int,
        @rand_delta tinyint

select @rand_o_key = acid_o_key,
       @rand_l_key = acid_l_key,
       @rand_delta = acid_delta
from acid_values
where acid_test= 'Isolation 2'

select 'Random Values Used',
       @rand_o_key "@RAND_O_KEY",
       @rand_l_key "@RAND_L_KEY",
       @rand_delta "@RAND_DELTA"

exec tran_w_rb @rand_o_key,
              @rand_l_key,
              @rand_delta

GO

-- File: ISOL2_2.SQL
-- Microsoft TPC-H Benchmark Kit Ver. 2.00
-- Copyright Microsoft, 1999

-- ACID CODE BEGIN
-- Wait for 5 seconds to allow ISOL2_1 to execute
WAITFOR DELAY '00:00:05'
-- ACID CODE END

declare @acid_test char(25),
        @rand_o_key int

select @rand_o_key = acid_o_key
from acid_values
where acid_test= 'Isolation 2'

select 'Random Values Used',
       @rand_o_key "@RAND_O_KEY"

exec iso_query @rand_o_key
GO

-- File: ISOL3_1.SQL
```

Appendix C

```
-- Microsoft TPC-H Benchmark Kit Ver. 2.00
-- Copyright Microsoft, 1999
```

```
declare @acid_test char(25),
        @rand_o_key int,
        @rand_l_key int,
        @rand_delta tinyint

select top 1
  @rand_o_key = acid_o_key,
  @rand_l_key = acid_l_key,
  @rand_delta = acid_delta
from acid_values
where acid_test= 'Isolation 3'
order by seq_num asc

select 'Random Values Used',
  @rand_o_key "@RAND_O_KEY",
  @rand_l_key "@RAND_L_KEY",
  @rand_delta "@RAND_DELTA"

exec tran_w_com @rand_o_key,
               @rand_l_key,
               @rand_delta
```

GO

```
-- File: ISOL3_2.SQL
-- Microsoft TPC-H Benchmark Kit Ver. 2.00
-- Copyright Microsoft, 1999
```

```
-- ACID CODE BEGIN
-- Wait for 5 seconds to allow ISOL3_1 to execute
WAITFOR DELAY '00:00:05'
-- ACID CODE END
```

```
declare @acid_test char(25),
        @rand_o_key int,
        @rand_l_key int,
        @rand_delta tinyint

select top 1
  @rand_o_key = acid_o_key,
  @rand_l_key = acid_l_key
from acid_values
where acid_test= 'Isolation 3'
order by seq_num asc

select top 1
  @rand_delta = acid_delta
from acid_values
where acid_test= 'Isolation 3'
order by seq_num desc

select 'Random Values Used',
  @rand_o_key "@RAND_O_KEY",
  @rand_l_key "@RAND_L_KEY",
  @rand_delta "@RAND_DELTA"
```

```
exec iso34_tran_w_com @rand_o_key,
```

```
@rand_l_key,
@rand_delta
```

GO

```
-- File: ISOL4_1.SQL
-- Microsoft TPC-H Benchmark Kit Ver. 2.00
-- Copyright Microsoft, 1999
```

```
declare @acid_test char(25),
        @rand_o_key int,
        @rand_l_key int,
        @rand_delta tinyint

select top 1
  @rand_o_key = acid_o_key,
  @rand_l_key = acid_l_key,
  @rand_delta = acid_delta
from acid_values
where acid_test= 'Isolation 4'
order by seq_num asc

select 'Random Values Used',
  @rand_o_key "@RAND_O_KEY",
  @rand_l_key "@RAND_L_KEY",
  @rand_delta "@RAND_DELTA"
```

```
exec tran_w_rb @rand_o_key,
               @rand_l_key,
               @rand_delta
```

GO

```
-- File: ISOL4_2.SQL
-- Microsoft TPC-H Benchmark Kit Ver. 2.00
-- Copyright Microsoft, 1999
```

```
-- ACID CODE BEGIN
-- Wait for 5 seconds to allow ISOL4_1 to execute
WAITFOR DELAY '00:00:05'
-- ACID CODE END
```

```
declare @acid_test char(25),
        @rand_o_key int,
        @rand_l_key int,
        @rand_delta tinyint

select top 1
  @rand_o_key = acid_o_key,
  @rand_l_key = acid_l_key
from acid_values
where acid_test= 'Isolation 4'
order by seq_num asc

select top 1
  @rand_delta = acid_delta
from acid_values
where acid_test= 'Isolation 4'
order by seq_num desc
```

```
select 'Random Values Used',
```

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```
@rand_o_key "@RAND_O_KEY",
@rand_l_key "@RAND_L_KEY",
@rand_delta "@RAND_DELTA"

exec iso34_tran_w_com @rand_o_key,
                    @rand_l_key,
                    @rand_delta

GO

-- File: ISOL5_1.SQL
-- Microsoft TPC-H Benchmark Kit Ver. 2.00
-- Copyright Microsoft, 1999

declare @acid_test char(25),
        @rand_o_key int,
        @rand_l_key int,
        @rand_delta tinyint

select @rand_o_key = acid_o_key,
       @rand_l_key = acid_l_key,
       @rand_delta = acid_delta

from acid_values
where acid_test= 'Isolation 5'

select 'Random Values Used',
       @rand_o_key "@RAND_O_KEY",
       @rand_l_key "@RAND_L_KEY",
       @rand_delta "@RAND_DELTA"

exec tran_w_com @rand_o_key,
               @rand_l_key,
               @rand_delta

GO

-- File: ISOL5_2.SQL
-- Microsoft TPC-H Benchmark Kit Ver. 2.00
-- Copyright Microsoft, 1999

-- ACID CODE BEGIN
-- Wait for 5 seconds to allow ISOL5_1 to execute
WAITFOR DELAY '00:00:05'
-- ACID CODE END

declare @acid_test char(25),
        @rand_part int,
        @rand_supp int

select @rand_part = acid_part,
       @rand_supp = acid_supp

from acid_values
where acid_test= 'Isolation 5'

select 'Random Values Used',
       @rand_part "@RAND_PART",
       @rand_supp "@RAND_SUPP"

exec iso5_parts @rand_part,
               @rand_supp

GO

-- File: ISOL6_2.SQL
-- Microsoft TPC-H Benchmark Kit Ver. 2.00
-- Copyright Microsoft, 1999
```

```
GO
-- acid_qry1.sql
--
-- TPC-H Version 2.00 ACID Transaction
--
-- Implemented trunc(x,2) as ROUND(x,2,1) See SQL Server
7.0 Online Documentation
--
-- Currently the DELTA is 0 to maximize the runtime for the
query.
-- Modify the 'WHERE' clause to use a different value.
--
-- ACID CODE BEGIN
print ''
print 'TPC-H ACID Query Start:'
select convert(char(30), getdate(),9)
print ''
-- ACID CODE END

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(*)
                AS COUNT_ORDER
FROM LINEITEM
WHERE L_SHIPDATE <= dateadd(dd, 0, '1998/12/01')
GROUP BY L_RETURNFLAG,
         L_LINESTATUS
ORDER BY L_RETURNFLAG,
         L_LINESTATUS

-- ACID CODE BEGIN
print ''
print 'TPC-H ACID Query End:'
select convert(char(30), getdate(),9)
print ''
-- ACID CODE END

GO

-- File: ISOL6_2.SQL
-- Microsoft TPC-H Benchmark Kit Ver. 2.00
-- Copyright Microsoft, 1999
```

Appendix C

```
declare @acid_test      char(25),
        @rand_o_key    int,
        @rand_l_key    int,
        @rand_delta    tinyint

select  @rand_o_key    = acid_o_key,
        @rand_l_key    = acid_l_key,
        @rand_delta    = acid_delta

from    acid_values

where   acid_test= 'Isolation 6'

select  'Random Values Used',
        @rand_o_key "@RAND_O_KEY",
        @rand_l_key "@RAND_L_KEY",
        @rand_delta "@RAND_DELTA"

exec iso6_tran_w_com    @rand_o_key,
                        @rand_l_key,
                        @rand_delta

GO

-- acid_qry1.sql
--
-- TPC-H Version 2.00 ACID Transaction
--
-- Implemented trunc(x,2) as ROUND(x,2,1) See SQL Server
7.0 Online Documentation
--
--
--
--
-- ACID CODE BEGIN
print ''
print 'TPC-H ACID Query Start:'
select convert(char(30), getdate(),9)
print ''
-- ACID CODE END

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(*)
            AS COUNT_ORDER
FROM LINEITEM
WHERE L_SHIPDATE <= dateadd(dd, 2000, '1998/12/01')
GROUP BY L_RETURNFLAG,
```

```
L_LINESTATUS
ORDER BY L_RETURNFLAG,
L_LINESTATUS

-- ACID CODE BEGIN
print ''
print 'TPC-H ACID Query End:'
select convert(char(30), getdate(),9)
print ''
-- ACID CODE END

GO

-- File:  ATOM_RB.SQL
-- Microsoft TPC-H Benchmark Kit Ver. 2.00
-- Copyright Microsoft, 1999
-- Purpose: Atomicity rollback test

declare @acid_test      char(25),
        @rand_o_key    int,
        @rand_l_key    int,
        @rand_delta    tinyint

select  @rand_o_key    = acid_o_key,
        @rand_l_key    = acid_l_key,
        @rand_delta    = acid_delta

from    acid_values

where   acid_test= 'Atomicity_Rollback'

select  'Random Values Used',
        @rand_o_key "@RAND_O_KEY",
        @rand_l_key "@RAND_L_KEY",
        @rand_delta "@RAND_DELTA"

exec tran_w_rb    @rand_o_key,
                  @rand_l_key,
                  @rand_delta

GO

--
-- Insert your values in the "between" clause below
--
-- These selects should result in Zero rows found
--
-- Durability Stream 1
select  *
from    acid_values
where   seq_num between 11 and 210 and
        not exists (
            select  *
            from    HISTORY_DUR
            where   H_O_KEY = acid_o_key

and

            H_L_KEY = acid_l_key

and
```

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```

)
H_DELTA = acid_delta
not exists (
select *
from HISTORY_DUR
where H_O_KEY = acid_o_key
)
-- Durability Stream 2
select *
from acid_values
where seq_num between 211 and 410 and
not exists (
select *
from HISTORY_DUR
where H_O_KEY = acid_o_key
)
and
H_L_KEY = acid_l_key
and
H_DELTA = acid_delta
)

-- Durability Stream 3
select *
from acid_values
where seq_num between 411 and 610 and
not exists (
select *
from HISTORY_DUR
where H_O_KEY = acid_o_key
)
and
H_L_KEY = acid_l_key
and
H_DELTA = acid_delta
)

-- Durability Stream 4
select *
from acid_values
where seq_num between 611 and 810 and
not exists (
select *
from HISTORY_DUR
where H_O_KEY = acid_o_key
)
and
H_L_KEY = acid_l_key
and
H_DELTA = acid_delta
)

-- Durability Stream 5
select *
from acid_values
where seq_num between 811 and 1010 and
not exists (
select *
from HISTORY_DUR
where H_O_KEY = acid_o_key
)
and
H_L_KEY = acid_l_key
and
H_DELTA = acid_delta
)

-- Durability Stream 6
select *
from acid_values
where seq_num between 1011 and 1210 and
not exists (
select *
from HISTORY_DUR
where H_O_KEY = acid_o_key
)
and
H_L_KEY = acid_l_key
and
H_DELTA = acid_delta
)

-- Durability Stream 1
select *
from acid_values
where seq_num between 11 and 210 and
not exists (
select *
from HISTORY_DUR
where H_O_KEY = acid_o_key
)
and
H_L_KEY = acid_l_key
and
H_DELTA = acid_delta
)

-- Durability Stream 2
select *
from acid_values
where seq_num between 211 and 410 and
not exists (
select *
from HISTORY_DUR
where H_O_KEY = acid_o_key
)
and
H_L_KEY = acid_l_key
and
H_DELTA = acid_delta
)

-- Durability Stream 3
select *
from acid_values
where seq_num between 411 and 610 and
not exists (
select *
from HISTORY_DUR
where H_O_KEY = acid_o_key
)
and
H_L_KEY = acid_l_key
and
H_DELTA = acid_delta
)

-- Durability Stream 4
select *
from acid_values
where seq_num between 611 and 810 and
not exists (
select *
from HISTORY_DUR
)
)

```

Appendix C

```

                                where H_O_KEY = acid_o_key                                ( o_orderkey
and                                                                    int,
                                H_L_KEY = acid_l_key                                                                    o_totalprice
and                                                                    money,
                                H_DELTA = acid_delta                                                                    l_orderkey
                                )                                                                    int,
                                                                    lineitem_sum
-- Durability Stream 5
select *                                                                    )
from acid_values
where seq_num between 811 and 1010 and
      not exists (
                                select *
                                from HISTORY_DUR
                                where H_O_KEY = acid_o_key
and
                                H_L_KEY = acid_l_key
and
                                H_DELTA = acid_delta
                                )
-- Durability Stream 6
select *
from acid_values
where seq_num between 1011 and 1210 and
      not exists (
                                select *
                                from HISTORY_DUR
                                where H_O_KEY = acid_o_key
and
                                H_L_KEY = acid_l_key
and
                                H_DELTA = acid_delta
                                )
-- File: DUR_VERIFY1.SQL
-- Microsoft TPC-H Kit Ver. 2.00
-- Copyright Microsoft, 1999
--
-- Durability Verification test 1
-- -----
-- Comment: ORDERS.O_TOTALPRICE should equal
LINEITEM sums
print ''
print 'Timestamp for Pre-Failure Durability Verification 1
start:'
select convert(char(30), getdate(),9)
print ''
select count(*) from HISTORY_DUR
GO
if exists ( select name from sysobjects where name =
'temp_dur1_output' )
drop table temp_dur1_output
GO
CREATE TABLE temp_dur1_output
                                INSERT INTO temp_dur1_output
                                SELECT DISTINCT(o.O_ORDERKEY),
                                o.O_TOTALPRICE,
                                I.L_ORDERKEY,
                                SUM(ROUND((ROUND((L_EXTENDEDPRICE *
(1 - L_DISCOUNT)),2,1) * (1 + L_TAX)),2,1))
                                FROM acid_values a INNER JOIN ORDERS o
                                ON a.acid_o_key = o.O_ORDERKEY JOIN
                                LINEITEM I
                                ON o.O_ORDERKEY = I.L_ORDERKEY
                                WHERE a.acid_test = 'Consistency_Durability'
                                GROUP BY o.O_ORDERKEY, o.O_TOTALPRICE,
                                I.L_ORDERKEY
                                ORDER BY o.O_ORDERKEY ASC
-- Select data from temporary table...
print ''
print 'Select all rows from temporary table'
print ''
SELECT o_orderkey 'O_OrderKey',
o_totalprice 'O_TotalPrice',
l_orderkey 'L_OrderKey',
lineitem_sum 'LineItem Sum'
FROM temp_dur1_output
print ''
print 'Select any rows where o_totalprice is not equal to
lineitem_sum'
print ''
SELECT *
FROM temp_dur1_output
WHERE o_totalprice <> lineitem_sum
print ''
print 'Timestamp for Durability 1 end:'
select convert(char(30), getdate(),9)
print ''
if exists ( select name from sysobjects where name =
'temp_dur1_output' )
drop table temp_dur1_output
GO
-- File: DUR_VERIFY2.SQL
```

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```
-- Microsoft TPC-H Kit Ver. 2.00
-- Copyright Microsoft, 1999
--
-- Durability Verification test 2
-- -----
--
-- Comment: ORDERS.O_TOTALPRICE should equal
LINEITEM sums

print ''
print 'Timestamp for Pre-Failure Durability Verification 2
start:'
select convert(char(30), getdate(),9)
print ''

select count(*) from HISTORY_DUR
GO

if exists ( select name from sysobjects where name =
'temp_dur2_output' )
drop table temp_dur2_output
GO

CREATE TABLE temp_dur2_output
(
o_orderkey
int,
o_totalprice
money,
l_orderkey
int,
lineitem_sum
money
)

INSERT INTO temp_dur2_output
SELECT DISTINCT(o.O_ORDERKEY),
o.O_TOTALPRICE,
l.L_ORDERKEY,
SUM(ROUND((ROUND((L_EXTENDEDPRICE *
(1 - L_DISCOUNT)),2,1) * (1 + L_TAX)),2,1))
FROM acid_values a INNER JOIN ORDERS o
ON a.acid_o_key = o.O_ORDERKEY JOIN
LINEITEM l
ON o.O_ORDERKEY = l.L_ORDERKEY
WHERE a.acid_test = 'Consistency_Durability'
GROUP BY o.O_ORDERKEY, o.O_TOTALPRICE,
l.L_ORDERKEY
ORDER BY o.O_ORDERKEY ASC

-- Select data from temporary table...
print ''
print 'Select all rows from temporary table'
print ''
SELECT o_orderkey 'O_OrderKey',
o_totalprice 'O_TotalPrice',
l_orderkey 'L_OrderKey',
lineitem_sum 'LineItem Sum'
FROM temp_dur2_output

print ''
print 'Select any rows where o_totalprice is not equal to
lineitem_sum'
print ''
SELECT *
FROM temp_dur2_output
WHERE o_totalprice <> lineitem_sum

print ''
print 'Timestamp for Durability 2 end:'
select convert(char(30), getdate(),9)
print ''

if exists ( select name from sysobjects where name =
'temp_dur2_output' )
drop table temp_dur2_output
GO

-- File: ATOM_C.SQL
-- Microsoft TPC-H Benchmark Kit Ver. 2.00
-- Copyright Microsoft, 1999
-- Purpose: Atomicity commit test

declare @acid_test char(25),
@rand_o_key int,
@rand_l_key int,
@rand_delta tinyint

select @rand_o_key = acid_o_key,
@rand_l_key = acid_l_key,
@rand_delta = acid_delta
from acid_values
where acid_test= 'Atomicity_Commit'

select 'Random Values Used',
@rand_o_key "@RAND_O_KEY",
@rand_l_key "@RAND_L_KEY",
@rand_delta "@RAND_DELTA"

exec tran_w_com @rand_o_key,
@rand_l_key,
@rand_delta
GO

-- File: CON1.SQL
-- Microsoft TPC-H Benchmark Kit Ver. 2.00
-- Copyright Microsoft, 1999
--
-- Consistency test 1
-- -----
```


Appendix C

```
--
-- Comment: ORDERS.O_TOTALPRICE should equal
LINEITEM sums

print ''
print 'Timestamp for Consistency 1 start:'
select convert(char(30), getdate(),9)
print ''

if exists ( select name from sysobjects where name =
'temp_con1_output' )
    drop table temp_con1_output

CREATE TABLE temp_con1_output
(
    o_orderkey
int,
    o_totalprice
money,
    l_orderkey
int,
    lineitem_sum
money
)

INSERT INTO temp_con1_output
SELECT DISTINCT(o.O_ORDERKEY),
    cast(o.O_TOTALPRICE as decimal(20,3)),
    l.L_ORDERKEY,
    cast(sum(cast( cast(
cast(cast(cast(cast(L_EXTENDEDPRICE as
decimal(20,3))*100 as integer) as decimal(20,3)) * (1-
cast(L_DISCOUNT as decimal(20,3))) as integer) * (1 +
cast(L_TAX as decimal(20,3))) as integer) as
decimal(20,3))/100) as decimal(20,3))
FROM acid_values a INNER JOIN ORDERS o
    ON a.acid_o_key = o.O_ORDERKEY JOIN LINEITEM
l
    ON o.O_ORDERKEY = l.L_ORDERKEY
WHERE a.acid_test = 'Consistency_Durability'
GROUP BY o.O_ORDERKEY, o.O_TOTALPRICE,
l.L_ORDERKEY
ORDER BY o.O_ORDERKEY ASC

-- Select data from temporary table...
print ''
print 'Select all rows from temporary table'
print ''
SELECT o_orderkey 'O_OrderKey',
    o_totalprice 'O_TotalPrice',
    l_orderkey 'L_OrderKey',
    lineitem_sum 'LineItem Sum'
FROM temp_con1_output

print ''
print 'Select any rows where o_totalprice is not equal to
lineitem_sum'
print ''
SELECT *
FROM temp_con1_output
```

```
WHERE o_totalprice <> lineitem_sum

print ''
print 'Timestamp for Consistency 1 end:'
select convert(char(30), getdate(),9)
print ''

if exists ( select name from sysobjects where name =
'temp_con1_output' )
    drop table temp_con1_output
GO
-- File: CON2.SQL
-- Microsoft TPC-H Benchmark Kit Ver. 2.00
-- Copyright Microsoft, 1999
--
-- Consistency test 2
-- -----
--
-- Comment: ORDERS.O_TOTALPRICE should equal
LINEITEM sums

print ''
print 'Timestamp for Consistency 2 start:'
select convert(char(30), getdate(),9)
print ''

if exists ( select name from sysobjects where name =
'temp_con2_output' )
    drop table temp_con2_output
GO

CREATE TABLE temp_con2_output
(
    o_orderkey
int,
    o_totalprice
money,
    l_orderkey
int,
    lineitem_sum
money
)

INSERT INTO temp_con2_output
SELECT DISTINCT(o.O_ORDERKEY),
    cast(o.O_TOTALPRICE as decimal(20,3)),
    l.L_ORDERKEY,
    cast(sum(cast( cast(
cast(cast(cast(cast(L_EXTENDEDPRICE as
decimal(20,3))*100 as integer) as decimal(20,3)) * (1-
cast(L_DISCOUNT as decimal(20,3))) as integer) * (1 +
cast(L_TAX as decimal(20,3))) as integer) as
decimal(20,3))/100) as decimal(20,3))
FROM acid_values a INNER JOIN ORDERS o
    ON a.acid_o_key = o.O_ORDERKEY JOIN LINEITEM
l
    ON o.O_ORDERKEY = l.L_ORDERKEY
WHERE a.acid_test = 'Consistency_Durability'
```

Appendix C

```
GROUP BY o.O_ORDERKEY, o.O_TOTALPRICE,  
l.L_ORDERKEY  
ORDER BY o.O_ORDERKEY ASC
```

```
-- Select data from temporary table...
```

```
print ''
```

```
print 'Select all rows from temporary table'
```

```
print ''
```

```
SELECT      o_orderkey 'O_OrderKey',  
            o_totalprice 'O_TotalPrice',  
            l_orderkey 'L_OrderKey',  
            lineitem_sum 'LineItem Sum'  
FROM temp_con2_output
```

```
print ''
```

```
print 'Select any rows where o_totalprice is not equal to  
lineitem_sum'
```

```
print ''
```

```
SELECT      *  
FROM temp_con2_output  
WHERE o_totalprice <> lineitem_sum
```

```
print ''
```

```
print 'Timestamp for Consistency 1 end:'
```

```
select convert(char(30), getdate(),9)
```

```
print ''
```

```
if exists ( select name from sysobjects where name =  
'temp_con2_output' )
```

```
drop table temp_con2_output
```

```
GO
```

Appendix C

Appendix D: Query text and Output

Appendix D

(4 row(s) affected)

-- using default substitutions

/* 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
-----
9938.530000   Supplier#000005359   UNITED
KINGDOM     185358   Manufacturer#4
QKuHYh,vZGiwu2FWEJoLDx04   33-429-790-

```

-- using default substitutions

/* 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, '1998-12-01')
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 37734107.000000
56586554400.730148 53758257134.870094
55909065222.827690 25.522006 38273.129735
0.049985 1478493
N F 991417.000000 1487504710.379999
1413082168.054098 1469649223.194377 25.516472
38284.467761 0.050093 38854
N O 74476040.000000
111701729697.739170 106118230307.605320
110367043872.497390 25.502227 38249.117989
0.049997 2920374
R F 37719753.000000
56568041380.900063 53741292684.604050
55889619119.831841 25.505794 38250.854626
0.050009 1478870

```

Appendix D

6131 blithely silent pinto beans are furiously. slyly final deposits across			packages across the ironic accounts grow slyly after the furiously		
9937.840000	Supplier#000005969	ROMANIA	9739.860000	Supplier#000003384	FRANCE
108438	Manufacturer#1		138357	Manufacturer#2	o,Z3v4POifevE k9U1b
ANDENSOSmk,miq23Xfb5RWt6dvUcvt6Qa	29-520-692-3537	carefully slow deposits use furiously. slyly ironic platelets above the ironic	6J1ucX,I	16-494-913-5925	slyly ironic theodolites hag
9936.220000	Supplier#000005250	UNITED KINGDOM	9721.950000	Supplier#000008757	UNITED KINGDOM
249	Manufacturer#4		156241	Manufacturer#3	
B3rq0xbSEim4Mpy2RH J	33-320-228-2957	blithely special packages are. stealthily express deposits across the closely final instructi	Atg6GnM4dT2	33-821-407-2995	ironic, even dolphins above the furiously ironic foxes sleep slyly around the caref
9923.770000	Supplier#000002324	GERMANY	9681.330000	Supplier#000008406	RUSSIA
29821	Manufacturer#4	y3OD9UyWSTOk	78405	Manufacturer#1	.qUuXcftUI
17-779-299-1839	quickly express packages breach quiet pinto beans. requ		32-139-873-8571	furiously even deposits affix thinly special theodolites. furiou	
9871.220000	Supplier#000006373	GERMANY	9643.550000	Supplier#000005148	ROMANIA
43868	Manufacturer#5	J8fcXWSTqM	107617	Manufacturer#1	kT4ciVFslx9z4s79p Js825
17-813-485-8637	never silent deposits integrate furiously blit		29-252-617-4850	doggedly even ideas boost furiously against the furiously express	
9870.780000	Supplier#000001286	GERMANY	9624.820000	Supplier#000001816	FRANCE
81285	Manufacturer#2		34306	Manufacturer#3	
YKA,E2fjiVd7eUrzp2Ef8j1QxGo2DFnosaTEH	17-516-924-4574	final theodolites cajole slyly special,	e7vab91vLJPWxxZnewmnDBpDmxYHrb	16-392-237-6726	blithely regular accounts cajole furiously. regular
9870.780000	Supplier#000001286	GERMANY	9624.780000	Supplier#000009658	ROMANIA
181285	Manufacturer#4		189657	Manufacturer#1	
YKA,E2fjiVd7eUrzp2Ef8j1QxGo2DFnosaTEH	17-516-924-4574	final theodolites cajole slyly special,	oE9uBgEfSS4opIcepXyAYM,x	29-748-876-2014	regular deposits haggle. furiously express asympto
9852.520000	Supplier#000008973	RUSSIA	9612.940000	Supplier#000003228	ROMANIA
18972	Manufacturer#2		120715	Manufacturer#2	
t5L67YdBYH6o,Vz24jpDyQ9	32-188-594-7038	quickly regular instructions wake-- carefully unusual braids into the expres	KDdpNKN3cWu7ZSrbdq7AfSLxx,qWB	29-325-784-8187	carefully pending accounts serve. furiously close deposits boost slyly. q
9847.830000	Supplier#000008097	RUSSIA	9612.940000	Supplier#000003228	ROMANIA
130557	Manufacturer#2	xMe97bpE69NzdwLoX	198189	Manufacturer#4	
32-375-640-3593	slyly regular dependencies sleep slyly furiously express dep		KDdpNKN3cWu7ZSrbdq7AfSLxx,qWB	29-325-784-8187	carefully pending accounts serve. furiously close deposits boost slyly. q
9847.570000	Supplier#000006345	FRANCE	9571.830000	Supplier#000004305	ROMANIA
86344	Manufacturer#1		179270	Manufacturer#2	
VSt3rzk3qG698u6ld8HhOByvrTcSTSvQIDQDag	16-886-766-7945	silent pinto beans should have to snooze carefully along the final reques	qNHZ7WmCzygwMPRDO9Ps	29-973-481-1831	furiously final deposits
9847.570000	Supplier#000006345	FRANCE	9558.100000	Supplier#000003532	UNITED KINGDOM
173827	Manufacturer#2		88515	Manufacturer#4	
VSt3rzk3qG698u6ld8HhOByvrTcSTSvQIDQDag	16-886-766-7945	silent pinto beans should have to snooze carefully along the final reques	EOeuiiOn21OVpTIGguufFDFsbN1p0lhpXHp	33-152-301-2164	daring, sly accounts breach about th
9836.930000	Supplier#000007342	RUSSIA	9492.790000	Supplier#000005975	GERMANY
4841	Manufacturer#4	JOIK7C1,7xrEZSSOw	25974	Manufacturer#5	S6mliCTx82z7IV
32-399-414-5385	final accounts haggle. bold accounts are furiously dugouts. furiously silent asymptotes are slyly		17-992-579-4839	always pending packages boost slyly.	
9817.100000	Supplier#000002352	RUSSIA	9461.050000	Supplier#000002536	UNITED KINGDOM
124815	Manufacturer#2	4LfoHUZjgJEbAKw	20033	Manufacturer#1	
TgdKcgOc4D4uCYw	32-551-831-1437	blithely pending packages across the ironic accounts grow slyly after the furiously	8mmGbyzaU 7ZS2wJumTibypncu9pNkDc4FYA	33-556-973-5522	even foxes are quickly furiously express requests. packages
9817.100000	Supplier#000002352	RUSSIA	Additional Rows Deleted
152351	Manufacturer#3	4LfoHUZjgJEbAKw	8376.520000	Supplier#000005306	UNITED KINGDOM
TgdKcgOc4D4uCYw	32-551-831-1437	blithely pending	190267	Manufacturer#5	9t8Y8
			QqSIsoADPt6NLdk,TP5zyRx41oBUlgoGc9	33-632-514-	

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7931 furiously even instructions integrate during the furiously regular re	7937.930000	Supplier#000009012	ROMANIA
8348.740000	Supplier#000008851	FRANCE	83995 Manufacturer#2
66344 Manufacturer#4 nWxi7GwEbjhw1			iUiTziH,Ek3i4lwSgunXMgrcTzwdb 29-250-925-9690
16-796-240-2472 ironic instructions nag slyly against the blithely bold ideas haggle quickly final, regular request	7914.450000	Supplier#000001013	RUSSIA
slyly even theodolites. requests alongside of	125988	Manufacturer#2	
8338.580000	Supplier#000007269	FRANCE	riRcntps4KEDtYScjpMIWeYF6mNnR 32-194-698-
17268 Manufacturer#4 ZwhJSwABUoiB04,3			3365 final, ironic theodolites alongside of the ironic
16-267-277-4365 ruthlessly regular asymptotes a	7912.910000	Supplier#000004211	GERMANY
8328.460000	Supplier#000001744	ROMANIA	159180 Manufacturer#5
69237 Manufacturer#5			2wQRVovHrm3,v03IKzfTd,1PYsFXQFFOG 17-266-
oLo3fV64q2,FKHa3p,qHnS7Yzv,ps8 29-330-728-5873			947-7315 final requests integrate slyly above the silent, even
blithely silent excuses are slyly above the furiously even courts	7912.910000	Supplier#000004211	GERMANY
8307.930000	Supplier#000003142	GERMANY	184210 Manufacturer#4
18139 Manufacturer#1 dqblvV8dCNAorGIJ			2wQRVovHrm3,v03IKzfTd,1PYsFXQFFOG 17-266-
17-595-447-6026 theodolites sleep blithely carefully regular warhorses. slyly regular ins	7894.560000	Supplier#000007981	GERMANY
8231.610000	Supplier#000009558	RUSSIA	85472 Manufacturer#4 NSJ96vMROAbeXP
192000 Manufacturer#2 mcdgen,yT1iJDHDS5fV			17-963-404-3760 regular, even theodolites integrate carefully.
32-762-137-5858 slyly regular theodolites sleep fluffily express depos	7887.080000	Supplier#000009792	GERMANY
8152.610000	Supplier#000002731	ROMANIA	164759 Manufacturer#3
15227 Manufacturer#4 nluXJCuY1tu			Y28ITVeYriT3kIGdV2K8fSZ V2UqT5H1Otz 17-988-
29-805-463-2030 gifts use. slyly silent ideas are carefully beneath the silent instructions. slyly sil	7871.500000	Supplier#000007206	RUSSIA
8109.090000	Supplier#000009186	FRANCE	104695 Manufacturer#1 3w
99185 Manufacturer#1			fNCnrVmvJJE95sgWZzvW 32-432-452-7731
wgfosrVPexl9pEXWywaqlBMDYYf 16-668-570-			1402 quickly pending requests are blithely along the ironic, until the slyly pending
1402 quickly pending requests are blithely along the ironic, final requests; instr	7852.450000	Supplier#000005864	RUSSIA
8102.620000	Supplier#000003347	UNITED KINGDOM	8363 Manufacturer#4 WCNfBPZeSXh3h,c
18344 Manufacturer#5 m			32-454-883-3821 blithely regular deposits
CtXS2S16i 33-454-274-8532 packages	7850.660000	Supplier#000001518	UNITED KINGDOM
grow special orbits. regular theodolites about the carefully pe	86501	Manufacturer#1	86501 Manufacturer#1
8046.070000	Supplier#000008780	FRANCE	ONda3YJiHKJOC 33-730-383-3892
191222 Manufacturer#3 AczzuE0UK9osj ,Lx0Jmh			furiously final accounts wake carefully idle requests. even dolphins wake acc
16-473-215-6395 regular epitaphs integrate slyly.	7843.520000	Supplier#000006683	FRANCE
8042.090000	Supplier#000003245	RUSSIA	11680 Manufacturer#4
135705 Manufacturer#4			2Z0JGkiv01Y00oCFwUGfviIbhzcDy 16-464-517-
Dh8Ikg39onrbOL4DyTfGw8a9oKUX3d9Y 32-836-132-			8943 carefully bold accounts doub
8872 carefully regular instructions integrate blithely silent foxes. furiously express instructions haggl	(100 row(s) affected)		
8042.090000	Supplier#000003245	RUSSIA	
150729 Manufacturer#1			-- using default substitutions
Dh8Ikg39onrbOL4DyTfGw8a9oKUX3d9Y 32-836-132-			/* TPC_H Query 3 - Shipping Priority */
8872 carefully regular instructions integrate blithely silent foxes. furiously express instructions haggl	SELECT	TOP 10	
7992.400000	Supplier#000006108	FRANCE	L_ORDERKEY,
118574 Manufacturer#1 8tBydnTDwUqfBfFV4i3			SUM(L_EXTENDEDPRICE*(1-L_DISCOUNT))
16-974-998-8937 regular pinto beans are after			AS REVENUE,
7980.650000	Supplier#000001288	FRANCE	O_ORDERDATE,
13784 Manufacturer#4 zE,7HgVPrCn			O_SHIPPRIORITY
16-646-464-8247 unusual pinto beans cajole furiously according t	FROM	CUSTOMER,	
7950.370000	Supplier#000008101	GERMANY	ORDERS,
33094 Manufacturer#5 kkYvL6lujovJgTNG			LINEITEM
IKkaXQDYgx8ILohj 17-627-663-8014 quickly regular requests are furiously. pending deposits wake	WHEREC_MKTSEGMENT	= 'BUILDING' AND	

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```

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_SHIPRIORITY
ORDER BY REVENUE DESC,
         O_ORDERDATE
L_ORDERKEY REVENUE
O_ORDERDATE O_SHIPRIORITY
-----
-----
2456423      406181.011100      1995-03-05
00:00:00.000 0
3459808      405838.698900      1995-03-04
00:00:00.000 0
492164       390324.061000      1995-02-19
00:00:00.000 0
1188320      384537.935900      1995-03-09
00:00:00.000 0
2435712      378673.055800      1995-02-26
00:00:00.000 0
4878020      378376.795200      1995-03-12
00:00:00.000 0
5521732      375153.921500      1995-03-13
00:00:00.000 0
2628192      373133.309400      1995-02-22
00:00:00.000 0
993600       371407.459500      1995-03-05
00:00:00.000 0
2300070      367371.145200      1995-03-13
00:00:00.000 0

```

(10 row(s) affected)

-- using default substitutions

/* 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, '1993-
07-01') AND
      EXISTS (
        SELECT *
        FROM LINEITEM
        WHERE L_ORDERKEY
        = O_ORDERKEY AND
        L_COMMITDATE < L_RECEIPTDATE
      )
GROUP BY O_ORDERPRIORITY
ORDER BY O_ORDERPRIORITY
O_ORDERPRIORITY ORDER_COUNT
-----
-----

```

```

1-URGENT      10594
2-HIGH        10476

```

```

3-MEDIUM      10410
4-NOT SPECIFIED 10556
5-LOW         10487

```

(5 row(s) affected)

-- using default substitutions

/* 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,
'1994-01-01')
GROUP BY N_NAME
ORDER BY REVENUE DESC
N_NAME REVENUE
-----
-----

```

```

INDONESIA      55502041.169700
VIETNAM       55295086.996700
CHINA         53724494.256600
INDIA         52035512.000200
JAPAN         45410175.695400

```

(5 row(s) affected)

-- using default substitutions

/* 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, '1994-01-01')
AND
      L_DISCOUNT BETWEEN .06 - 0.01 AND .06 +
0.01 AND
      L_QUANTITY < 24
REVENUE
-----
-----

```

```

123141078.228300

```

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(1 row(s) affected)

-- using default substitutions

/* 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

SUPP_NATION      CUST_NATION      L_YEAR
REVENUE
-----
FRANCE           GERMANY           1995
54639732.733600
FRANCE           GERMANY           1996
54633083.307600
GERMANY          FRANCE            1995
52531746.669700
    
```

GERMANY FRANCE 1996
52520549.022400

(4 row(s) affected)

-- using default substitutions

/* 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
O_YEAR      MKT_SHARE
-----
1995        0.034436
1996        0.041486
    
```


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(2 row(s) affected)

-- using default substitutions

/* 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%%'

```

)
GROUP BY   NATION,
            O_YEAR
ORDER BY   NATION,
            O_YEAR      DESC
            SUM_PROFIT
-----
ALGERIA    1998    31342867.234500
ALGERIA    1997    57138193.023300
ALGERIA    1996    56140140.133000
ALGERIA    1995    53051469.653400
ALGERIA    1994    53867582.128600
ALGERIA    1993    54942718.132400
ALGERIA    1992    54628034.712700
ARGENTINA  1998    30211185.708100
ARGENTINA  1997    50805741.752300
ARGENTINA  1996    51923746.575500
ARGENTINA  1995    49298625.766600
ARGENTINA  1994    50835610.109500
ARGENTINA  1993    51646079.177500
ARGENTINA  1992    50410314.994800
BRAZIL     1998    27217924.383200
BRAZIL     1997    48378669.198900

```

```

BRAZIL     1996    50482870.357200
BRAZIL     1995    47623383.634900
BRAZIL     1994    47840165.725600
BRAZIL     1993    49054694.035100
BRAZIL     1992    48667639.084200
CANADA     1998    30379833.768500
CANADA     1997    50465052.311400

```

..... Additional Rows Deleted

```

SAUDI ARABIA 1993    52937508.881800
SAUDI ARABIA 1992    54843459.641400
UNITED KINGDOM 1998    28494874.004000
UNITED KINGDOM 1997    49381810.898600
UNITED KINGDOM 1996    51386853.960400
UNITED KINGDOM 1995    51509586.788500
UNITED KINGDOM 1994    48086499.711500
UNITED KINGDOM 1993    49166827.223500
UNITED KINGDOM 1992    49349122.082500
UNITED STATES 1998    25126238.946100
UNITED STATES 1997    50077306.418600
UNITED STATES 1996    48048649.470300
UNITED STATES 1995    48809032.422600
UNITED STATES 1994    49296747.182700
UNITED STATES 1993    48029946.801400
UNITED STATES 1992    48671944.498300
VIETNAM      1998    30442736.059400
VIETNAM      1997    50309179.794200
VIETNAM      1996    50488161.410000
VIETNAM      1995    49658284.612500
VIETNAM      1994    50596057.260700
VIETNAM      1993    50953919.151900
VIETNAM      1992    49613838.315100

```

(175 row(s) affected)

-- using default substitutions

/* 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

```

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```

O_ORDERDATE < dateadd(mm, 3, '1993-
10-01') 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
C_CUSTKEY C_NAME REVENUE
C_ACCTBAL N_NAME C_ADDRESS
C_PHONE C_COMMENT
-----
-----
-----
57040 Customer#000057040 734235.245500
632.870000 JAPAN Eioyzzjf4pp
22-895-641-3466 requests sleep blithely about the furiously i
143347 Customer#000143347 721002.694800
2557.470000 EGYPT 1aReFYv,Kw4
14-742-935-3718 fluffily bold excuses haggle finally after the
u
60838 Customer#000060838 679127.307700
2454.770000 BRAZIL
64EaJ5vMAHWJIBOxJklpNc2RJiWE 12-913-494-
9813 furiously even pinto beans integrate under the ruthless
foxes; ironic, even dolphins across the slyl
101998 Customer#000101998 637029.566700
3790.890000 UNITED KINGDOM
01c9CILnNtfOQYmZj 33-593-865-6378
accounts doze blithely! enticing, final deposits sleep blithely
special accounts. slyly express accounts pla
125341 Customer#000125341 633508.086000
4983.510000 GERMANY
S29ODD6bceU8QSuueJznkNaK 17-582-695-5962
quickly express requests wake quickly blithely
25501 Customer#000025501 620269.784900
7725.040000 ETHIOPIA
W556MXuoiaYCCZamJI,Rn0B4ACUGdkQ8DZ 15-874-
808-6793 quickly special requests sleep evenly among the
special deposits. special deposi
115831 Customer#000115831 596423.867200
5098.100000 FRANCE rFeBbEEyk dl
ne7zV5fDrmiq1oK09wV7pxqCgIc 16-715-386-3788
carefully bold excuses sleep alongside of the thinly idle
84223 Customer#000084223 594998.023900
528.650000 UNITED KINGDOM
nAVZCs6BaWap rrM27N 2qBnzc5WBauxbA 33-442-
824-8191 pending, final ideas haggle final requests. unusual,
regular asymptotes affix according to the even foxes.
54289 Customer#000054289 585603.391800
5583.020000 IRAN
vXCxocSuo0Bad5JQI ,oobkZ 20-834-292-4707

```

```

express requests sublute blithely regular requests. regular,
even ideas solve.
39922 Customer#000039922 584878.113400
7321.110000 GERMANY
Zgy4s50l2GKN4pLDPBU8m342gIw6R 17-147-757-
8036 even pinto beans haggle. slyly bold accounts inte
6226 Customer#000006226 576783.760600
2230.090000 UNITED KINGDOM
8gPu8,NPGkfyQQ0hcIYUGPIBWc,ybP5g, 33-657-701-
3391 quickly final requests against the regular instructions
wake blithely final instructions. pa
922 Customer#000000922 576767.533300
3869.250000 GERMANY
Az9RFaut7NkPnc5zSD2PwHgVwr4jRzq 17-945-916-
9648 boldly final requests cajole blith
147946 Customer#000147946 576455.132000
2030.130000 ALGERIA
iANyZHjqhy7Ajah0pTrYyhJ 10-886-956-3143
furiously even accounts are blithely above the furiouslyl
115640 Customer#000115640 569341.193300
6436.100000 ARGENTINA Vtgfia9qI
7EpHgecU1X 11-411-543-4901 final instructions
are slyly according to the
73606 Customer#000073606 568656.857800
1785.670000 JAPAN
xuR0Tro5yChDfOCrjkd2ol 22-437-653-6966
furiously bold orbits about the furiously busy requests wake
across the furiously quiet theodolites. d
110246 Customer#000110246 566842.981500
7763.350000 VIETNAM 7KzflgX
MDOq7sOkI 31-943-426-9837 dolphins sleep
blithely among the slyly final
142549 Customer#000142549 563537.236800
5085.990000 INDONESIA
ChqEoK43OysjdHbtKCp6dKqjNyvvi9 19-955-562-
2398 regular, unusual dependencies boost slyly; ironic
attainments nag fluffily into the unusual packages?
146149 Customer#000146149 557254.986500
1791.550000 ROMANIA s87fvzFQpU
29-744-164-6487 silent, unusual requests detect quickly slyly
regul
52528 Customer#000052528 556397.350900
551.790000 ARGENTINA
NFztyTOR10UOJ 11-208-192-3205 unusual
requests detect. slyly dogged theodolites use slyly. deposit
23431 Customer#000023431 554269.536000
3381.860000 ROMANIA
HgiV0phqhaIa9aydNoIib 29-915-458-2654
instructions nag quickly. furiously bold accounts cajol

```

(20 row(s) affected)

-- using default substitutions

/* TPC_H Query 11 - Important Stock Identification */

```

SELECT PS_PARTKEY,
SUM(PS_SUPPLYCOST*PS_AVAILQTY)
AS VALUE

```

Appendix D

```

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
         PS_PARTKEY VALUE

```

```

-----
129760 17538456.860000
166726 16503353.920000
191287 16474801.970000
161758 16101755.540000
34452  15983844.720000
139035 15907078.340000
9403   15451755.620000
154358 15212937.880000
38823  15064802.860000
85606  15053957.150000
33354  14408297.400000
154747 14407580.680000
82865  14235489.780000
76094  14094247.040000
222    13937777.740000
121271 13908336.000000
55221  13716120.470000
22819  13666434.280000
76281  13646853.680000
85298  13581154.930000
85158  13554904.000000
139684 13535538.720000

```

..... Additional Rows Deleted

```

71475  7903367.580000
36289  7901946.500000
61739  7900794.000000
52338  7898638.080000
194299 7898421.240000
105235 7897829.940000
77207  7897752.720000
96712  7897575.270000
10157  7897046.250000

```

```

171154 7896814.500000
79373  7896186.000000
113808 7893353.880000
27901  7892952.000000
128820 7892882.720000
25891  7890511.200000
122819 7888881.020000
154731 7888301.330000
101674 7879324.600000
51968  7879102.210000
72073  7877736.110000
5182   7874521.730000

```

(1048 row(s) affected)

-- using default substitutions

/* 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, '1994-01-
01')

```

```

GROUP BY L_SHIPMODE
ORDER BY L_SHIPMODE
L_SHIPMODE HIGH_LINE_COUNT LOW_LINE_COUNT
-----

```

```

MAIL    6202    9324
SHIP    6200    9262

```

(2 row(s) affected)

-- using default substitutions

Appendix D

/* 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
C_COUNT CUSTDIST
-----

```

```

0      50004
9      6641
10     6566
11     6058
8      5949
12     5553
13     4989
19     4748
7      4707
18     4625
15     4552
17     4530
14     4484
20     4461
16     4323
21     4217
22     3730
6      3334
23     3129
24     2622
25     2079
5      1972
26     1593
27     1185
4      1033
28     869
29     559
3      398
30     373
31     235
2      144
32     128
33     71
34     48
35     33
1      23
36     17
37     7
40     4

```

90

```

38     4
39     2
41     1

```

(42 row(s) affected)

-- using default substitutions

/* 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, '1995-09-01')
PROMO_REVENUE
-----

```

16.380779

(1 row(s) affected)

-- using default substitutions

/* 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, '1996-01-01')
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
                        )

```

Appendix D

```
ORDER BY      S_SUPPKEY

DROP VIEW REVENUE0
S_SUPPKEY  S_NAME          S_ADDRESS
S_PHONE    TOTAL_REVENUE
-----
8449      Supplier#000008449  Wp34zim9qYFbVctdW
20-469-856-8873 1772627.208700
```

(1 row(s) affected)

-- using default substitutions

/* 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
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#11 STANDARD BURNISHED BRASS 36      24
Brand#15 MEDIUM ANODIZED NICKEL  3       24
Brand#15 SMALL ANODIZED BRASS    45      24
Brand#15 SMALL BURNISHED NICKEL  19      24
Brand#21 MEDIUM ANODIZED COPPER  3       24
Brand#22 SMALL BRUSHED NICKEL    3       24
Brand#22 SMALL BURNISHED BRASS   19      24
```

```
Brand#25 MEDIUM BURNISHED COPPER 36      24
Brand#31 PROMO POLISHED COPPER   36      24
Brand#33 LARGE POLISHED TIN       23      24
Brand#33 PROMO POLISHED STEEL    14      24
Brand#35 PROMO BRUSHED NICKEL    14      24
Brand#41 ECONOMY BRUSHED STEEL   9       24
Brand#41 ECONOMY POLISHED TIN    19      24
Brand#41 LARGE PLATED COPPER     36      24
Brand#42 ECONOMY PLATED BRASS    3       24
Brand#42 STANDARD POLISHED TIN   49      24
Brand#43 PROMO BRUSHED TIN       3       24
```

..... Additional Rows Deleted

```
Brand#55 STANDARD POLISHED COPPER 23      4
Brand#55 STANDARD POLISHED COPPER 45      4
Brand#55 STANDARD POLISHED NICKEL  3       4
Brand#55 STANDARD POLISHED NICKEL 23      4
Brand#55 STANDARD POLISHED NICKEL 36      4
Brand#55 STANDARD POLISHED NICKEL 45      4
Brand#55 STANDARD POLISHED NICKEL 49      4
Brand#55 STANDARD POLISHED STEEL  14      4
Brand#55 STANDARD POLISHED STEEL 23      4
Brand#55 STANDARD POLISHED TIN     9       4
Brand#55 STANDARD POLISHED TIN    19      4
Brand#55 STANDARD POLISHED TIN    36      4
Brand#11 SMALL BRUSHED TIN         19      3
Brand#15 LARGE PLATED NICKEL       45      3
Brand#15 LARGE POLISHED NICKEL     9       3
Brand#21 PROMO BURNISHED STEEL    45      3
Brand#22 STANDARD PLATED STEEL    23      3
Brand#25 LARGE PLATED STEEL       19      3
Brand#32 STANDARD ANODIZED COPPER 23      3
Brand#33 SMALL ANODIZED BRASS      9       3
Brand#35 MEDIUM ANODIZED TIN      19      3
Brand#51 SMALL PLATED BRASS        23      3
Brand#52 MEDIUM BRUSHED BRASS     45      3
Brand#53 MEDIUM BRUSHED TIN       45      3
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)

-- using default substitutions

/* 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)
```

Appendix D

```

FROM Customer#000146608 146608 3342468 1994-
LINEITEM 06-12 00:00:00.000 499794.580000 303.000000
WHERE Customer#000096103 96103 5984582 1992-
L_PARTKEY = P_PARTKEY 03-16 00:00:00.000 494398.790000 312.000000
) Customer#000024341 24341 1474818 1992-
AVG_YEARLY 11-15 00:00:00.000 491348.260000 302.000000
----- Customer#000137446 137446 5489475 1997-
348406.054286 05-23 00:00:00.000 487763.250000 311.000000
(1 row(s) affected) Customer#000107590 107590 4267751 1994-
-- using default substitutions 11-04 00:00:00.000 485141.380000 301.000000
Customer#000050008 50008 2366755 1996-
/* TPC_H Query 18 - Large Volume Customer */ 12-09 00:00:00.000 483891.260000 302.000000
Customer#000015619 15619 3767271 1996-
SELECT TOP 100 08-07 00:00:00.000 480083.960000 318.000000
C_NAME, Customer#000077260 77260 1436544 1992-
C_CUSTKEY, Customer#000109379 109379 5746311 1996-
O_ORDERKEY, 10-10 00:00:00.000 478064.110000 302.000000
O_ORDERDATE, Customer#000054602 54602 5832321 1997-
O_TOTALPRICE, 02-09 00:00:00.000 471220.080000 307.000000
SUM(L_QUANTITY) Customer#000105995 105995 2096705 1994-
FROM CUSTOMER, 07-03 00:00:00.000 469692.580000 307.000000
ORDERS, Customer#000148885 148885 2942469 1992-
LINEITEM 05-31 00:00:00.000 469630.440000 313.000000
WHERE O_ORDERKEY IN ( SELECT 05-19 00:00:00.000 469605.590000 308.000000
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
C_NAME C_CUSTKEY O_ORDERKEY
O_ORDERDATE O_TOTALPRICE
-----
Customer#000128120 128120 4722021 1994-
04-07 00:00:00.000 544089.090000 323.000000
Customer#000144617 144617 3043270 1997-
02-12 00:00:00.000 530604.440000 317.000000
Customer#000013940 13940 2232932 1997-
04-13 00:00:00.000 522720.610000 304.000000
Customer#000066790 66790 2199712 1996-
09-30 00:00:00.000 515531.820000 327.000000
Customer#000046435 46435 4745607 1997-
07-03 00:00:00.000 508047.990000 309.000000
Customer#000015272 15272 3883783 1993-
07-28 00:00:00.000 500241.330000 302.000000
Customer#000146608 146608 3342468 1994-
06-12 00:00:00.000 499794.580000 303.000000
Customer#000096103 96103 5984582 1992-
03-16 00:00:00.000 494398.790000 312.000000
Customer#000024341 24341 1474818 1992-
11-15 00:00:00.000 491348.260000 302.000000
Customer#000137446 137446 5489475 1997-
05-23 00:00:00.000 487763.250000 311.000000
Customer#000107590 107590 4267751 1994-
11-04 00:00:00.000 485141.380000 301.000000
Customer#000050008 50008 2366755 1996-
12-09 00:00:00.000 483891.260000 302.000000
Customer#000015619 15619 3767271 1996-
08-07 00:00:00.000 480083.960000 318.000000
Customer#000077260 77260 1436544 1992-
09-12 00:00:00.000 479499.430000 307.000000
Customer#000109379 109379 5746311 1996-
10-10 00:00:00.000 478064.110000 302.000000
Customer#000054602 54602 5832321 1997-
02-09 00:00:00.000 471220.080000 307.000000
Customer#000105995 105995 2096705 1994-
07-03 00:00:00.000 469692.580000 307.000000
Customer#000148885 148885 2942469 1992-
05-31 00:00:00.000 469630.440000 313.000000
Customer#000114586 114586 551136 1993-
05-19 00:00:00.000 469605.590000 308.000000
Customer#000105260 105260 5296167 1996-
09-06 00:00:00.000 469360.570000 303.000000
Customer#000147197 147197 1263015 1997-
02-02 00:00:00.000 467149.670000 320.000000
Customer#000064483 64483 2745894 1996-
07-04 00:00:00.000 466991.350000 304.000000
Customer#000136573 136573 2761378 1996-
05-31 00:00:00.000 461282.730000 301.000000
Customer#000016384 16384 502886 1994-
04-12 00:00:00.000 458378.920000 312.000000
Customer#000117919 117919 2869152 1996-
06-20 00:00:00.000 456815.920000 317.000000
Customer#000012251 12251 735366 1993-
11-24 00:00:00.000 455107.260000 309.000000
Customer#000120098 120098 1971680 1995-
06-14 00:00:00.000 453451.230000 308.000000
Customer#000066098 66098 5007490 1992-
08-07 00:00:00.000 453436.160000 304.000000
Customer#000117076 117076 4290656 1997-
02-05 00:00:00.000 449545.850000 301.000000
Customer#000129379 129379 4720454 1997-
06-07 00:00:00.000 448665.790000 303.000000
Customer#000126865 126865 4702759 1994-
11-07 00:00:00.000 447606.650000 320.000000
Customer#000088876 88876 983201 1993-
12-30 00:00:00.000 446717.460000 304.000000
Customer#000036619 36619 4806726 1995-
01-17 00:00:00.000 446704.090000 328.000000
Customer#000141823 141823 2806245 1996-
12-29 00:00:00.000 446269.120000 310.000000
Customer#000053029 53029 2662214 1993-
08-13 00:00:00.000 446144.490000 302.000000

```

Appendix D

Customer#000018188	18188	3037414	1995-		P_CONTAINER IN ('SM CASE', 'SM BOX', 'SM PACK', 'SM PKG')	AND
01-25 00:00:00.000	443807.220000	308.000000			L_QUANTITY >= 1	AND
Customer#000066533	66533	29158	1995-		L_QUANTITY <= 1 + 10	AND
10-21 00:00:00.000	443576.500000	305.000000			P_SIZE BETWEEN 1 AND 5	AND
Customer#000037729	37729	4134341	1995-		L_SHIPMODE IN ('AIR', 'AIR REG')	AND
06-29 00:00:00.000	441082.970000	309.000000			L_SHIPINSTRUCT = 'DELIVER IN	
Customer#000003566	3566	2329187	1998-		PERSON'	
01-04 00:00:00.000	439803.360000	304.000000)	
Customer#000045538	45538	4527553	1994-		OR	
05-22 00:00:00.000	436275.310000	305.000000			(
Customer#000081581	81581	4739650	1995-		P_PARTKEY = L_PARTKEY	AND
11-04 00:00:00.000	435405.900000	305.000000			P_BRAND = 'Brand#23'	AND
Customer#000119989	119989	1544643	1997-		P_CONTAINER IN ('MED BAG', 'MED BOX', 'MED PKG', 'MED PACK')	AND
09-20 00:00:00.000	434568.250000	320.000000			L_QUANTITY >= 10	AND
Customer#000003680	3680	3861123	1998-		L_QUANTITY <= 10 + 10	AND
07-03 00:00:00.000	433525.970000	301.000000			P_SIZE BETWEEN 1 AND 10	AND
Customer#000113131	113131	967334	1995-		L_SHIPMODE IN ('AIR', 'AIR REG')	AND
12-15 00:00:00.000	432957.750000	301.000000			L_SHIPINSTRUCT = 'DELIVER IN	
Customer#000141098	141098	565574	1995-		PERSON'	
09-24 00:00:00.000	430986.690000	301.000000)	
Customer#000093392	93392	5200102	1997-		OR	
01-22 00:00:00.000	425487.510000	304.000000			(
Customer#000015631	15631	1845057	1994-		P_PARTKEY = L_PARTKEY	AND
05-12 00:00:00.000	419879.590000	302.000000			P_BRAND = 'Brand#34'	AND
Customer#000112987	112987	4439686	1996-		P_CONTAINER IN ('LG CASE', 'LG BOX', 'LG PACK', 'LG PKG')	AND
09-17 00:00:00.000	418161.490000	305.000000			L_QUANTITY >= 20	AND
Customer#000012599	12599	4259524	1998-		L_QUANTITY <= 20 + 10	AND
02-12 00:00:00.000	415200.610000	304.000000			P_SIZE BETWEEN 1 AND 15	AND
Customer#000105410	105410	4478371	1996-		L_SHIPMODE IN ('AIR', 'AIR REG')	AND
03-05 00:00:00.000	412754.510000	302.000000			L_SHIPINSTRUCT = 'DELIVER IN	
Customer#000149842	149842	5156581	1994-		PERSON'	
05-30 00:00:00.000	411329.350000	302.000000)	
Customer#000010129	10129	5849444	1994-		OR	
03-21 00:00:00.000	409129.850000	309.000000			(
Customer#000069904	69904	1742403	1996-		P_PARTKEY = L_PARTKEY	AND
10-19 00:00:00.000	408513.000000	305.000000			P_BRAND = 'Brand#34'	AND
Customer#000017746	17746	6882	1997-		P_CONTAINER IN ('LG CASE', 'LG BOX', 'LG PACK', 'LG PKG')	AND
04-09 00:00:00.000	408446.930000	303.000000			L_QUANTITY >= 20	AND
Customer#000013072	13072	1481925	1998-		L_QUANTITY <= 20 + 10	AND
03-15 00:00:00.000	399195.470000	301.000000			P_SIZE BETWEEN 1 AND 15	AND
Customer#000082441	82441	857959	1994-		L_SHIPMODE IN ('AIR', 'AIR REG')	AND
02-07 00:00:00.000	382579.740000	305.000000			L_SHIPINSTRUCT = 'DELIVER IN	
Customer#000088703	88703	2995076	1994-		PERSON'	
01-30 00:00:00.000	363812.120000	302.000000)	

(57 row(s) affected)

-- using default substitutions

/* 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'
)
REVENUE
-----
3083843.057800

```

(1 row(s) affected)

-- using default substitutions

/* TPC_H Query 20 - Potential Part Promotion */

Appendix D

```

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
                    WHEREP_NAME like 'forest%'
                    )
                    AND
                    PS_AVAILQTY
                    > ( SELECT
                    PS_AVAILQTY
                    FROM LINEITEM
                    WHEREL_PARTKEY = PS_PARTKEY
                    AND
                    L_SUPPKEY = PS_SUPPKEY
                    AND
                    L_SHIPDATE >= '1994-01-01'
                    AND
                    L_SHIPDATE <
                    dateadd(yy,1,'1994-01-01')
                    )
                    )
            AND
            S_NATIONKEY = N_NATIONKEY AND
            N_NAME = 'CANADA'
ORDER BY   S_NAME
S_NAME     S_ADDRESS
-----
Supplier#000000020 iybAE,RmTymrZVYaFZva2SH,j
Supplier#000000091
YV45D7TkfdQanOOZ7q9QxkyGUapU1oOWU6q3
Supplier#000000197
YC2Acon6kjY3zj3Fbxs2k4Vdf7X0cd2F
Supplier#000000226 83qOdU2EYRdPQAQhEtn GRZEd
Supplier#000000285 Br7e1nnt1yxrw6Impj7YdhFDjuBf
Supplier#000000378 FfbhyCxWvcPrO8ltp9
Supplier#000000402
i9Sw4DoyMhzhKXCH9By,AYSgmD
Supplier#000000530 0qwCMwobKY
OcmLyfRXlagA8ukENJv,
Supplier#000000688 D
fw5ocppmZpYBBIPI718hCihLDZ5KhKX
Supplier#000000710 f19YPvOyb
QoYwjKC,oPycpGfieBAcwKJo

```

```

Supplier#000000736
16i2nMwVuovfKnuVgaSGK2rDy65D1AFLegiL7
Supplier#000000761
zISLelQUj2XrvTTFnv7WAcYZGvvMTx882d4
Supplier#000000884 bmhEShejaS
Supplier#000000887 urEaTejH5POADP2ARrf
Supplier#000000935 ij98czM
2KzWe7dDT0xB8sq0UfCdvrx
Supplier#000000975 ,AC e,tBpNwKb5xMUzeohxIRn,
hdZJo73gFQF8y
Supplier#000001263 rQWr6nf8ZhB2TAiIDivo5Io
Supplier#000001399 LmrocnIMSyYOWuANx7
Supplier#000001446 lch9HMNU1R7a0LIybsUodVknk6
Supplier#000001454 TOpingu2TVXIjhiL93h,
Supplier#000001500 wDmF5xLxtQch9ctVu,
Supplier#000001602 uKNWleafaM644
Supplier#000001626 UhxNRzUu1dtFmp0
Supplier#000001682 pXTkGxrTQVyH1Rr
Supplier#000001699 Q9C4rfJ26oijVPqqcqVXeRI

```

..... Additional Rows Deleted

```

Supplier#000008895
2cH4okfaLSZTTg8sKRbbJQxkmeFu2Esj
Supplier#000008967 2kwEHyMG
7FwozNImAUE6mH0hYtqYculJM
Supplier#000008972 w2vF6 D5YZO3visPXsqVfLADTK
Supplier#000009032 qK,trB6Sdy4Dz1BRUFNy
Supplier#000009147 rOAuryHxpZ9eOvx
Supplier#000009252 F7cZaPUHwh1
ZKyj3xmAVWC1XdP ue1p5m,i
Supplier#000009278 RqYTzgxj93CLX 0mcYfCENOfD
Supplier#000009327 uoqMdf7e7Gj9dbQ53
Supplier#000009430 igRqmneFt
Supplier#000009567 r4Wfx4c3xsEAjcGj71HHZByornl
D9vrztXlv4
Supplier#000009601 51m637bO,Rw5DnHWFUvLacRx9
Supplier#000009709
rRnCbHYgDgl9PZYnyWKVYSUW0vKg
Supplier#000009753 wLhVEcRmd7PkJF4FBnGK7Z
Supplier#000009796 z,y4Idmr15DOvPUqYG
Supplier#000009799 4wNjXGa4OKW1
Supplier#000009811 E3iuqq7UzXU7oPZIE2Gu6
Supplier#000009812
APFRMy3lCbGfGa53n5t9DxxFPQPgnjrGt32
Supplier#000009862 rJzweWeN58
Supplier#000009868 ROjGgx5gvtkmmUUoeyy7v
Supplier#000009869
ucLqxzrpBTRMewGSM29t0rNTM30g1Tu3Xgg3mKag
Supplier#000009899 7XdpAhrzr1t,UQFZE
Supplier#000009974
7wJ,J5DKcxSU4Kp1cQLpbcAvB5AsvKT

```

(204 row(s) affected)

-- using default substitutions

/* TPC_H Query 21 - Suppliers Who Kept Orders Waiting */

Appendix D

```

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
     S_NATIONKEY = N_NATIONKEY AND
     N_NAME = 'SAUDI ARABIA'
GROUP BY   S_NAME
ORDER BY   NUMWAIT DESC,
           S_NAME
S_NAME    NUMWAIT
-----
Supplier#000002829    20
Supplier#000005808    18
Supplier#000000262    17
Supplier#000000496    17
Supplier#000002160    17
Supplier#000002301    17
Supplier#000002540    17
Supplier#000003063    17
Supplier#000005178    17
Supplier#000008331    17
Supplier#000002005    16
Supplier#000002095    16
Supplier#000005799    16
Supplier#000005842    16
Supplier#000006450    16
Supplier#000006939    16
Supplier#000009200    16
Supplier#000009727    16
Supplier#000000486    15
Supplier#000000565    15

```

```

Supplier#000001046    15
Supplier#000001047    15
Supplier#000001161    15
Supplier#000001336    15
Supplier#000001435    15

```

..... Additional Rows Deleted

```

Supplier#000006825    13
Supplier#000007021    13
Supplier#000007417    13
Supplier#000007497    13
Supplier#000007602    13
Supplier#000008134    13
Supplier#000008234    13
Supplier#000009435    13
Supplier#000009436    13
Supplier#000009564    13
Supplier#000009896    13
Supplier#000000379    12
Supplier#000000673    12
Supplier#000000762    12
Supplier#000000811    12
Supplier#000000821    12
Supplier#000001337    12
Supplier#000001916    12
Supplier#000001925    12
Supplier#000002039    12
Supplier#000002357    12
Supplier#000002483    12

```

(100 row(s) affected)

-- using default substitutions

/* 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

```

Appendix D

```
SELECT      NOT EXISTS (
*
ORDERS      FROM
O_CUSTKEY   = C_CUSTKEY
)           )
GROUP BY    AS CUSTSALE
ORDER BY    CENTRYCODE
CENTRYCODE NUMCUST  TOTACCTBAL
```

```
-----
13   888   6737713.990000
17   861   6460573.720000
18   964   7236687.400000
23   892   6701457.950000
29   948   7158866.630000
30   909   6808436.130000
31   922   6806670.180000
```

(7 row(s) affected)

Appendix E

Appendix E: Seed and Input Parameters

Appendix E

Seed

622143400

Stream0

2 45 BRASS AFRICA
 1 107
 3 BUILDING 1995-03-04
 4 1993-09-01
 5 AMERICA 1997-01-01
 6 1997-01-01 0.06 25
 7 KENYARUSSIA
 8 RUSSIAEUROPE PROMO POLISHED
 NICKEL
 9 tomato
 10 1994-06-01
 11 SAUDI ARABIA0.0000010000
 12 FOB REG AIR 1993-01-01
 13 express packages
 14 1993-07-01
 15 1993-05-01
 16 Brand#21 STANDARD PLATED 18
 26 32 8 5 38 11
 17
 17 Brand#11 MED PACK
 18 312
 19 Brand#33 Brand#45 Brand#14
 3 14 23
 20 lime 1996-01-01 UNITED STATES
 21 MOROCCO
 22 32 26 28 23 10 17
 30

Stream1

21 GERMANY
 3 HOUSEHOLD 1995-03-21
 18 313
 5 EUROPE 1997-01-01
 11 INDIA 0.0000010000
 7 FRANCE KENYA
 6 1997-01-01 0.04 25
 20 steel 1994-01-01 KENYA
 17 Brand#13 MED DRUM
 12 MAIL SHIP 1993-01-01
 16 Brand#11 MEDIUM POLISHED 5
 46 16 3 9 4 38
 42
 15 1995-12-01
 13 express packages
 10 1993-04-01
 2 33 NICKEL EUROPE

8 KENYA AFRICA PROMO BURNISHED
 NICKEL
 14 1993-10-01
 19 Brand#35 Brand#23 Brand#13
 8 15 30
 9 smoke
 22 11 24 18 28 22 33
 16
 1 115
 4 1996-03-01

Stream2

6 1997-01-01 0.09 24
 17 Brand#15 JUMBO BAG
 14 1994-01-01
 16 Brand#41 PROMO ANODIZED 33
 17 2 9 48 19 14
 30
 19 Brand#42 Brand#51 Brand#53
 3 16 26
 10 1994-01-01
 9 salmon
 2 21 TIN AFRICA
 15 1993-09-01
 8 FRANCE EUROPE ECONOMY
 BRUSHED NICKEL
 5 MIDDLE EAST 1997-01-01
 22 14 33 25 16 24 21
 15
 12 TRUCK SHIP 1993-01-01
 7 UNITED KINGDOM FRANCE
 13 express packages
 18 315
 1 63
 4 1993-12-01
 20 frosted 1997-01-01 EGYPT
 3 BUILDING 1995-03-06
 11 VIETNAM 0.0000010000
 21 UNITED STATES

Stream3

8 UNITED KINGDOM EUROPE
 ECONOMY PLATED NICKEL
 5 AFRICA 1993-01-01
 4 1996-07-01
 6 1993-01-01 0.06 25
 17 Brand#22 JUMBO PACK
 7 MOROCCO UNITED KINGDOM
 1 71
 18 312
 22 28 24 15 26 27 16
 17
 14 1994-04-01
 9 purple

Appendix E

10	1994-10-01								18	315
15	1996-04-01								14	1994-11-01
11	INDONESIA	0.0000010000							22	21 28 34 31 10 23
20	purple	1996-01-01	CHINA							32
2	8	COPPER	EUROPE						11	IRAN 0.0000010000
21	PERU								13	special requests
19	Brand#44	Brand#44	Brand#52						3	HOUSEHOLD 1995-03-25
	8	17	22						1	87
13	express packages								2	34 NICKEL EUROPE
16	Brand#22	SMALL BURNISHED	37						5	ASIA 1993-01-01
	38	11	22 10 41 17						8	GERMANY EUROPE LARGE
	21									POLISHED BRASS
12	RAIL SHIP	1994-01-01							20	misty 1993-01-01 UNITED KINGDOM
3	HOUSEHOLD	1995-03-23							12	SHIP REG AIR 1994-01-01
									17	Brand#25 WRAP BAG
									10	1994-04-01
									9	navy

Stream4

5	AMERICA	1993-01-01							
21	INDONESIA								
14	1994-08-01								
19	Brand#41	Brand#22	Brand#51						
	4	18	29						
15	1993-12-01								
17	Brand#24	JUMBO DRUM							
12	AIR SHIP	1994-01-01							
6	1993-01-01	0.04	25						
4	1994-04-01								
9	peach								
8	MOROCCO	AFRICA	ECONOMY						
	ANODIZED BRASS								
16	Brand#12	LARGE POLISHED	40						
	49	19	18 11 9 17						
	39								
11	RUSSIA	0.0000010000							
2	46	BRASS AMERICA							
10	1993-07-01								
18	314								
1	79								
13	express requests								
7	GERMANY	MOROCCO							
22	18	30	21 10 29 32						
	22								
3	AUTOMOBILE	1995-03-08							
20	chiffon	1994-01-01	INDIA						

Stream5

21	ARGENTINA								
15	1996-07-01								
4	1996-11-01								
6	1993-01-01	0.09	24						
7	UNITED STATES	GERMANY							
16	Brand#42	PROMO BRUSHED	30						
	29	3	4 37 39 7						
	44								
19	Brand#53	Brand#15	Brand#45						
	9	19	26						

Appendix F

Appendix F: Benchmark Scripts

print.c

```
/*
 * $Id: print.c,v 1.2 2005/01/03 20:08:59 jms Exp $
 *
 * Revision History
 * =====
 * $Log: print.c,v $
 * Revision 1.2 2005/01/03 20:08:59 jms
 * change line terminations
 *
 * Revision 1.1.1.1 2004/11/24 23:31:47 jms
 * re-establish external server
 *
 * Revision 1.4 2004/02/18 16:26:49 jms
 * 32/64 bit changes for overflow handling needed additional
 * changes when ported back to windows
 *
 * Revision 1.3 2004/02/18 14:05:53 jms
 * porting changes for LINUX and 64 bit RNG
 *
 * Revision 1.2 2004/01/22 05:49:29 jms
 * AIX porting (AIX 5.1)
 *
 * Revision 1.1.1.1 2003/08/07 17:58:34 jms
 * recreation after CVS crash
 *
 * Revision 1.2 2003/08/07 17:58:34 jms
 * Convery RNG to 64bit space as preparation for new large
 * scale RNG
 *
 * Revision 1.1.1.1 2003/04/03 18:54:21 jms
 * initial checkin
 *
 */
/* generate flat files for data load */
#include <stdio.h>
#ifdef VMS
#include <sys/types.h>
#endif
#ifdef SUN
#include <unistd.h>
#endif
#include <math.h>

#include "dss.h"
#include "dsstypes.h"
#include <string.h>

/*
 * Function Prototypes
 */
FILE *print_prep_PROTO((int table, int update));
int pr_drange_PROTO((int tbl, DSS_HUGE min, DSS_HUGE
cnt, long num));

FILE *
```

```
print_prep(int table, int update)
{
    char upath[128];
    FILE *res;

    if (updates)
        {
            if (update > 0) /* updates */
                if ( insert_segments )
                    {
                        int this_segment;

                        if(strcmp(tdefs[table].name,"orders.tbl"))

                            this_segment=++insert_orders_segment;
                        else

                            this_segment=++insert_lineitem_segment;
                        sprintf(upath,
"%s%c%s.u%d.%d",

                            env_config(PATH_TAG, PATH_DFLT),
                                PATH_SEP,
tdefs[table].name, update%10000,this_segment);
                    }
                else
                    {
                        sprintf(upath,
"%s%c%s.u%d",

                            env_config(PATH_TAG,
PATH_DFLT),
                                PATH_SEP,
tdefs[table].name, update);
                    }
                else /* deletes */
                    if ( delete_segments )
                        {
                            ++delete_segment;
                            sprintf(upath,
"%s%cdelete.u%d.%d",

                                env_config(PATH_TAG, PATH_DFLT),
                                    PATH_SEP, -update%10000,
                                        delete_segment);
                        }
                    else
                        {
                            sprintf(upath,
"%s%cdelete.%d",

                                env_config(PATH_TAG,
PATH_DFLT), PATH_SEP, -update);
                        }
                return(fopen(upath, "w"));
            }
        }
    res = tbl_open(table, "w");
    OPEN_CHECK(res, tdefs[table].name);
    return(res);
}
```

```

int
dbg_print(int format, FILE *target, void *data, int len, int sep)
{
    int dollars,
        cents;

    switch(format)
    {
    case DT_STR:
        if (columnar)
            fprintf(target, "%-*s", len, (char
*)data);
        else
            fprintf(target, "%s", (char *)data);
        break;
#ifdef MVS
        case DT_VSTR:
            /* note: only used in MVS, assumes
columnar output */
            fprintf(target, "%c%c%-*s",
len, (char *)data);
            break;
#endif /* MVS */
        case DT_INT:
            if (columnar)
                fprintf(target, "%12ld", (long)data);
            else
                fprintf(target, "%ld", (long)data);
            break;
        case DT_HUGE:
            fprintf(target, HUGE_FORMAT,
*(DSS_HUGE *)data);
            break;
        case DT_KEY:
            fprintf(target, "%ld", (long)data);
            break;
        case DT_MONEY:
            cents = (int)*(DSS_HUGE *)data;
            if (cents < 0)
                {
                fprintf(target, "-");
                cents = -cents;
                }
            dollars = cents / 100;
            cents %= 100;
            if (columnar)
                fprintf(target, "%12ld.%02ld",
dollars, cents);
            else
                fprintf(target, "%ld.%02ld",
dollars, cents);
            break;
        case DT_CHR:
            if (columnar)
                fprintf(target, "%c ", *(char
*)data);
            else
                fprintf(target, "%c", *(char *)data);

```

```

        break;
    }

#ifdef EOL_HANDLING
    if (sep)
#endif /* EOL_HANDLING */
    if (!columnar)
        fprintf(target, "%c", SEPARATOR);

    return(0);
}

int
pr_cust(customer_t *c, int mode)
{
    static FILE *fp = NULL;

    if (fp == NULL)
        fp = print_prep(CUST, 0);

    PR_STRT(fp);
    PR_HUGE(fp, &c->custkey);
    PR_STR(fp, c->mktsegment, C_MSEG_LEN);
    PR_HUGE(fp, &c->nation_code);
    PR_VSTR(fp, c->name, C_NAME_LEN);
    PR_VSTR(fp, c->address,
(columnar)?(long)(ceil(C_ADDR_LEN *
V_STR_HGH)):c->alen);
    PR_STR(fp, c->phone, PHONE_LEN);
    PR_MONEY(fp, &c->acctbal);
    PR_VSTR_LAST(fp, c->comment,
(columnar)?(long)(ceil(C_CMNT_LEN *
V_STR_HGH)):c->clen);
    PR_END(fp);

    return(0);
}

/*
 * print the numbered order
 */
int
pr_order(order_t *o, int mode)
{
    static FILE *fp_o = NULL;
    static int last_mode = 0;

    if (fp_o == NULL || mode != last_mode)
        {
        if (fp_o)
            fclose(fp_o);
        fp_o = print_prep(ORDER, mode);
        last_mode = mode;
        }

    PR_STRT(fp_o);
    PR_STR(fp_o, o->odate, DATE_LEN);
    PR_HUGE(fp_o, &o->okey);
    PR_HUGE(fp_o, &o->custkey);
    PR_STR(fp_o, o->opriority, O_OPRIO_LEN);

```



```

PR_INT(fp_o, o->spriority);
PR_STR(fp_o, o->clerk, O_CLRK_LEN);
PR_CHR(fp_o, &o->orderstatus);
PR_MONEY(fp_o, &o->totalprice);
PR_VSTR_LAST(fp_o, o->comment,
  (columnar)?(long)(ceil(O_CMNT_LEN *
V_STR_HGH)):o->cflen);
PR_END(fp_o);

return(0);
}

/*
 * print an order's lineitems
 */
int
pr_line(order_t *o, int mode)
{
  static FILE *fp_l = NULL;
  static int last_mode = 0;
  long i;

  if (fp_l == NULL || mode != last_mode)
  {
    if (fp_l)
      fclose(fp_l);
    fp_l = print_prep(LINE, mode);
    last_mode = mode;
  }

  for (i = 0; i < o->lines; i++)
  {
    PR_STRT(fp_l);
    PR_STR(fp_l, o->l[i].sdate, DATE_LEN);
    PR_HUGE(fp_l, &o->l[i].okey);
    PR_MONEY(fp_l, &o->l[i].discount);
    PR_MONEY(fp_l, &o->l[i].eprice);
    PR_HUGE(fp_l, &o->l[i].supkey);
    PR_HUGE(fp_l, &o->l[i].quantity);
    PR_CHR(fp_l, &o->l[i].rflag[0]);
    PR_HUGE(fp_l, &o->l[i].partkey);
    PR_CHR(fp_l, &o->l[i].lstatus[0]);
    PR_MONEY(fp_l, &o->l[i].tax);
    PR_STR(fp_l, o->l[i].cdate, DATE_LEN);
    PR_STR(fp_l, o->l[i].rdate, DATE_LEN);
    PR_STR(fp_l, o->l[i].shipmode, L_SMODE_LEN);
    PR_HUGE(fp_l, &o->l[i].lcnt);
    PR_STR(fp_l, o->l[i].shipinstruct, L_INST_LEN);
    PR_VSTR_LAST(fp_l, o->l[i].comment,
      (columnar)?(long)(ceil(L_CMNT_LEN *
V_STR_HGH)):o->l[i].cflen);
    PR_END(fp_l);
  }

  return(0);
}

/*
 * print the numbered order *and* its associated lineitems

```

```

*/
int
pr_order_line(order_t *o, int mode)
{
  tdefs[ORDER].name = tdefs[ORDER_LINE].name;
  pr_order(o, mode);
  pr_line(o, mode);

  return(0);
}

/*
 * print the given part
 */
int
pr_part(part_t *part, int mode)
{
  static FILE *p_fp = NULL;

  if (p_fp == NULL)
    p_fp = print_prep(PART, 0);

  PR_STRT(p_fp);
  PR_HUGE(p_fp, &part->partkey);
  PR_VSTR(p_fp, part->type,
    (columnar)?(long)P_TYPE_LEN:part->tlen);
  PR_HUGE(p_fp, &part->size);
  PR_STR(p_fp, part->brand, P_BRND_LEN);
  PR_VSTR(p_fp, part->name,
    (columnar)?(long)P_NAME_LEN:part->nlen);
  PR_STR(p_fp, part->container, P_CNTR_LEN);
  PR_STR(p_fp, part->mfgr, P_MFG_LEN);
  PR_MONEY(p_fp, &part->retailprice);
  PR_VSTR_LAST(p_fp, part->comment,
    (columnar)?(long)(ceil(P_CMNT_LEN *
V_STR_HGH)):part->cflen);
  PR_END(p_fp);

  return(0);
}

/*
 * print the given part's suppliers
 */
int
pr_psupp(part_t *part, int mode)
{
  static FILE *ps_fp = NULL;
  long i;

  if (ps_fp == NULL)
    ps_fp = print_prep(PSUPP, mode);

  for (i = 0; i < SUPP_PER_PART; i++)
  {
    PR_STRT(ps_fp);
    PR_HUGE(ps_fp, &part->s[i].partkey);
    PR_HUGE(ps_fp, &part->s[i].supkey);
    PR_MONEY(ps_fp, &part->s[i].scost);

```

```

    PR_HUGE(ps_fp, &part->s[i].qty);
    PR_VSTR_LAST(ps_fp, part->s[i].comment,
        (columnar)?(long)(ceil(PS_CMNT_LEN *
V_STR_HGH)):part->s[i].clen);
    PR_END(ps_fp);
}

```

```

return(0);
}

```

```

/*
 * print the given part *and* its suppliers
 */

```

```

int
pr_part_psupp(part_t *part, int mode)
{
    tdefs[PART].name = tdefs[PART_PSUPP].name;
    pr_part(part, mode);
    pr_psupp(part, mode);

    return(0);
}

```

```

int
pr_supp(supplier_t *supp, int mode)
{
    static FILE *fp = NULL;

```

```

    if (fp == NULL)
        fp = print_prep(SUPP, mode);

```

```

    PR_STRT(fp);
    PR_HUGE(fp, &supp->suppkey);
    PR_HUGE(fp, &supp->nation_code);
    PR_STR(fp, supp->name, S_NAME_LEN);
    PR_VSTR(fp, supp->address,
        (columnar)?(long)(ceil(S_ADDR_LEN *
V_STR_HGH)):supp->alen);
    PR_STR(fp, supp->phone, PHONE_LEN);
    PR_MONEY(fp, &supp->acctbal);
    PR_VSTR_LAST(fp, supp->comment,
        (columnar)?(long)(ceil(S_CMNT_LEN *
V_STR_HGH)):supp->clen);
    PR_END(fp);

```

```

return(0);
}

```

```

int
pr_nation(code_t *c, int mode)
{
    static FILE *fp = NULL;

```

```

    if (fp == NULL)
        fp = print_prep(NATION, mode);

```

```

    PR_STRT(fp);
    PR_HUGE(fp, &c->code);
    PR_STR(fp, c->text, NATION_LEN);

```

```

    PR_INT(fp, c->join);
    PR_VSTR_LAST(fp, c->comment,
        (columnar)?(long)(ceil(N_CMNT_LEN *
V_STR_HGH)):c->clen);
    PR_END(fp);

```

```

return(0);
}

```

```

int
pr_region(code_t *c, int mode)
{
    static FILE *fp = NULL;

```

```

    if (fp == NULL)
        fp = print_prep(REGION, mode);

```

```

    PR_STRT(fp);
    PR_HUGE(fp, &c->code);
    PR_STR(fp, c->text, REGION_LEN);
    PR_VSTR_LAST(fp, c->comment,
        (columnar)?(long)(ceil(R_CMNT_LEN *
V_STR_HGH)):c->clen);
    PR_END(fp);

```

```

return(0);
}

```

```

/*
 * NOTE: this routine does NOT use the BCD2_* routines. As
a result,
 * it WILL fail if the keys being deleted exceed 32 bits. Since
this
 * would require ~660 update iterations, this seems an
acceptable
 * oversight
 */

```

```

int
pr_drange(int tbl, DSS_HUGE min, DSS_HUGE cnt, long
num)
{

```

```

    static int last_num = 0;
    static FILE *dfp = NULL;
    DSS_HUGE child = -1;
    DSS_HUGE start, last, new;

```

```

        static DSS_HUGE rows_per_segment=0;
        static DSS_HUGE rows_this_segment=0;

```

```

    if (last_num != num)
    {
        if (dfp)
            fclose(dfp);
        dfp = print_prep(tbl, -num);
        if (dfp == NULL)
            return(-1);
        last_num = num;
        rows_this_segment=0;
    }

```

```

start = MK_SPARSE(min, num/ (10000 / refresh));
last = start - 1;
for (child=min; cnt > 0; child++, cnt--)
{
new = MK_SPARSE(child, num/ (10000 / refresh));
if (gen_rng == 1 && new - last == 1)
{
last = new;
continue;
}
if (gen_sql)
{
fprintf(dfp,
"delete from %s where %s between %ld and
%ld;\n",
tdefs[ORDER].name, "o_orderkey", start,
last);
fprintf(dfp,
"delete from %s where %s between %ld and
%ld;\n",
tdefs[LINE].name, "l_orderkey", start,
last);
fprintf(dfp, "commit work;\n");
}
else
if (gen_rng)
{
PR_STRT(dfp);
PR_HUGE(dfp, &start);
PR_HUGE(dfp, &last);
PR_END(dfp);
}
else
{
if (delete_segments)
{
if(rows_per_segment==0)

rows_per_segment = (cnt / delete_segments) + 1;

if(++rows_this_segment) > rows_per_segment)
{

fclose(dfp);
dfp =
if (dfp
== NULL) return(-1);

last_num = num;

rows_this_segment=1;
}
}

PR_STRT(dfp);
PR_HUGE(dfp, &new);
PR_END(dfp);
}
}

}

/*
* verify functions: routines which replace the pr_routines and
generate a pseudo checksum
* instead of generating the actual contents of the tables.
Meant to allow large scale data
* validation without requiring a large amount of storage
*/
int
vrf_cust(customer_t *c, int mode)
{
VRF_STRT(CUST);
VRF_INT(CUST, c->custkey);
VRF_STR(CUST, c->name);
VRF_STR(CUST, c->address);
VRF_INT(CUST, c->nation_code);
VRF_STR(CUST, c->phone);
VRF_MONEY(CUST, c->acctbal);
VRF_STR(CUST, c->mktsegment);
VRF_STR(CUST, c->comment);
VRF_END(CUST);

return(0);
}

/*
* print the numbered order
*/
int
vrf_order(order_t *o, int mode)
{
VRF_STRT(ORDER);
VRF_HUGE(ORDER, o->okey);
VRF_INT(ORDER, o->custkey);
VRF_CHR(ORDER, o->orderstatus);
VRF_MONEY(ORDER, o->totalprice);
VRF_STR(ORDER, o->odate);
VRF_STR(ORDER, o->opriority);
VRF_STR(ORDER, o->clerk);
VRF_INT(ORDER, o->spriority);
VRF_STR(ORDER, o->comment);
VRF_END(ORDER);

return(0);
}

```

```

}

/*
 * print an order's lineitems
 */
int
vrf_line(order_t *o, int mode)
{
    int i;

    for (i = 0; i < o->lines; i++)
    {
        VRF_STRT(LINE);
        VRF_HUGE(LINE, o->l[i].okey);
        VRF_INT(LINE, o->l[i].partkey);
        VRF_INT(LINE, o->l[i].suppkey);
        VRF_INT(LINE, o->l[i].lcnt);
        VRF_INT(LINE, o->l[i].quantity);
        VRF_MONEY(LINE, o->l[i].eprice);
        VRF_MONEY(LINE, o->l[i].discount);
        VRF_MONEY(LINE, o->l[i].tax);
        VRF_CHR(LINE, o->l[i].rflag[0]);
        VRF_CHR(LINE, o->l[i].lstatus[0]);
        VRF_STR(LINE, o->l[i].sdate);
        VRF_STR(LINE, o->l[i].cdate);
        VRF_STR(LINE, o->l[i].rdate);
        VRF_STR(LINE, o->l[i].shipinstruct);
        VRF_STR(LINE, o->l[i].shipmode);
        VRF_STR(LINE, o->l[i].comment);
        VRF_END(LINE);
    }

    return(0);
}

/*
 * print the numbered order *and* its associated lineitems
 */
int
vrf_order_line(order_t *o, int mode)
{
    vrf_order(o, mode);
    vrf_line(o, mode);

    return(0);
}

/*
 * print the given part
 */
int
vrf_part(part_t *part, int mode)
{
    VRF_STRT(PART);
    VRF_INT(PART, part->partkey);
    VRF_STR(PART, part->name);
    VRF_STR(PART, part->mfgr);
    VRF_STR(PART, part->brand);
    VRF_STR(PART, part->type);
    VRF_INT(PART, part->size);
    VRF_STR(PART, part->container);
    VRF_MONEY(PART, part->retailprice);
    VRF_STR(PART, part->comment);
    VRF_END(PART);

    return(0);
}

/*
 * print the given part's suppliers
 */
int
vrf_psupp(part_t *part, int mode)
{
    long i;

    for (i = 0; i < SUPP_PER_PART; i++)
    {
        VRF_STRT(PSUPP);
        VRF_INT(PSUPP, part->s[i].partkey);
        VRF_INT(PSUPP, part->s[i].suppkey);
        VRF_INT(PSUPP, part->s[i].qty);
        VRF_MONEY(PSUPP, part->s[i].scost);
        VRF_STR(PSUPP, part->s[i].comment);
        VRF_END(PSUPP);
    }

    return(0);
}

/*
 * print the given part *and* its suppliers
 */
int
vrf_part_psupp(part_t *part, int mode)
{
    vrf_part(part, mode);
    vrf_psupp(part, mode);

    return(0);
}

int
vrf_supp(supplier_t *supp, int mode)
{
    VRF_STRT(SUPP);
    VRF_INT(SUPP, supp->suppkey);
    VRF_STR(SUPP, supp->name);
    VRF_STR(SUPP, supp->address);
    VRF_INT(SUPP, supp->nation_code);
    VRF_STR(SUPP, supp->phone);
    VRF_MONEY(SUPP, supp->acctbal);
    VRF_STR(SUPP, supp->comment);
    VRF_END(SUPP);

    return(0);
}

```

```

int
vrf_nation(code_t *c, int mode)
{
  VRF_STRT(NATION);
  VRF_INT(NATION, c->code);
  VRF_STR(NATION, c->text);
  VRF_INT(NATION, c->join);
  VRF_STR(NATION, c->comment);
  VRF_END(NATION);

  return(0);
}

```

```

int
vrf_region(code_t *c, int mode)
{
  VRF_STRT(REGION);
  VRF_INT(REGION, c->code);
  VRF_STR(REGION, c->text);
  VRF_STR(REGION, c->comment);
  VRF_END(fp);

  return(0);
}

```

CreateRF1proc.sql

```

-- File:  CREATERF1PROC.SQL
--      Microsoft TPC-H Benchmark Kit Ver. 1.00
--      Copyright Microsoft, 1999
--
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 DATETIME
  DECLARE @enddate DATETIME
  DECLARE @edate DATETIME
  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)

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 datetime output,
@edate datetime output',@startdate output, @enddate output

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 @totRangeSize = @rangeSize
    SET @rangeSum = 0
    SET @rangeStart = @div * @rangeSize
    SET @i = @mod
    while (@i > 0)
      BEGIN
        SET @rangeSize = (@totRangeSize -
@rangeSum)/2
        SET @rangeSum = @rangeSum +
@rangeSize
        SET @rangeStart = @rangeStart +
@rangeSize
        SET @insert_sets = @insert_sets/2
        SET @i = @i - 1
        end

        IF (@mod + 1 = @skip) -- last allocation
          SET @rangeSize = @totRangeSize -
@rangeSum
        ELSE
          SET @rangeSize = (@totRangeSize -
@rangeSum)/2
        IF (@rangeSize < 0)
          SET @rangeSize = 0
        IF (@insert_sets <= 0)
          SET @insert_sets = 1
      END
  END

```

```

end
ELSE
  BEGIN
    SET @rangeSize = datediff(day, @startdate,
@enddate)/@total_executions
    SET @rangeStart = @rangeSize * (@index - 1)
    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)'
SET @liSql = N'INSERT INTO LINEITEM
(L_ORDERKEY,L_PARTKEY,L_SUPPKEY,L_LINENUM
BER,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_LINENUMB
ER,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)'

--
-- 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 datetime, @edate datetime', @startdate, @edate
      EXEC sp_executesql @liSql, N'@startdate
datetime, @edate datetime', @startdate, @edate
    END TRY
    BEGIN CATCH
      SET @success = 0
      IF (error_number() = 1205) --
deadlock victim
        PRINT 'Insert deadlock - restarting
RF1'
      ELSE
        BEGIN -- not a
deadlock
          PRINT 'Error - Not a deadlock'
          PRINT ERROR_NUMBER()
          PRINT ERROR_SEVERITY()
          PRINT ERROR_MESSAGE()
          PRINT ERROR_STATE()
          PRINT XACT_STATE()
          END
          IF (@@trancount>0)
            ROLLBACK TRANSACTION
        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

```

CreateRF2proc.sql

```

-- File:  CREATERF2PROC.SQL
--      Microsoft TPC-H Benchmark Kit Ver. 1.00
--      Copyright Microsoft, 1999
--
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 DATETIME
DECLARE @enddate DATETIME
DECLARE @edate DATETIME
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)
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 datetime output, @edate
datetime output',@startdate output, @enddate output

```

```

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 @totRangeSize = @rangeSize
        SET @rangeSum = 0
        SET @rangeStart = @div * @rangeSize
        SET @i = @mod
        WHILE (@i > 0)
            BEGIN
                SET @rangeSize = (@totRangeSize -
@rangeSum)/2
                SET @rangeSum = @rangeSum +
@rangeSize
                SET @rangeStart = @rangeStart +
@rangeSize
                SET @delete_sets = @delete_sets/2
                SET @i = @i - 1
            END
        IF (@mod + 1 = @skip) -- last allocation
            SET @rangeSize = @totRangeSize -
@rangeSum
        ELSE
            SET @rangeSize = (@totRangeSize -
@rangeSum)/2
        IF (@rangeSize < 0)
            SET @rangeSize = 0
        IF (@delete_sets <= 0)
            SET @delete_sets = 1
        END
    ELSE
        BEGIN
            SET @rangeSize = datediff(day, @startdate,
@enddate)/@total_executions
            SET @rangeStart = @rangeSize * (@index - 1)
        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)'

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)'

WHILE @startdate < @enddate
    BEGIN

        DELETE_TRANS:
        SET @success = 1
        BEGIN TRANSACTION

        BEGIN TRY
            EXEC sp_executesql @liSql, N'@startdate
datetime, @edate datetime', @startdate, @edate
            EXEC sp_executesql @orderSql,
N'@startdate datetime, @edate datetime', @startdate, @edate
        END TRY
        BEGIN CATCH
            SET @success = 0
            IF (error_number() = 1205) --
deadlock victim
                PRINT 'Insert deadlock - restarting
RF2'
            ELSE
                BEGIN -- not a
deadlock
                    PRINT 'Error - Not a deadlock'
                    PRINT ERROR_NUMBER()
                    PRINT ERROR_SEVERITY()
                    PRINT ERROR_MESSAGE()
                    PRINT ERROR_STATE()
                    PRINT XACT_STATE()
                    END
                    IF (@@trancount>0)
                        ROLLBACK TRANSACTION
                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

ErrHandling.bas

```

Attribute VB_Name = "ErrHandling"
' FILE:    ErrHandling.bas
'        Reporting Program for Microsoft TPC-H Kit Ver.
1.00
'        Copyright Microsoft, 1999
'        All Rights Reserved

```

```

' PURPOSE:  Error handling module for TPCHMetrics
report generation program
' Contact:  Reshma Tharamal (reshmat@microsoft.com)

```

Option Explicit

Public Sub DisplayErrors()

' Display error information such as error number, description, etc to the user

```

Dim strError As String
Dim errLoop As DAO.Error
Dim errCode As Long

```

```

If Err.Number <> 0 Then
    ' Visual Basic Error
    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
    ' DAO Error
    ' Enumerate Errors collection and display properties of
' each Error object.
    For Each errLoop In DAO.Errors
        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

    MsgBox strError
Next
End If

```

```
End Sub
```

TPCHReports.bas

```

Attribute VB_Name = "TPCHReports"
' FILE: TPCHReports.bas
' Reporting Program for Microsoft TPC-H Kit Ver.
1.00
' Copyright Microsoft, 1999
' All Rights Reserved
'
' PURPOSE: This is the main module that contains the
report generation
' functions for TPCHMetrics
' Contact: Reshma Tharamal (reshmat@microsoft.com)
'
Option Explicit

' DAO workspace, database and recordset objects
Private mwrkJet As DAO.Workspace
Private mDB As DAO.Database
Private mrecDtls As DAO.Recordset

' Constants for Power and Throughput runs
' Must correspond to index for checkboxes, chkRun on
frmTPCHMetrics
Public Enum eRunType
    Power = 1
    Throughput = 2
End Enum

' Range of streams for which the Power/Throughput run
reports can be generated
Private Const miStreamIdMin As Integer = 0 ' Corresponds to
PowerRun
Private Const miStreamIdMax As Integer = 10

' Power Run corresponds to Stream 0
Private Const miStreamPowerRun As Integer =
miStreamIdMin

```

```

' Range of Power/Throughput run queries
Private Const miQueryIdMin As Integer = 1
Private Const miQueryIdMax As Integer = 24 ' Includes RF
functions

' Constant for Query 15 since it is split into view creation and
execution
' in the non-standard version of the kit
Private Const miQuery15 As Integer = 15

' Constants for refresh functions, RF1 and RF2
Private Const miQueryIdRF1 As Integer = 23
Private Const miQueryIdRF2 As Integer = 24

' Number of refresh functions
Private Const miRefreshFuncs As Integer = 2

' Constant for the first iterator value for the refresh functions
Private Const msFirstRFIterator As String = "1"

' Upper bound for Scale Factor (& number of streams) array
Private Const miSFUBound As Integer = 8

' Array of valid scale factors
Private marrSF(miSFUBound) As Single
' Array of minimum number of throughput streams for each
scale factor
Private marrStreams(miSFUBound) As Integer

' Default scale factor array location
Private Const miDefaultSF As Integer = 0

' Default number of insert segments per update set
Private Const miDefInsSegmentsPerUpdateSet As Integer =
16
' Default number of delete segments per update set
Private Const miDefDelSegmentsPerUpdateSet As Integer =
16

#If Not TPCH_KIT Then
    ' Default value for first update set for throughput run
    Private Const miDefUpdateSetFirst As Integer = 2
#End If

' Module-level variables for all report inputs
Private msDbFile As String ' Workspace definition file
name
Private msOutput As String ' Report file name
Private mbRunType(eRunType.Power To
eRunType.Throughput) As Boolean
' Array with Yes/No values for type of
report
' being generated
Private miStreamIdLo As Integer ' Will be initialized to 0 or 1,
depending on whether the
' PowerRun Metric is being generated or
not

```

```

Private miStreamIdHi As Integer ' Will be initialized to
number of throughput
    ' streams or 0, depending on whether the
    ' ThroughputRun Metric is being
generated or not
Private mlRunId As Long      ' Run identifier
Private mfSF As Single      ' Scale factor for the run
Private miInsSegmentsPerUpdateSet As Integer ' Number of
insert segments per update set
Private miDelSegmentsPerUpdateSet As Integer ' Number
of delete segments per update set

#If Not TPCH_KIT Then
    Private miUpdateSetFirst As Integer      ' First update set
for throughput run
#End If

' Constants for each of the dimensions (stream and query ) in
the arQuerySequence array
Private Const miDimensionStream As Integer = 1
Private Const miDimensionQuery As Integer = 2

' Array containing the sequence in which queries are executed,
excluding the refresh functions
Private arQuerySequence(miStreamIdMin To
miStreamIdMax, miQueryIdMin To miQueryIdMax -
miRefreshFuncs) As Integer

' Structure containing step execution statistics
Private Type StepExecutionDtIs
    StartTime As Currency
    EndTime As Currency
    StartTimeNextStep As Currency
    ElapsedTime As Double
    ElapsedTpch As Double
    sStartTm As String
    sEndTm As String
    sStartNextTm As String
End Type

' Array containing step execution statistics for each query in
each stream
Private arExecutionDtIs(miStreamIdMin To miStreamIdMax,
miQueryIdMin To miQueryIdMax) As StepExecutionDtIs

' Constants used to format dates and timestamps
Private Const msDtSeparator As String = "-"
Private Const msTmSeparator As String = ":"
Private Const msMsSeparator As String = "."
Private Const msBlank As String = " "
Private Const msFmtMsPadWZeroes As String = "000"
Private Const msFmtYrPadWZeroes As String = "0000"

' Constants used to format stream and query identifiers
Private Const msFmtNumberWOZeroes As String = "###"
Private Const msFmtNumberPadWZeroes As String = "00"

' Constant used to format fractions
Private Const miNumDecimalPlaces As Integer = 1

' Constants used by the metrics calculation functions
Private Const mfMinElapsed As Single = 0.05
Private Const mfMinElapsedRound As Single = 0.1

' String constants for labels in workspace. Edit these labels if
the workspace is modified.
' Two versions of the workspace currently exist - the one in
the tpch kit and the
' one that Larry and Grace use
' PowerRun labels
#If TPCH_KIT Then
    Private Const msStartStepLabelPowerRF1 As String =
"Power - Execute RF1"
    Private Const msStartStepLabelPowerRF2 As String =
"Power - Execute RF2"
    Private Const msStartStepLabelPowerOther As String =
"Power - Execute Query "

    Private Const msEndStepLabelPowerRF1 As String =
"Power - Execute RF1"
    Private Const msEndStepLabelPowerRF2 As String =
"Power - Execute RF2"
#Else
    Private Const msStartStepLabelPowerRF1 As String =
"Execute RF1 in Parallel"
    Private Const msStartStepLabelPowerRF2 As String =
"Execute Query RF2 Thread"
    Private Const msStartStepLabelPower15 As String =
"Create REVENUE View"
    Private Const msStartStepLabelPowerOther As String =
"Execute Query "

    Private Const msEndStepLabelPowerRF1 As String =
"Execute RF1 in Parallel"
    Private Const msEndStepLabelPowerRF2 As String =
"Execute Query RF2 Thread"
    Private Const msEndStepLabelPower15 As String =
"Execute using REVENUE"
#End If

' ThroughputRun labels
#If TPCH_KIT Then
    Private Const msStartStepLabelThroughputRF1First As
String = "Throughput - Semaphore Loop for RF Delay"
    Private Const msEndStepLabelThroughputRF2Rest As
String = "Throughput - Stream - Increment Update Set"

    Private Const msLabelThroughputRF As String =
"Sequential Refresh Stream Execution"
    Private Const msLblThroughputRF12Mgr As String =
"Throughput - Refresh Streams"
    Private Const msLabelThroughputRF1 As String =
"Throughput - RF1 - Stream%STREAM_NUM%"
    Private Const msLabelThroughputRF2 As String =
"Throughput - RF2 - Stream%STREAM_NUM%"
    Private Const msLblThroughputRF1 As String =
"Throughput - Execute Stream%STREAM_NUM% RF1"

```

```

Private Const msLblThroughputRF2 As String =
"Throughput - Execute Stream%STREAM_NUM% RF2"

Private Const msStepLabelThroughputOther As String =
"Throughput - Query Stream "
#Else
Private Const msStartStepLabelThroughputRF1 As String =
"Wait for Throughput Run"
Private Const msStartStepLabelThroughputRF2 As String =
"Throughput RF2"
Private Const msStartStepLabelThroughputOther As String
= "Execute Query for Stream "

Private Const msEndStepLabelThroughputRF1 As String =
"Throughput RF1"

Private Const msLabelThroughputRF As String = "Refresh
Streams"
Private Const msLabelThroughputRFWithIt As String =
"Refresh Streams with Iterators"
Private Const msLabelThroughputRF1 As String = "RF1"
Private Const msLabelThroughputRF2 As String = "RF2"
Private Const msLabelThroughputRF12 As String = "RF1
post Throughput Queries"
#End If

Private Sub CalcElapsedTmAndPrint()
' This is the main function that computes the elapsed time
for each
' step, the Qpp for the Power and Throughput runs and the
composite
' QppH

Dim iStreamId As Integer
Dim iQueryId As Integer
Dim lMinElapsed As Double
Dim lMaxElapsed As Double
Dim fSigma As Double
Dim fQppPower As Double
Dim fQppThroughput As Double
Dim fQppH As Double
Dim cStart As Currency
Dim cEnd As Currency
Dim fElapsedThroughput As Double
Dim ftemp As Double
Dim sStartTm As String
Dim sEndTm As String

' Calculate the timing interval for each query in each stream
For iStreamId = miStreamIdLo To miStreamIdHi

For iQueryId = miQueryIdMin To miQueryIdMax Step 1

' Calculate the elapsed time for a query as the
difference
' between the end time and the start time for a step
arExecutionDtls(iStreamId, iQueryId).ElapsedTime =

```

```

(arExecutionDtls(iStreamId, iQueryId).EndTime -
-
arExecutionDtls(iStreamId,
iQueryId).StartTime) * 10

' If the timing interval for a query is less than 0.05
seconds,
' it must be rounded up to 0.1 second to avoid 0 values
' Refer to Section 5.3.7.5 of the TPC-H Spec Rev.
1.1.0
If (arExecutionDtls(iStreamId,
iQueryId).ElapsedTime) < mfMinElapsed Then
arExecutionDtls(iStreamId, iQueryId).ElapsedTime
= mfMinElapsedRound
Else
arExecutionDtls(iStreamId, iQueryId).ElapsedTime
= _
Round(arExecutionDtls(iStreamId,
iQueryId).ElapsedTime, miNumDecimalPlaces)
End If

' Calculate the timing interval for the TPC-H Metric as
the difference
' between the start time of the next step and the start
time for a step
arExecutionDtls(iStreamId, iQueryId).ElapsedTpch =
-
(arExecutionDtls(iStreamId,
iQueryId).StartTimeNextStep - _
arExecutionDtls(iStreamId,
iQueryId).StartTime) * 10

' If the timing interval for a query is less than 0.05
seconds,
' it must be rounded up to 0.1 second to avoid 0 values
' Refer to Section 5.3.7.5 of the TPC-H Spec Rev.
1.1.0
If (arExecutionDtls(iStreamId,
iQueryId).ElapsedTpch) < mfMinElapsed Then
arExecutionDtls(iStreamId, iQueryId).ElapsedTpch
= mfMinElapsedRound
Else
arExecutionDtls(iStreamId, iQueryId).ElapsedTpch
= _
Round(arExecutionDtls(iStreamId,
iQueryId).ElapsedTpch, miNumDecimalPlaces)
End If
Next iQueryId

Next iStreamId

If mbRunType(eRunType.Power) Then
lMinElapsed = arExecutionDtls(miStreamPowerRun,
miQueryIdMin).ElapsedTpch
lMaxElapsed = 0

' Determine minimum and maximum query timing
intervals for the PowerRun

```

```

For iQueryId = miQueryIdMin To miQueryIdMax -
miRefreshFuncs Step 1

```

```

    If arExecutionDtls(miStreamPowerRun,
iQueryId).ElapsedTpch > lMaxElapsed Then
        lMaxElapsed =
arExecutionDtls(miStreamPowerRun, iQueryId).ElapsedTpch
    End If

```

```

    If arExecutionDtls(miStreamPowerRun,
iQueryId).ElapsedTpch < lMinElapsed Then
        lMinElapsed =
arExecutionDtls(miStreamPowerRun, iQueryId).ElapsedTpch
    End If

```

```

Next iQueryId

```

```

' If the ratio between the longest query timing interval
and the shortest query
' timing interval in the PowerRun is greater than 1000,
then increase all query
' timing intervals which are smaller than
max[QI(i,0)]/1000 to max[QI(i,0)]/1000
' Refer to Section 5.4.1.4 of the TPC-H Spec Rev. 1.1.0
If lMaxElapsed / lMinElapsed > 1000 Then
    lMinElapsed = lMaxElapsed / 1000

```

```

For iQueryId = miQueryIdMin To miQueryIdMax
Step 1

```

```

    If arExecutionDtls(miStreamPowerRun,
iQueryId).ElapsedTpch > lMaxElapsed Then
        lMaxElapsed =
arExecutionDtls(miStreamPowerRun, iQueryId).ElapsedTpch
    End If

```

```

    If arExecutionDtls(miStreamPowerRun,
iQueryId).ElapsedTpch < (lMaxElapsed / 1000) Then
        arExecutionDtls(miStreamPowerRun,
iQueryId).ElapsedTpch = lMinElapsed
    End If

```

```

Next iQueryId
End If

```

```

' Determine the Power Metric
fSigma = 0
For iQueryId = miQueryIdMin To miQueryIdMax Step 1
    fSigma = fSigma +
Log(arExecutionDtls(miStreamPowerRun,
iQueryId).ElapsedTpch)
Next iQueryId
fSigma = fSigma * (-1 / 24)
fQppPower = Round(Exp(fSigma) * 3600 * mfSF,
miNumDecimalPlaces)
End If

```

```

If mbRunType(eRunType.Throughput) Then
' Determine the elapsed time for the throughput run

```

```

    cStart = arExecutionDtls(miStreamPowerRun + 1,
miQueryIdMin).StartTime
    cEnd = 0

```

```

For iStreamId = miStreamPowerRun + 1 To
miStreamIdHi

```

```

    For iQueryId = miQueryIdMin To miQueryIdMax
Step 1

```

```

        If arExecutionDtls(iStreamId, iQueryId).StartTime
< cStart Then
            cStart = arExecutionDtls(iStreamId,
iQueryId).StartTime
        End If

```

```

        If arExecutionDtls(iStreamId, iQueryId).EndTime >
cEnd Then
            cEnd = arExecutionDtls(iStreamId,
iQueryId).EndTime
        End If

```

```

    Next iQueryId

```

```

Next iStreamId

```

```

sStartTm = JulianToString(cStart)
sEndTm = JulianToString(cEnd)

```

```

fElapsedThroughput = Round((cEnd - cStart) * 10,
miNumDecimalPlaces)
fSigma = 3600 / fElapsedThroughput
fQppThroughput = Round(fSigma * miStreamIdHi * 22
* mfSF, miNumDecimalPlaces)
End If

```

```

' Compute the composite QppH value
fQppH = Round(Sqr(fQppPower * fQppThroughput),
miNumDecimalPlaces)

```

```

Call PrintStatistics(fQppPower, fElapsedThroughput,
fQppThroughput, fQppH, _
sStartTm, sEndTm)

```

```

End Sub

```

```

Private Sub CloseDbAndWsp()
' Close the database structures

```

```

On Error Resume Next

```

```

If Not mDB Is Nothing Then
    mDB.Close
    Set mDB = Nothing
End If

```

```

If Not mwrkJet Is Nothing Then
    mwrkJet.Close
    Set mwrkJet = Nothing
End If

```

```

End Sub

Public Sub NumStreamsEnabled(Index As Integer)
    ' Enables the number of throughput streams only if the
    throughput
    ' metric report is being generated

    If Index = eRunType.Throughput Then
        frmTPCHMetrics.cboStreams.Enabled = _

(frmTPCHMetrics.chkRun(eRunType.Throughput).Value =
vbChecked)
#If Not TPCH_KIT Then
    ' Enables the first throughput update set only if the
    throughput
    ' metric report is being generated
    frmTPCHMetrics.txtUpdateSetFirst.Enabled = _

(frmTPCHMetrics.chkRun(eRunType.Throughput).Value =
vbChecked)
#End If
    End If

End Sub

Private Function ParentInstId(iStreamId As Integer, iQueryId
As Integer) As Long
    ' Determines the parent instance identifier for the refresh
    functions
    ' Uses the refresh function label that marks the start of
    execution for
    ' the refresh function
    ' E.g. TPC-H Kit, Stream1, RF1: the start time for the
    refresh function
    ' is the start time for the step, 'Throughput - Semaphore
    Loop for RF Delay'
    ' but the end time for the refresh function is the end time for
    the step,
    ' 'Throughput - Execute Stream1 RF1'
    ' Similarly, in the HP version of the TPC-H Kit, RF1: the
    start time
    ' for the refresh function is the start time for the step,
    ' 'Wait for Throughput Run' but the end time for the refresh
    function
    ' is the end time for the step, 'Throughput RF1'

    Dim sLabel As String
    Dim sSql As String
    Dim sIt As String
    Dim lInstId As Long

    ParentInstId = 0

    ' Start at the top level step and work down to the parent of
    the refresh
    ' function. Initialize the step label and iterator values at
    every
    ' step, build a query and determine the instance identifier

```

```

sLabel = msLabelThroughputRF
sSql = "step_label = " & MakeStringFieldValid(sLabel)
mrecDtls.FindFirst sSql
If mrecDtls.NoMatch = True Then
    MsgBox "Step " & "" & sLabel & "" & " not found! " &
-
    "The Throughput Run was not completely
    executed!"
    Exit Function
End If

lInstId = mrecDtls.Fields("instance_id").Value

#If TPCH_KIT Then
    If (iStreamId = miStreamPowerRun + 1) And iQueryId =
miQueryIdRF1 Then
        ParentInstId = lInstId
        Exit Function
    End If

    sLabel = msLblThroughputRF12Mgr
    sIt = CStr(iStreamId)
#Else
    sLabel = msLabelThroughputRFWithIt
    ' Stream 1 in Throughput run has iterator value first update
    set,
    ' Stream 2 in Throughput run has iterator value first update
    set + 1, ... and so on
    sIt = Format(iStreamId + miUpdateSetFirst - 1,
msFmtNumberWOZeroes)
#End If

sSql = "step_label = " & MakeStringFieldValid(sLabel) & _
" and parent_instance_id = " & CStr(lInstId) & _
" and iterator_value = " & MakeStringFieldValid(sIt)
mrecDtls.FindFirst sSql
If mrecDtls.NoMatch = True Then
    MsgBox "Step " & "" & sLabel & "" & _
" not found for iterator " & "" & sIt & "" & ". " & _
"The Throughput Run was not completely
    executed!"
    Exit Function
End If

lInstId = mrecDtls.Fields("instance_id").Value

sLabel = IIf(iQueryId = miQueryIdRF1,
msLabelThroughputRF1, msLabelThroughputRF2)

sSql = "step_label = " & MakeStringFieldValid(sLabel) & _
" and parent_instance_id = " & CStr(lInstId)

mrecDtls.FindFirst sSql
If mrecDtls.NoMatch = True Then
    MsgBox "Step " & "" & sLabel & "" & _
" not found for iterator " & "" & sIt & "" & ". " & _
"The Throughput Run was not completely
    executed!"

```

```

Exit Function
End If

ParentInstId = mrecDtls.Fields("instance_id").Value

End Function
Private Function ParentInstIdEnd(iStreamId As Integer,
iQueryId As Integer) As Long
' Determines the parent instance identifier for the refresh
functions
' Uses the refresh function label that marks the end of
execution for
' the refresh function
' E.g. TPC-H Kit, Stream1, RF1: the start time for the
refresh function
' is the start time for the step, 'Throughput - Semaphore
Loop for RF Delay'
' but the end time for the refresh function is the end time for
the step,
' 'Throughput - Execute Stream1 RF1'
' Similarly, in the HP version of the TPC-H Kit, RF1: the
start time
' for the refresh function is the start time for the step,
' 'Wait for Throughput Run' but the end time for the refresh
function
' is the end time for the step, 'Throughput RF1'

Dim sLabel As String
Dim sSql As String
Dim sIt As String
Dim IInstId As Long

' Start at the top level step and work down to the parent of
the refresh
' function. Initialize the step label and iterator values at
every
' step, build a query and determine the instance identifier

ParentInstIdEnd = 0

#If TPCH_KIT Then
sLabel = msLabelThroughputRF
sSql = "step_label = " & MakeStringFieldValid(sLabel)
mrecDtls.FindFirst sSql
If mrecDtls.NoMatch = True Then
MsgBox "Step " & "" & sLabel & "" & " not found! " &
-
"The Throughput Run was not completely
executed!"
Exit Function
End If

IInstId = mrecDtls.Fields("instance_id").Value

sLabel = msLblThroughputRF12Mgr
sIt = CStr(iStreamId)
sSql = "step_label = " & MakeStringFieldValid(sLabel) & _
" and parent_instance_id = " & CStr(IInstId) & _
" and iterator_value = " & MakeStringFieldValid(sIt)

```

```

mrecDtls.FindFirst sSql
If mrecDtls.NoMatch = True Then
MsgBox "Step " & "" & sLabel & "" & _
" not found for iterator " & "" & sIt & "" & ". " & _
"The Throughput Run was not completely
executed!"
Exit Function
End If

IInstId = mrecDtls.Fields("instance_id").Value

If iQueryId = miQueryIdRF2 And iStreamId <>
miStreamIdHi Then
ParentInstIdEnd = IInstId
Exit Function
End If

sLabel = IIf(iQueryId = miQueryIdRF1,
msLabelThroughputRF1, msLabelThroughputRF2)
sSql = "step_label = " & MakeStringFieldValid(sLabel) & _
" and parent_instance_id = " & CStr(IInstId)
mrecDtls.FindFirst sSql
If mrecDtls.NoMatch = True Then
MsgBox "Step " & "" & sLabel & "" & " not found! " &
-
"The Throughput Run was not completely
executed!"
Exit Function
End If

ParentInstIdEnd = mrecDtls.Fields("instance_id").Value
#Else
sLabel = msLabelThroughputRF
sSql = "step_label = " & MakeStringFieldValid(sLabel)

mrecDtls.FindFirst sSql
If mrecDtls.NoMatch = True Then
MsgBox "Step " & "" & sLabel & "" & _
" not found for iterator " & "" & sIt & "" & ". " & _
"The Throughput Run was not completely
executed!"
Exit Function
End If

IInstId = mrecDtls.Fields("instance_id").Value

' Stream 1 in Throughput run has iterator value first update
set,
' Stream 2 in Throughput run has iterator value first update
set + 1, ... and so on
sIt = Format(iStreamId + miUpdateSetFirst - 1,
msFmtNumberWOZeroes)
sLabel = msLabelThroughputRFWithIt
sSql = "step_label = " & MakeStringFieldValid(sLabel) & _
" and parent_instance_id = " & CStr(IInstId) & _
" and iterator_value = " & MakeStringFieldValid(sIt)

mrecDtls.FindFirst sSql
If mrecDtls.NoMatch = True Then

```

```

MsgBox "Step " & "" & sLabel & "" & _
    " not found for iterator " & "" & sIt & "" & ". " & _
    "The Throughput Run was not completely
executed!"
Exit Function
End If

IInstId = mrecDtls.Fields("instance_id").Value
sLabel = IIf(iQueryId = miQueryIdRF1,
msLabelThroughputRF1, msLabelThroughputRF2)

sSql = "step_label = " & MakeStringFieldValid(sLabel) & _
    " and parent_instance_id = " & CStr(IInstId)

mrecDtls.FindFirst sSql
If mrecDtls.NoMatch = True Then
    MsgBox "Step " & "" & sLabel & "" & _
        " not found for iterator " & "" & sIt & "" & ". " & _
        "The Throughput Run was not completely
executed!"
Exit Function
End If

IInstId = mrecDtls.Fields("instance_id").Value

If iQueryId = miQueryIdRF1 Then
    sLabel = msLabelThroughputRF1

    sSql = "step_label = " & MakeStringFieldValid(sLabel)
& _
    " and parent_instance_id = " & CStr(IInstId)

mrecDtls.FindFirst sSql
If mrecDtls.NoMatch = True Then
    MsgBox "Step " & "" & sLabel & "" & _
        " not found for iterator " & "" & sIt & "" & ". "
& _
        "The Throughput Run was not completely
executed!"
Exit Function
End If

IInstId = mrecDtls.Fields("instance_id").Value
End If

ParentInstIdEnd = IInstId

#End If

End Function
Public Sub Initialize()

' Initialize an array of valid scale factors
marrSF(0) = 0.1
marrSF(1) = 1
marrSF(2) = 10
marrSF(3) = 30
marrSF(4) = 100
marrSF(5) = 300

```

```

marrSF(6) = 1000
marrSF(7) = 3000
marrSF(8) = 10000

' and the number of streams for each scale factor
marrStreams(0) = 2
marrStreams(1) = 2
marrStreams(2) = 3
marrStreams(3) = 4
marrStreams(4) = 5
marrStreams(5) = 6
marrStreams(6) = 7
marrStreams(7) = 8
marrStreams(8) = 9

' Load the valid scale factors and number of streams for
each
' scale factor in the combo boxes on the form
Call LoadSFAndStreams(frmTPCHMetrics.cboSF,
frmTPCHMetrics.cboStreams)

' Initialize the number of insert and delete segments per
update
' set to default values
frmTPCHMetrics.txtInsertSegments.Text =
miDefInsSegmentsPerUpdateSet
frmTPCHMetrics.txtDeleteSegments.Text =
miDefDelSegmentsPerUpdateSet

#If TPCH_KIT Then
    frmTPCHMetrics.lblFirstUpdateSet.Enabled = False
    frmTPCHMetrics.txtUpdateSetFirst.Enabled = False
#Else
    frmTPCHMetrics.lblFirstUpdateSet.Enabled = True
    frmTPCHMetrics.txtUpdateSetFirst.Enabled = True
' Initialize the first update set for the throughput run
    frmTPCHMetrics.txtUpdateSetFirst.Text =
miDefUpdateSetFirst
#End If

' Initialize the sequence in which queries are executed for
PowerRun
arQuerySequence(miStreamPowerRun, miQueryIdMin) =
14
arQuerySequence(miStreamPowerRun, miQueryIdMin + 1)
= 2
arQuerySequence(miStreamPowerRun, miQueryIdMin + 2)
= 9
arQuerySequence(miStreamPowerRun, miQueryIdMin + 3)
= 20
arQuerySequence(miStreamPowerRun, miQueryIdMin + 4)
= 6
arQuerySequence(miStreamPowerRun, miQueryIdMin + 5)
= 17
arQuerySequence(miStreamPowerRun, miQueryIdMin + 6)
= 18
arQuerySequence(miStreamPowerRun, miQueryIdMin + 7)
= 8

```

```

arQuerySequence(miStreamPowerRun, miQueryIdMin + 8)
= 21
arQuerySequence(miStreamPowerRun, miQueryIdMin + 9)
= 13
arQuerySequence(miStreamPowerRun, miQueryIdMin +
10) = 3
arQuerySequence(miStreamPowerRun, miQueryIdMin +
11) = 22
arQuerySequence(miStreamPowerRun, miQueryIdMin +
12) = 16
arQuerySequence(miStreamPowerRun, miQueryIdMin +
13) = 4
arQuerySequence(miStreamPowerRun, miQueryIdMin +
14) = 11
arQuerySequence(miStreamPowerRun, miQueryIdMin +
15) = 15
arQuerySequence(miStreamPowerRun, miQueryIdMin +
16) = 1
arQuerySequence(miStreamPowerRun, miQueryIdMin +
17) = 10
arQuerySequence(miStreamPowerRun, miQueryIdMin +
18) = 19
arQuerySequence(miStreamPowerRun, miQueryIdMin +
19) = 5
arQuerySequence(miStreamPowerRun, miQueryIdMin +
20) = 7
arQuerySequence(miStreamPowerRun, miQueryIdMin +
21) = 12

```

' Initialize the sequence in which throughput run queries are executed

```

arQuerySequence(miStreamPowerRun + 1, miQueryIdMin)
= 21
arQuerySequence(miStreamPowerRun + 1, miQueryIdMin
+ 1) = 3
arQuerySequence(miStreamPowerRun + 1, miQueryIdMin
+ 2) = 18
arQuerySequence(miStreamPowerRun + 1, miQueryIdMin
+ 3) = 5
arQuerySequence(miStreamPowerRun + 1, miQueryIdMin
+ 4) = 11
arQuerySequence(miStreamPowerRun + 1, miQueryIdMin
+ 5) = 7
arQuerySequence(miStreamPowerRun + 1, miQueryIdMin
+ 6) = 6
arQuerySequence(miStreamPowerRun + 1, miQueryIdMin
+ 7) = 20
arQuerySequence(miStreamPowerRun + 1, miQueryIdMin
+ 8) = 17
arQuerySequence(miStreamPowerRun + 1, miQueryIdMin
+ 9) = 12
arQuerySequence(miStreamPowerRun + 1, miQueryIdMin
+ 10) = 16
arQuerySequence(miStreamPowerRun + 1, miQueryIdMin
+ 11) = 15
arQuerySequence(miStreamPowerRun + 1, miQueryIdMin
+ 12) = 13
arQuerySequence(miStreamPowerRun + 1, miQueryIdMin
+ 13) = 10

```

```

arQuerySequence(miStreamPowerRun + 1, miQueryIdMin
+ 14) = 2
arQuerySequence(miStreamPowerRun + 1, miQueryIdMin
+ 15) = 8
arQuerySequence(miStreamPowerRun + 1, miQueryIdMin
+ 16) = 14
arQuerySequence(miStreamPowerRun + 1, miQueryIdMin
+ 17) = 19
arQuerySequence(miStreamPowerRun + 1, miQueryIdMin
+ 18) = 9
arQuerySequence(miStreamPowerRun + 1, miQueryIdMin
+ 19) = 22
arQuerySequence(miStreamPowerRun + 1, miQueryIdMin
+ 20) = 1
arQuerySequence(miStreamPowerRun + 1, miQueryIdMin
+ 21) = 4

arQuerySequence(miStreamPowerRun + 2, miQueryIdMin)
= 6
arQuerySequence(miStreamPowerRun + 2, miQueryIdMin
+ 1) = 17
arQuerySequence(miStreamPowerRun + 2, miQueryIdMin
+ 2) = 14
arQuerySequence(miStreamPowerRun + 2, miQueryIdMin
+ 3) = 16
arQuerySequence(miStreamPowerRun + 2, miQueryIdMin
+ 4) = 19
arQuerySequence(miStreamPowerRun + 2, miQueryIdMin
+ 5) = 10
arQuerySequence(miStreamPowerRun + 2, miQueryIdMin
+ 6) = 9
arQuerySequence(miStreamPowerRun + 2, miQueryIdMin
+ 7) = 2
arQuerySequence(miStreamPowerRun + 2, miQueryIdMin
+ 8) = 15
arQuerySequence(miStreamPowerRun + 2, miQueryIdMin
+ 9) = 8
arQuerySequence(miStreamPowerRun + 2, miQueryIdMin
+ 10) = 5
arQuerySequence(miStreamPowerRun + 2, miQueryIdMin
+ 11) = 22
arQuerySequence(miStreamPowerRun + 2, miQueryIdMin
+ 12) = 12
arQuerySequence(miStreamPowerRun + 2, miQueryIdMin
+ 13) = 7
arQuerySequence(miStreamPowerRun + 2, miQueryIdMin
+ 14) = 13
arQuerySequence(miStreamPowerRun + 2, miQueryIdMin
+ 15) = 18
arQuerySequence(miStreamPowerRun + 2, miQueryIdMin
+ 16) = 1
arQuerySequence(miStreamPowerRun + 2, miQueryIdMin
+ 17) = 4
arQuerySequence(miStreamPowerRun + 2, miQueryIdMin
+ 18) = 20
arQuerySequence(miStreamPowerRun + 2, miQueryIdMin
+ 19) = 3
arQuerySequence(miStreamPowerRun + 2, miQueryIdMin
+ 20) = 11

```


arQuerySequence(miStreamPowerRun + 5, miQueryIdMin
 + 12) = 3
 arQuerySequence(miStreamPowerRun + 5, miQueryIdMin
 + 13) = 1
 arQuerySequence(miStreamPowerRun + 5, miQueryIdMin
 + 14) = 2
 arQuerySequence(miStreamPowerRun + 5, miQueryIdMin
 + 15) = 5
 arQuerySequence(miStreamPowerRun + 5, miQueryIdMin
 + 16) = 8
 arQuerySequence(miStreamPowerRun + 5, miQueryIdMin
 + 17) = 20
 arQuerySequence(miStreamPowerRun + 5, miQueryIdMin
 + 18) = 12
 arQuerySequence(miStreamPowerRun + 5, miQueryIdMin
 + 19) = 17
 arQuerySequence(miStreamPowerRun + 5, miQueryIdMin
 + 20) = 10
 arQuerySequence(miStreamPowerRun + 5, miQueryIdMin
 + 21) = 9

 arQuerySequence(miStreamPowerRun + 6, miQueryIdMin)
 = 10
 arQuerySequence(miStreamPowerRun + 6, miQueryIdMin
 + 1) = 3
 arQuerySequence(miStreamPowerRun + 6, miQueryIdMin
 + 2) = 15
 arQuerySequence(miStreamPowerRun + 6, miQueryIdMin
 + 3) = 13
 arQuerySequence(miStreamPowerRun + 6, miQueryIdMin
 + 4) = 6
 arQuerySequence(miStreamPowerRun + 6, miQueryIdMin
 + 5) = 8
 arQuerySequence(miStreamPowerRun + 6, miQueryIdMin
 + 6) = 9
 arQuerySequence(miStreamPowerRun + 6, miQueryIdMin
 + 7) = 7
 arQuerySequence(miStreamPowerRun + 6, miQueryIdMin
 + 8) = 4
 arQuerySequence(miStreamPowerRun + 6, miQueryIdMin
 + 9) = 11
 arQuerySequence(miStreamPowerRun + 6, miQueryIdMin
 + 10) = 22
 arQuerySequence(miStreamPowerRun + 6, miQueryIdMin
 + 11) = 18
 arQuerySequence(miStreamPowerRun + 6, miQueryIdMin
 + 12) = 12
 arQuerySequence(miStreamPowerRun + 6, miQueryIdMin
 + 13) = 1
 arQuerySequence(miStreamPowerRun + 6, miQueryIdMin
 + 14) = 5
 arQuerySequence(miStreamPowerRun + 6, miQueryIdMin
 + 15) = 16
 arQuerySequence(miStreamPowerRun + 6, miQueryIdMin
 + 16) = 2
 arQuerySequence(miStreamPowerRun + 6, miQueryIdMin
 + 17) = 14
 arQuerySequence(miStreamPowerRun + 6, miQueryIdMin
 + 18) = 19

arQuerySequence(miStreamPowerRun + 6, miQueryIdMin
 + 19) = 20
 arQuerySequence(miStreamPowerRun + 6, miQueryIdMin
 + 20) = 17
 arQuerySequence(miStreamPowerRun + 6, miQueryIdMin
 + 21) = 21

 arQuerySequence(miStreamPowerRun + 7, miQueryIdMin)
 = 18
 arQuerySequence(miStreamPowerRun + 7, miQueryIdMin
 + 1) = 8
 arQuerySequence(miStreamPowerRun + 7, miQueryIdMin
 + 2) = 20
 arQuerySequence(miStreamPowerRun + 7, miQueryIdMin
 + 3) = 21
 arQuerySequence(miStreamPowerRun + 7, miQueryIdMin
 + 4) = 2
 arQuerySequence(miStreamPowerRun + 7, miQueryIdMin
 + 5) = 4
 arQuerySequence(miStreamPowerRun + 7, miQueryIdMin
 + 6) = 22
 arQuerySequence(miStreamPowerRun + 7, miQueryIdMin
 + 7) = 17
 arQuerySequence(miStreamPowerRun + 7, miQueryIdMin
 + 8) = 1
 arQuerySequence(miStreamPowerRun + 7, miQueryIdMin
 + 9) = 11
 arQuerySequence(miStreamPowerRun + 7, miQueryIdMin
 + 10) = 9
 arQuerySequence(miStreamPowerRun + 7, miQueryIdMin
 + 11) = 19
 arQuerySequence(miStreamPowerRun + 7, miQueryIdMin
 + 12) = 3
 arQuerySequence(miStreamPowerRun + 7, miQueryIdMin
 + 13) = 13
 arQuerySequence(miStreamPowerRun + 7, miQueryIdMin
 + 14) = 5
 arQuerySequence(miStreamPowerRun + 7, miQueryIdMin
 + 15) = 7
 arQuerySequence(miStreamPowerRun + 7, miQueryIdMin
 + 16) = 10
 arQuerySequence(miStreamPowerRun + 7, miQueryIdMin
 + 17) = 16
 arQuerySequence(miStreamPowerRun + 7, miQueryIdMin
 + 18) = 6
 arQuerySequence(miStreamPowerRun + 7, miQueryIdMin
 + 19) = 14
 arQuerySequence(miStreamPowerRun + 7, miQueryIdMin
 + 20) = 15
 arQuerySequence(miStreamPowerRun + 7, miQueryIdMin
 + 21) = 12

 arQuerySequence(miStreamPowerRun + 8, miQueryIdMin)
 = 19
 arQuerySequence(miStreamPowerRun + 8, miQueryIdMin
 + 1) = 1
 arQuerySequence(miStreamPowerRun + 8, miQueryIdMin
 + 2) = 15

arQuerySequence(miStreamPowerRun + 8, miQueryIdMin
 + 3) = 17
 arQuerySequence(miStreamPowerRun + 8, miQueryIdMin
 + 4) = 5
 arQuerySequence(miStreamPowerRun + 8, miQueryIdMin
 + 5) = 8
 arQuerySequence(miStreamPowerRun + 8, miQueryIdMin
 + 6) = 9
 arQuerySequence(miStreamPowerRun + 8, miQueryIdMin
 + 7) = 12
 arQuerySequence(miStreamPowerRun + 8, miQueryIdMin
 + 8) = 14
 arQuerySequence(miStreamPowerRun + 8, miQueryIdMin
 + 9) = 7
 arQuerySequence(miStreamPowerRun + 8, miQueryIdMin
 + 10) = 4
 arQuerySequence(miStreamPowerRun + 8, miQueryIdMin
 + 11) = 3
 arQuerySequence(miStreamPowerRun + 8, miQueryIdMin
 + 12) = 20
 arQuerySequence(miStreamPowerRun + 8, miQueryIdMin
 + 13) = 16
 arQuerySequence(miStreamPowerRun + 8, miQueryIdMin
 + 14) = 6
 arQuerySequence(miStreamPowerRun + 8, miQueryIdMin
 + 15) = 22
 arQuerySequence(miStreamPowerRun + 8, miQueryIdMin
 + 16) = 10
 arQuerySequence(miStreamPowerRun + 8, miQueryIdMin
 + 17) = 13
 arQuerySequence(miStreamPowerRun + 8, miQueryIdMin
 + 18) = 2
 arQuerySequence(miStreamPowerRun + 8, miQueryIdMin
 + 19) = 21
 arQuerySequence(miStreamPowerRun + 8, miQueryIdMin
 + 20) = 18
 arQuerySequence(miStreamPowerRun + 8, miQueryIdMin
 + 21) = 11

 arQuerySequence(miStreamPowerRun + 9, miQueryIdMin)
 = 8
 arQuerySequence(miStreamPowerRun + 9, miQueryIdMin
 + 1) = 13
 arQuerySequence(miStreamPowerRun + 9, miQueryIdMin
 + 2) = 2
 arQuerySequence(miStreamPowerRun + 9, miQueryIdMin
 + 3) = 20
 arQuerySequence(miStreamPowerRun + 9, miQueryIdMin
 + 4) = 17
 arQuerySequence(miStreamPowerRun + 9, miQueryIdMin
 + 5) = 3
 arQuerySequence(miStreamPowerRun + 9, miQueryIdMin
 + 6) = 6
 arQuerySequence(miStreamPowerRun + 9, miQueryIdMin
 + 7) = 21
 arQuerySequence(miStreamPowerRun + 9, miQueryIdMin
 + 8) = 18
 arQuerySequence(miStreamPowerRun + 9, miQueryIdMin
 + 9) = 11

arQuerySequence(miStreamPowerRun + 9, miQueryIdMin
 + 10) = 19
 arQuerySequence(miStreamPowerRun + 9, miQueryIdMin
 + 11) = 10
 arQuerySequence(miStreamPowerRun + 9, miQueryIdMin
 + 12) = 15
 arQuerySequence(miStreamPowerRun + 9, miQueryIdMin
 + 13) = 4
 arQuerySequence(miStreamPowerRun + 9, miQueryIdMin
 + 14) = 22
 arQuerySequence(miStreamPowerRun + 9, miQueryIdMin
 + 15) = 1
 arQuerySequence(miStreamPowerRun + 9, miQueryIdMin
 + 16) = 7
 arQuerySequence(miStreamPowerRun + 9, miQueryIdMin
 + 17) = 12
 arQuerySequence(miStreamPowerRun + 9, miQueryIdMin
 + 18) = 9
 arQuerySequence(miStreamPowerRun + 9, miQueryIdMin
 + 19) = 14
 arQuerySequence(miStreamPowerRun + 9, miQueryIdMin
 + 20) = 5
 arQuerySequence(miStreamPowerRun + 9, miQueryIdMin
 + 21) = 16

 arQuerySequence(miStreamPowerRun + 10,
 miQueryIdMin) = 6
 arQuerySequence(miStreamPowerRun + 10,
 miQueryIdMin + 1) = 15
 arQuerySequence(miStreamPowerRun + 10,
 miQueryIdMin + 2) = 18
 arQuerySequence(miStreamPowerRun + 10,
 miQueryIdMin + 3) = 17
 arQuerySequence(miStreamPowerRun + 10,
 miQueryIdMin + 4) = 12
 arQuerySequence(miStreamPowerRun + 10,
 miQueryIdMin + 5) = 1
 arQuerySequence(miStreamPowerRun + 10,
 miQueryIdMin + 6) = 7
 arQuerySequence(miStreamPowerRun + 10,
 miQueryIdMin + 7) = 2
 arQuerySequence(miStreamPowerRun + 10,
 miQueryIdMin + 8) = 22
 arQuerySequence(miStreamPowerRun + 10,
 miQueryIdMin + 9) = 13
 arQuerySequence(miStreamPowerRun + 10,
 miQueryIdMin + 10) = 21
 arQuerySequence(miStreamPowerRun + 10,
 miQueryIdMin + 11) = 10
 arQuerySequence(miStreamPowerRun + 10,
 miQueryIdMin + 12) = 14
 arQuerySequence(miStreamPowerRun + 10,
 miQueryIdMin + 13) = 9
 arQuerySequence(miStreamPowerRun + 10,
 miQueryIdMin + 14) = 3
 arQuerySequence(miStreamPowerRun + 10,
 miQueryIdMin + 15) = 16
 arQuerySequence(miStreamPowerRun + 10,
 miQueryIdMin + 16) = 20

```

arQuerySequence(miStreamPowerRun + 10,
miQueryIdMin + 17) = 19
arQuerySequence(miStreamPowerRun + 10,
miQueryIdMin + 18) = 11
arQuerySequence(miStreamPowerRun + 10,
miQueryIdMin + 19) = 4
arQuerySequence(miStreamPowerRun + 10,
miQueryIdMin + 20) = 8
arQuerySequence(miStreamPowerRun + 10,
miQueryIdMin + 21) = 5

End Sub

Private Sub QueryRunDetails()
' Queries step execution records from the database

Dim strSql As String

On Error GoTo QueryRunDetailsErr

Screen.MousePointer = vbHourglass

Set mwrkJet = CreateWorkspace("tpch", "admin",
gsEmptyString, dbUseJet)

' Open database for exclusive access
Set mDB = mwrkJet.OpenDatabase(msDbFile,
Options:=True)

strSql = "select a.step_id, a.version_no, a.command, " & _
" a.instance_id, a.parent_instance_id, a.iterator_value,
" & _
" a.start_time, a.end_time, " & _
" b.step_label, b.step_file_name, b.step_text, " & _
" b.step_level, b.sequence_no, " & _
" b.iterator_name " & _
" from run_step_details a, att_steps b " & _
" where a.step_id = b.step_id " & _
" and a.version_no = b.version_no " & _
" and a.run_id = " & CStr(mlRunId) & _
" order by b.step_level, b.sequence_no, a.instance_id"

Set mrecDtls = mDB.OpenRecordset(strSql,
dbOpenSnapshot)
If mrecDtls.RecordCount = 0 Then
Screen.MousePointer = vbDefault
MsgBox "There are no records in the database for the run
identifier." & _
" Unable to generate reports."
Else
Call CollectStats
End If

mrecDtls.Close
CloseDbAndWsp

Screen.MousePointer = vbDefault

Exit Sub

```

```

QueryRunDetailsErr:

Screen.MousePointer = vbDefault
DisplayErrors

CloseDbAndWsp

End Sub
Public Sub GenerateSelected()
' Called when the user clicks on Generate on the
TPCHMetrics form.
' Validates all the user inputs and calls a function to
generate
' the reports if inputs are valid.
' Initializes module-level variables to the values input by the
user
Dim sTemp As String

On Error GoTo GenerateSelectedErr

' Initialize the enabled value for the type of report being
generated
mbRunType(eRunType.Power) = _
(frmTPCHMetrics.chkRun(eRunType.Power).Value =
vbChecked)
mbRunType(eRunType.Throughput) = _
(frmTPCHMetrics.chkRun(eRunType.Throughput).Value =
vbChecked)

If (Not mbRunType(eRunType.Power) And Not
mbRunType(eRunType.Throughput)) Then
MsgBox "Atleast one report type must be selected."
Exit Sub
End If

' Initialize the stream identifier bounds depending on the
type of
' report being generated
miStreamIdLo = IIf(mbRunType(eRunType.Power),
miStreamPowerRun, miStreamPowerRun + 1)
miStreamIdHi = IIf(mbRunType(eRunType.Throughput),
miStreamIdMax, miStreamPowerRun)
If mbRunType(eRunType.Throughput) Then
' Initialize the number of throughput streams if a
throughput
' metric is being generated
sTemp = Trim(frmTPCHMetrics.cboStreams.Text)
If sTemp = gsEmptyString Then
MsgBox "Please enter the number of throughput
streams that were executed."
Exit Sub
End If

If IsNumeric(sTemp) = False Then
MsgBox "The number of throughput streams must be
numeric."
Exit Sub

```

```

End If

miStreamIdHi = CInt(sTemp)
If miStreamIdHi < 1 Or miStreamIdHi > miStreamIdMax
Then
    MsgBox "Number of throughput streams must range
from 1 to 10." & _
        "Disable the throughput run checkbox if no
throughput streams were executed."
    Exit Sub
End If

' Initialize the run identifier
sTemp = Trim(frmTPCHMetrics.cboRunId.Text)
If sTemp = gsEmptyString Then
    MsgBox "Please enter the run identifier."
    Exit Sub
End If

If IsNumeric(sTemp) = False Then
    MsgBox "The run identifier must be numeric."
    Exit Sub
End If
mlRunId = CLng(sTemp)

' Initialize the scale factor for the run
sTemp = Trim(frmTPCHMetrics.cboSF.Text)
If sTemp = gsEmptyString Then
    MsgBox "Please enter the scale factor for the run."
    Exit Sub
End If

If IsNumeric(sTemp) = False Then
    MsgBox "The scale factor must be numeric."
    Exit Sub
End If
mfSF = CSng(sTemp)

' Initialize the workspace definition file
msDbFile = Trim(frmTPCHMetrics.txtDbFile)
If msDbFile = gsEmptyString Then
    MsgBox "Please enter the workspace definition file (.stp)
containing the run history."
    Exit Sub
End If

' Initialize the report file and ensure that it doesn't already
exist
msOutput = Trim(frmTPCHMetrics.txtReport)
If msOutput = gsEmptyString Then
    MsgBox "Please enter the output file name."
    Exit Sub
End If

msOutput = MakePathValid(msOutput)
If msOutput = gsEmptyString Then
    MsgBox "The output file path is not valid. Please enter a
valid path."

```

```

Exit Sub
End If

If Dir$(msOutput, vbNormal + vbHidden + vbReadOnly +
vbSystem) <> gsEmptyString Then
    MsgBox "The output file already exists. Please delete it
or enter a new one."
    Exit Sub
End If

' Initialize the number of insert and delete segments per
update set
sTemp = Trim(frmTPCHMetrics.txtInsertSegments.Text)
If sTemp = gsEmptyString Then
    MsgBox "Please enter the number of insert segments per
update set. (StepMaster parameter:
INSERT_SEGMENTS_PER_UPDATE_SET)"
    Exit Sub
End If

If IsNumeric(sTemp) = False Then
    MsgBox "The number of insert segments must be
numeric. (StepMaster parameter:
INSERT_SEGMENTS_PER_UPDATE_SET)"
    Exit Sub
End If
miInsSegmentsPerUpdateSet = CInt(sTemp)

sTemp = Trim(frmTPCHMetrics.txtDeleteSegments.Text)
If sTemp = gsEmptyString Then
    MsgBox "Please enter the number of delete segments per
update set. (StepMaster parameter:
DELETE_SEGMENTS_PER_UPDATE_SET)"
    Exit Sub
End If

If IsNumeric(sTemp) = False Then
    MsgBox "The number of delete segments must be
numeric. (StepMaster parameter:
DELETE_SEGMENTS_PER_UPDATE_SET)"
    Exit Sub
End If

miDelSegmentsPerUpdateSet = CInt(sTemp)

#If Not TPCH_KIT Then
If mbRunType(eRunType.Throughput) Then
    ' Initialize the value of the first update set
sTemp = Trim(frmTPCHMetrics.txtUpdateSetFirst.Text)
If sTemp = gsEmptyString Then
    MsgBox "Please enter the first update set for the
throughput run. (StepMaster parameter:
1ST_THRUPUT_UPDATE_SET)"
    Exit Sub
End If

If IsNumeric(sTemp) = False Then
    MsgBox "The first update set for the throughput run
must be numeric. (StepMaster parameter:
1ST_THRUPUT_UPDATE_SET)"

```

```

Exit Sub
End If
miUpdateSetFirst = CInt(sTemp)
End If
#End If

' The user inputs are valid. Call a procedure to query step
execution
' details and generate the TPCHEMetric report.
Call QueryRunDetails

Exit Sub

GenerateSelectedErr:
DisplayErrors

End Sub
Private Function LabelStartPower(iQueryId As Integer) As
String
' Returns the step label for the passed in power query
identifier
' Uses the label that marks the start of execution for the
query
' E.g. TPC-H Kit, Stream1, RF1: the start time for the
refresh function
' is the start time for the step, 'Throughput - Semaphore
Loop for RF Delay'
' but the end time for the refresh function is the end time for
the step,
' 'Throughput - Execute Stream1 RF1'
' Similarly, in the HP version of the TPC-H Kit, Throughput
Run, RF1:
' the start time for RF1 is the start time for the step,
' 'Wait for Throughput Run' but the end time for RF1 is the
end time
' for the step, 'Throughput RF1'
' E.g. in the HP version of the TPC-H Kit, query 15 is
executed in
' 2 parts. Therefore, the start time for query 15 is the start
time
' for the step, 'Create REVENUE View' but the end time for
query 15
' is the end time for the step, 'Execute using REVENUE'

Select Case iQueryId
Case miQueryIdRF1
LabelStartPower = msStartStepLabelPowerRF1

Case miQueryIdRF2
LabelStartPower = msStartStepLabelPowerRF2

#If Not TPCH_KIT Then
Case miQuery15
LabelStartPower = msStartStepLabelPower15
#End If

Case Else
LabelStartPower = msStartStepLabelPowerOther &
Format$(iQueryId, msFmtNumberPadWZeros)

```

```

End Select

End Function
Private Function LabelEndPower(iQueryId As Integer) As
String
' Returns the step label for the passed in power query
identifier
' Uses the label that marks the end of execution for the
query
' E.g. TPC-H Kit, Stream1, RF1: the start time for the
refresh function
' is the start time for the step, 'Throughput - Semaphore
Loop for RF Delay'
' but the end time for the refresh function is the end time for
the step,
' 'Throughput - Execute Stream1 RF1'
' Similarly, in the HP version of the TPC-H Kit, Throughput
Run, RF1:
' the start time for RF1 is the start time for the step,
' 'Wait for Throughput Run' but the end time for RF1 is the
end time
' for the step, 'Throughput RF1'
' E.g. in the HP version of the TPC-H Kit, query 15 is
executed in
' 2 parts. Therefore, the start time for query 15 is the start
time
' for the step, 'Create REVENUE View' but the end time for
query 15
' is the end time for the step, 'Execute using REVENUE'

#If TPCH_KIT Then
Debug.Assert iQueryId = miQueryIdRF1 Or iQueryId =
miQueryIdRF2
Select Case iQueryId
Case miQueryIdRF1
LabelEndPower = msEndStepLabelPowerRF1
Case miQueryIdRF2
LabelEndPower = msEndStepLabelPowerRF2
End Select
#Else
Debug.Assert iQueryId = miQueryIdRF1 Or iQueryId =
miQueryIdRF2 Or iQueryId = miQuery15
Select Case iQueryId
Case miQueryIdRF1
LabelEndPower = msEndStepLabelPowerRF1
Case miQueryIdRF2
LabelEndPower = msEndStepLabelPowerRF2
Case miQuery15
LabelEndPower = msEndStepLabelPower15
End Select
#End If

End Function
#If Not TPCH_KIT Then
Private Function GetEndStepIfThroughput(iQueryId As
Integer) As String
' Returns the iterator value for the passed in query identifier
' for the throughput run

```

```

' Returns the iterator value that marks the end of execution
for the query
' E.g. in the HP version of the TPC-H Kit, query 15 is
executed in
' 2 parts. Therefore, the iterator value for the start of query
15
' is 15V but the the iterator value for the end of query 15 is
15

```

```

Debug.Assert iQueryId = miQuery15
GetEndStepItThroughput = miQuery15

```

```

End Function
#End If

```

```

Private Function LabelStartThroughput(iStream As Integer, _
    iQuery As Integer) As String
' Returns the step label for the passed in query and stream in
the
' throughput run
' Returns the label that marks the start of execution for the
query
' E.g. TPC-H Kit, Stream1, RF1: the start time for the
refresh function
' is the start time for the step, 'Throughput - Semaphore
Loop for RF Delay'
' but the end time for the refresh function is the end time for
the step,
' 'Throughput - Execute Stream1 RF1'
' Similarly, in the HP version of the TPC-H Kit, Throughput
Run, RF1:
' the start time for RF1 is the start time for the step,
' 'Wait for Throughput Run' but the end time for RF1 is the
end time
' for the step, 'Throughput RF1'

```

```

#If TPCH_KIT Then
    Select Case iQuery
        Case miQueryIdRF1
            LabelStartThroughput = IIf(iStream =
miStreamPowerRun + 1, _
                msStartStepLabelThroughputRF1First, _
                msLblThroughputRF1)

        Case miQueryIdRF2
            LabelStartThroughput = msLblThroughputRF2

        Case Else
            LabelStartThroughput =
msStepLabelThroughputOther & _
                Format$(iStream, msFmtNumberWOZeroes)
    End Select
#Else
    Select Case iQuery
        Case miQueryIdRF1
            LabelStartThroughput =
msStartStepLabelThroughputRF1

        Case miQueryIdRF2

```

```

        LabelStartThroughput =
msStartStepLabelThroughputRF2

        Case Else
            LabelStartThroughput =
msStartStepLabelThroughputOther & _
                Format$(iStream, msFmtNumberPadWZeroes)
    End Select
#End If

```

```

End Function
Private Function LabelEndThroughput(iStream As Integer,
iQuery As Integer) As String
' Returns the step label for the passed in query and stream in
the
' throughput run
' Returns the label that marks the end of execution for the
query
' E.g. TPC-H Kit, Stream1, RF1: the start time for the
refresh function
' is the start time for the step, 'Throughput - Semaphore
Loop for RF Delay'
' but the end time for the refresh function is the end time for
the step,
' 'Throughput - Execute Stream1 RF1'
' Similarly, in the HP version of the TPC-H Kit, Throughput
Run, RF1:
' the start time for RF1 is the start time for the step,
' 'Wait for Throughput Run' but the end time for RF1 is the
end time
' for the step, 'Throughput RF1'

```

```

#If TPCH_KIT Then
    Select Case iQuery
        Case miQueryIdRF1
            LabelEndThroughput = msLblThroughputRF1

        Case miQueryIdRF2
            LabelEndThroughput = IIf(iStream = miStreamIdHi, _
                msLblThroughputRF2,
msEndStepLabelThroughputRF2Rest)

        Case Else
            Debug.Assert True
    End Select
#Else
    LabelEndThroughput = msEndStepLabelThroughputRF1
#End If

```

```

End Function

Private Function IteratorThroughput(iStream As Integer,
iQuery As Integer) As String
' Returns the iterator value for the passed in stream and
query
' for the throughput run
' Returns the iterator value that marks the start of execution
for the query

```

```

' E.g. in the HP version of the TPC-H Kit, query 15 is
executed in
' 2 parts. Therefore, the iterator value for the start of query
15
' is 15V but the the iterator value for the end of query 15 is
15

#If TPCH_KIT Then
    Dim iQIndex As Integer
#End If

Select Case iQuery
    Case miQueryIdRF1
        IteratorThroughput = msFirstRFIterator

    Case miQueryIdRF2
        IteratorThroughput = msFirstRFIterator

    Case Else
        #If TPCH_KIT Then
            ' The step iterates from 1 to 22 but the queries are
generated
            ' by qgen in the order that they should be executed
in.
            ' e.g. Stream1Q1.sql contains the query
corresponding to
            ' Stream 1, Query 21
            For iQIndex = miQueryIdMin To miQueryIdMax
Step 1
                If arQuerySequence(iStream, iQIndex) = iQuery
Then
                    Exit For
                End If
                Next iQIndex

                IteratorThroughput = Format$(iQIndex,
msFmtNumberWOZeroes)
            #Else
                IteratorThroughput = Format$(iQuery,
msFmtNumberWOZeroes)
                If iQuery = miQuery15 Then
                    ' Query 15 starts with the creation of the view
                    ' The query file is 15V + StreamId.sql and the
iterator
                    ' value is 15V
                    IteratorThroughput = IteratorThroughput & "V"
                End If
            #End If
        End Select

    End Function
Private Function IteratorPowerRF(iStream As Integer, iQuery
As Integer) As String
    ' Returns the iterator value for the passed in query in the
PowerRun

    Debug.Assert iQuery = miQueryIdRF1 Or iQuery =
miQueryIdRF2

```

```

Select Case iQuery
    Case miQueryIdRF1
        IteratorPowerRF = msFirstRFIterator

    Case miQueryIdRF2
        IteratorPowerRF = msFirstRFIterator

    End Select

End Function

Private Sub CollectStats()
    ' This function determines the start time, end time and start
time for
    ' the next step (if applicable) for each query in each stream

    Dim iStreamId As Integer
    Dim iParentInstId As Long
    Dim iQueryId As Integer
    Dim iNextQuery As Integer
    Dim iNextStream As Integer
    Dim sLabel As String
    Dim sIt As String
    Dim sSql As String
    Dim iUBound As Integer

    If mbRunType(eRunType.Power) Then
        ' Populate start and end times for the PowerRun
        iStreamId = miStreamPowerRun

        For iQueryId = miQueryIdMin To miQueryIdMax Step 1
label
            ' Determine the start time for the step using the step
            sLabel = LabelStartPower(iQueryId)

            sSql = "step_label = " &
MakeStringFieldValid(sLabel)

            If (iQueryId = miQueryIdRF1 Or iQueryId =
miQueryIdRF2) Then
                sIt = IteratorPowerRF(iStreamId, iQueryId)
                sSql = sSql & " and iterator_value = " &
MakeStringFieldValid(sIt)
            End If

            mrecDtls.FindFirst sSql
            If mrecDtls.NoMatch = True Then
                MsgBox "Step " & "" & sLabel & "" & " not found."
" & _
                    "The PowerRun was not completely executed!"
            End Sub
        End If

        arExecutionDtls(iStreamId, iQueryId).StartTime =
mrecDtls.Fields("start_time").Value

        ' Determine the end time for the step

```



```

    If iQueryId = miQueryIdRF1 Or iQueryId =
miQueryIdRF2 Then
    ' RF1 and RF2, find the time at which the last
refresh function
    ' completed
    sLabel = LabelEndPower(iQueryId)
    arExecutionDtls(iStreamId, iQueryId).EndTime = 0

    iUBound = IIf(iQueryId = miQueryIdRF1,
miInsSegmentsPerUpdateSet, _
miDelSegmentsPerUpdateSet)

    For iNextQuery = msFirstRFIterator To iUBound
Step 1
    sSql = "step_label = " &
MakeStringFieldValid(sLabel) & _
" and iterator_value = "
    sIt = Format$(iNextQuery,
msFmtNumberWOZeros)
    sSql = sSql & MakeStringFieldValid(sIt)
mrecDtls.FindFirst sSql
    If mrecDtls.NoMatch = True Then
        MsgBox "Step " & "" & sLabel & "" & _
" not found for iterator " & "" & sIt & ""
& ". " & _
"The PowerRun was not completely
executed!"
        Exit Sub
    End If
    If mrecDtls.Fields("end_time").Value > _
arExecutionDtls(iStreamId,
iQueryId).EndTime Then
        arExecutionDtls(iStreamId,
iQueryId).EndTime = _
mrecDtls.Fields("end_time").Value
    End If
    Next iNextQuery
    #If Not TPCH_KIT Then
    ElseIf iQueryId = miQuery15 Then
        sLabel = LabelEndPower(iQueryId)
        sSql = "step_label = " &
MakeStringFieldValid(sLabel)
mrecDtls.FindFirst sSql
        If mrecDtls.NoMatch = True Then
            MsgBox "Step " & "" & sLabel & "" & " not
found. " & _
"The PowerRun was not completely
executed!"
            Exit Sub
        End If
        arExecutionDtls(iStreamId, iQueryId).EndTime =
mrecDtls.Fields("end_time").Value
    #End If
    Else
        arExecutionDtls(iStreamId, iQueryId).EndTime =
mrecDtls.Fields("end_time").Value
    End If

```

```

    ' The timing interval for a query is the time between
the start
    ' time of the next query and the start time of the query,
except
    ' for the last query of the set for which it is the time
between
    ' the end time of the query and the start time
    ' The timing interval for the execution of the refresh
function
    ' must be measured between the start time for the first
' refresh function and the end time for the last refresh
function
    ' Refer to Sections 5.3.7.2 and 5.3.7.3 of the TPC-H
Spec. Rev 1.1.0
    If NextStepExists(iStreamId, iQueryId, iNextQuery)
Then
        ' Determine the start time of the next step, if
applicable
        sLabel = LabelStartPower(iNextQuery)

        sSql = "step_label = " &
MakeStringFieldValid(sLabel)
mrecDtls.FindFirst sSql
        If mrecDtls.NoMatch = True Then
            MsgBox "Step " & "" & sLabel & "" & " not
found. " & _
"The PowerRun was not completely
executed!"
            Exit Sub
        End If

        arExecutionDtls(iStreamId,
iQueryId).StartTimeNextStep =
mrecDtls.Fields("start_time").Value
        Else
            ' Else, initialize start time for the next step to the end
time for the step
            arExecutionDtls(iStreamId,
iQueryId).StartTimeNextStep = _
arExecutionDtls(iStreamId,
iQueryId).EndTime
        End If

        ' Convert all the 64-bit timestamps to string values
arExecutionDtls(iStreamId, iQueryId).sStartTm =
JulianToString(arExecutionDtls(iStreamId,
iQueryId).StartTime)
arExecutionDtls(iStreamId, iQueryId).sEndTm =
JulianToString(arExecutionDtls(iStreamId,
iQueryId).EndTime)
arExecutionDtls(iStreamId, iQueryId).sStartNextTm =
JulianToString(arExecutionDtls(iStreamId,
iQueryId).StartTimeNextStep)
        Next iQueryId
    End If

    If mbRunType(eRunType.Throughput) Then
        ' Populate start and end times for the ThroughputRun
        For iStreamId = miStreamIdMin + 1 To miStreamIdHi

```

```

For iQueryId = miQueryIdMin To miQueryIdMax
Step 1
    ' Determine the start time for the step using the step
    label
    sLabel = LabelStartThroughput(iStreamId,
iQueryId)
    sSql = "step_label = " &
MakeStringFieldValid(sLabel)

    #If TPCH_KIT Then
        If (iQueryId <> miQueryIdRF1 Or iStreamId <>
miStreamPowerRun + 1) Then
            sIt = IteratorThroughput(iStreamId, iQueryId)
            sSql = sSql & " and iterator_value = " &
MakeStringFieldValid(sIt)
            End If
        #Else
            If iQueryId <> miQueryIdRF1 Then
                sIt = IteratorThroughput(iStreamId, iQueryId)
                sSql = sSql & " and iterator_value = " &
MakeStringFieldValid(sIt)
                End If
            #End If

        If iQueryId = miQueryIdRF1 Or iQueryId =
miQueryIdRF2 Then
            IParentInstId = ParentInstId(iStreamId, iQueryId)
            If IParentInstId = 0 Then Exit Sub
            sSql = sSql & " and parent_instance_id = " &
CStr(IParentInstId)
            End If

            mrecDtls.FindFirst sSql
            If mrecDtls.NoMatch = True Then
                MsgBox "Step " & "" & sLabel & "" & _
                    " not found for iterator " & "" & sIt & "" &
                    ". " & _
                    "The Throughput Run was not completely
executed!"
                Exit Sub
            End If

            arExecutionDtls(iStreamId, iQueryId).StartTime =
mrecDtls.Fields("start_time").Value

            ' Determine the end time for the step

            If iQueryId = miQueryIdRF1 Or iQueryId =
miQueryIdRF2 Then
                ' RF1 and RF2, find the time at which the last
refresh
                ' function completed
                arExecutionDtls(iStreamId, iQueryId).EndTime =
0

                iUBound = IIf(iQueryId = miQueryIdRF1,
miInsSegmentsPerUpdateSet, _
miDelSegmentsPerUpdateSet)

```

```

#If TPCH_KIT Then
    sLabel = LabelEndThroughput(iStreamId,
iQueryId)
#Else
    If iQueryId = miQueryIdRF1 Then
        sLabel = LabelEndThroughput(iStreamId,
iQueryId)
    End If
#End If
IParentInstId = ParentInstIdEnd(iStreamId,
iQueryId)

#If TPCH_KIT Then
    If iQueryId = miQueryIdRF2 And iStreamId
<> miStreamIdHi Then
        sSql = "step_label = " &
MakeStringFieldValid(sLabel) & _
            " and parent_instance_id = " &
CStr(IParentInstId)

        mrecDtls.FindFirst sSql
        If mrecDtls.NoMatch = True Then
            MsgBox "Step " & "" & sLabel & "" & _
                " not found for iterator " & "" & sIt
                & "" & ". " & _
                "The Throughput run was not
completely executed!"
            Exit Sub
        End If
        arExecutionDtls(iStreamId,
iQueryId).EndTime = _
            mrecDtls.Fields("end_time").Value
    Else
#End If

    ' Find the time at which the last refresh
function completed
    For iNextQuery = msFirstRFIterator To
iUBound Step 1
        sIt = Format$(iNextQuery,
msFmtNumberWOZeroes)
        sSql = "step_label = " &
MakeStringFieldValid(sLabel) & _
            " and iterator_value = " &
MakeStringFieldValid(sIt)
            sSql = sSql & " and parent_instance_id = "
& CStr(IParentInstId)

        mrecDtls.FindFirst sSql
        If mrecDtls.NoMatch = True Then
            MsgBox "Step " & "" & sLabel & "" & _
                " not found for iterator " & "" & sIt
                & "" & ". " & _
                "The Throughput run was not
completely executed!"
            Exit Sub
        End If
        If mrecDtls.Fields("end_time").Value > _

```

```

        arExecutionDtls(iStreamId,
iQueryId).EndTime Then
        arExecutionDtls(iStreamId,
iQueryId).EndTime = _
            mrecDtls.Fields("end_time").Value
        End If
        Next iNextQuery

#If TPCH_KIT Then
    End If
#End If

#If Not TPCH_KIT Then
ElseIf iQueryId = miQuery15 Then
    sLabel = LabelStartThroughput(iStreamId,
iQueryId)
        sIt = GetEndStepIfThroughput(iQueryId)
        sSql = "step_label = " &
MakeStringFieldValid(sLabel) & _
            " and iterator_value = " &
MakeStringFieldValid(sIt)

        mrecDtls.FindFirst sSql
        If mrecDtls.NoMatch = True Then
            MsgBox "Step " & "" & sLabel & "" & _
                " not found for iterator " & "" & sIt &
"" & ". " & _
                "The Throughput run was not
completely executed!"
            Exit Sub
        End If
        arExecutionDtls(iStreamId,
iQueryId).EndTime = mrecDtls.Fields("end_time").Value
        #End If
    Else
        arExecutionDtls(iStreamId, iQueryId).EndTime =
mrecDtls.Fields("end_time").Value
        End If

' The timing interval for a query is the time between
the start
' time of the next query and the start time of the
query, except
' for the last query of the set for which it is the time
between
' the end time of the query and the start time
' The timing interval for the execution of the refresh
function
' must be measured between the start time for the
first
' refresh function and the end time for the last
refresh function
' Refer to Sections 5.3.7.2 and 5.3.7.3 of the TPC-H
Spec. Rev 1.1.0
If NextStepExists(iStreamId, iQueryId, iNextQuery)
Then
    ' Determine the start time of the next step, if
applicable
    iNextStream = iStreamId

```

```

        sLabel = LabelStartThroughput(iNextStream,
iNextQuery)
        sSql = "step_label = " &
MakeStringFieldValid(sLabel)
        #If TPCH_KIT Then
            sIt = IteratorThroughput(iNextStream,
iNextQuery)
            sSql = sSql & " and iterator_value = " &
MakeStringFieldValid(sIt)
        #Else
            sIt = IteratorThroughput(iNextStream,
iNextQuery)
            sSql = sSql & " and iterator_value = " &
MakeStringFieldValid(sIt)
        #End If

        If iQueryId = miQueryIdRF1 Or iQueryId =
miQueryIdRF2 Then
            IParentInstId = ParentInstId(iNextStream,
iNextQuery)
            If IParentInstId = 0 Then Exit Sub
            sSql = sSql & " and parent_instance_id = " &
CStr(IParentInstId)
            End If

        mrecDtls.FindFirst sSql
        If mrecDtls.NoMatch = True Then
            MsgBox "Step " & "" & sLabel & "" & _
                " not found for iterator " & "" & sIt & ""
& ". " & _
                "The Throughput run was not completely
executed!"
            Exit Sub
        End If

        arExecutionDtls(iStreamId,
iQueryId).StartTimeNextStep =
mrecDtls.Fields("start_time").Value
        Else
            ' Else, initialize start time for the next step to the
end time for the step
            arExecutionDtls(iStreamId,
iQueryId).StartTimeNextStep = arExecutionDtls(iStreamId,
iQueryId).EndTime
            End If

            ' Convert all the 64-bit timestamps to string values
            arExecutionDtls(iStreamId, iQueryId).sStartTm =
JulianToString(arExecutionDtls(iStreamId,
iQueryId).StartTime)
            arExecutionDtls(iStreamId, iQueryId).sEndTm =
JulianToString(arExecutionDtls(iStreamId,
iQueryId).EndTime)
            arExecutionDtls(iStreamId, iQueryId).sStartNextTm
= JulianToString(arExecutionDtls(iStreamId,
iQueryId).StartTimeNextStep)

        Next iQueryId
        Next iStreamId

```

```

End If

' Call a procedure to calculate the elapsed time for each step
and
' the Power and Throughput Metrics
Call CalcElapsedTmAndPrint

End Sub
Private Function JulianToString(cJTime As Currency)
' Converts the passed in 64-bit date to a formatted string
that can
' be printed in the report
' The format of date/time in reports is yyyy-mm-dd
hh:mm:ss.sss
' This format has these benefits:
' - is sortable, since all fields are arranged most to least
significant
' and all numeric
' - is directly interpreted by Excel as a time/date value
' - is fixed width
' - is Y2K compliant

Dim lYr As Long
Dim lMon As Long
Dim lDt As Long
Dim lHr As Long
Dim lMin As Long
Dim lSec As Long
Dim lMs As Long
Dim cJTemp As Currency

Call smtimelib.JulianToTime(cJTime, lYr, lMon, lDt, lHr,
lMin, lSec, lMs)
JulianToString = Format$(lYr, msFmtYrPadWZeroes) &
msDtSeparator & _
Format$(lMon, msFmtNumberPadWZeroes) &
msDtSeparator & _
Format$(lDt, msFmtNumberPadWZeroes) & msBlank
& _
Format$(lHr, msFmtNumberPadWZeroes) &
msTmSeparator & _
Format$(lMin, msFmtNumberPadWZeroes) &
msTmSeparator & _
Format$(lSec, msFmtNumberPadWZeroes) &
msMsSeparator & _
Format$(lMs, msFmtMsPadWZeroes)

End Function
Public Sub LoadRunIds(cboLoad As ComboBox, sDbFile As
String)
' Opens the passed in workspace definition file and loads all
the
' run identifiers in the passed in combo box

Dim strSql As String
Dim lRunId As Long

On Error GoTo LoadRunIdsErr

```

```

Screen.MousePointer = vbHourglass

Set mwrkJet = CreateWorkspace("tpch", "admin",
gsEmptyString, dbUseJet)

' Open database for exclusive access
Set mDB = mwrkJet.OpenDatabase(sDbFile,
Options:=True)

strSql = "select run_id from run_header order by run_id
desc"
Set mrecDtls = mDB.OpenRecordset(strSql,
dbOpenSnapshot)

cboLoad.Clear

If mrecDtls.RecordCount = 0 Then
Screen.MousePointer = vbDefault
MsgBox "There are no run records. Unable to load list of
run ids."
Else
mrecDtls.MoveFirst
While Not mrecDtls.EOF
' Add run identifier to the combo box
lRunId = mrecDtls.Fields("run_id").Value
cboLoad.AddItem CStr(lRunId)

mrecDtls.MoveNext
Wend
If cboLoad.ListCount > 0 Then
cboLoad.ListIndex = 0
End If
End If

mrecDtls.Close
CloseDbAndWsp

Screen.MousePointer = vbDefault

Exit Sub

LoadRunIdsErr:

Screen.MousePointer = vbDefault
DisplayErrors

CloseDbAndWsp

End Sub
Public Sub LoadSFAndStreams(cboSF As ComboBox,
cboStreams As ComboBox)
' Loads all the valid scale factors in cboSF
' Loads the number of throughput streams for each scale
factor in
' cboStreams
' This procedure assumes that the arrays, marrSF and
marrStreams have
' already been initialized.

```

```

Dim iIndex As Integer

On Error GoTo LoadSFAndStreamsErr

cboSF.Clear
cboStreams.Clear

For iIndex = LBound(marrSF) To UBound(marrSF)
    cboSF.AddItem CStr(marrSF(iIndex))
    cboSF.ItemData(iIndex) = iIndex

    cboStreams.AddItem CStr(marrStreams(iIndex))
    cboStreams.ItemData(iIndex) = iIndex
Next iIndex

cboSF.ListIndex = miDefaultSF
cboStreams.ListIndex = miDefaultSF

Exit Sub

LoadSFAndStreamsErr:

    DisplayErrors

End Sub

Private Function NextStepExists(iStream As Integer, iQuery
As Integer, _
    iNextQuery As Integer) As Boolean
    ' Returns False if this is the last step in the query stream
    ' If not, populates iNextQuery with the index of the next
    query

    Dim iQIndex As Integer

    If iQuery = miQueryIdRF1 Or iQuery = miQueryIdRF2
Then
        NextStepExists = False
    Else
        For iQIndex = LBound(arQuerySequence,
miDimensionQuery) _
            To UBound(arQuerySequence, miDimensionQuery)
Step 1
            If arQuerySequence(iStream, iQIndex) = iQuery Then
                Exit For
            End If
        Next iQIndex

        NextStepExists = (iQIndex < UBound(arQuerySequence,
miDimensionQuery))

        If NextStepExists Then
            iNextQuery = arQuerySequence(iStream, iQIndex + 1)
        End If
    End If

End Function

Private Sub PrintStatistics(fQppPower As Double,
fElapsedThroughput As Double, _

```

```

    fQppThroughput As Double, fQppH As Double,
sStartTm As String, _
    sEndTm As String)
    ' This function prints the execution statistics for each step
    ' and the Power and Throughput Metrics to the output file

    Dim iQIndex As Integer
    Dim iSIndex As Integer
    Dim sPrint As String
    Dim hOutputFile As Integer

    hOutputFile = 0

    hOutputFile = FreeFile
    Open msOutput For Output Shared As hOutputFile
    ' Header information
    Print #hOutputFile, "Workspace file:" & vbTab &
msDbFile
    Print #hOutputFile, "Run identifier:" & vbTab &
CStr(mlRunId)
    Print #hOutputFile, "Database Scale Factor:" & vbTab &
CStr(mfSF)
    Print #hOutputFile, "Query Streams for Throughput Test:"
& vbTab & CStr(miStreamIdHi)
    Print #hOutputFile, "Measurement Interval in Throughput
Test (Ts):" & vbTab & CStr(fElapsedThroughput) & vbTab &
vbTab & _
        "Start Time: " & vbTab & sStartTm & vbTab
& vbTab & _
        "End Time: " & vbTab & sEndTm
    Print #hOutputFile, "TPC-H Power:" & vbTab &
CStr(fQppPower)
    Print #hOutputFile, "TPC-H Throughput:" & vbTab &
CStr(fQppThroughput)
    Print #hOutputFile, "TPC-H Composite Query-Per-Hour
Rating (QphH):" & vbTab & CStr(fQppH)
    Print #hOutputFile,

    ' Print Query names in column header
    Print #hOutputFile, vbTab;

    For iQIndex = miQueryIdMin To miQueryIdRF1 - 1
        sPrint = "Q" & Format$(iQIndex,
msFmtNumberWOZeros) & vbTab
        Print #hOutputFile, sPrint;
    Next iQIndex

    For iQIndex = miQueryIdRF1 To miQueryIdRF2
        sPrint = "RF" & Format$(iQIndex - miQueryIdRF1 + 1,
msFmtNumberWOZeros) & vbTab
        Print #hOutputFile, sPrint;
    Next iQIndex

    Print #hOutputFile,

    ' Print TPC-H timing intervals for each query in timing grid
    For iSIndex = miStreamIdLo To miStreamIdHi

```

```

sPrint = "Stream " & Format$(iSIndex,
msFmtNumberPadWZeroes) & vbTab
Print #hOutputFile, sPrint;

For iQIndex = miQueryIdMin To miQueryIdMax Step 1

    sPrint = CStr(arExecutionDtls(iSIndex,
iQIndex).ElapsedTpch) & vbTab
    Print #hOutputFile, sPrint;
    Next iQIndex

Print #hOutputFile,

Next iSIndex

Print #hOutputFile,
Print #hOutputFile, "Elapsed times for each step"
Print #hOutputFile,

' Print elapsed times for each query in timing grid
For iSIndex = miStreamIdLo To miStreamIdHi

    sPrint = "Stream " & Format$(iSIndex,
msFmtNumberPadWZeroes) & vbTab
    Print #hOutputFile, sPrint;

    For iQIndex = miQueryIdMin To miQueryIdMax Step 1

        sPrint = CStr(arExecutionDtls(iSIndex,
iQIndex).ElapsedTime) & vbTab
        Print #hOutputFile, sPrint;
        Next iQIndex

    Print #hOutputFile,

Next iSIndex

Print #hOutputFile,
Print #hOutputFile, vbTab & "Query Id" & vbTab & "Start
Time" & vbTab & _
    "End Time" & vbTab & "Start Next Step" & vbTab &
"Step Delta" & vbTab & _
    "Official Query Elapsed" & vbTab & "Difference"

' Print step execution details, viz. start time, end time,
TPCH timing
' interval and elapsed times for each query
For iSIndex = miStreamIdLo To miStreamIdHi

    sPrint = "Stream " & Format$(iSIndex,
msFmtNumberPadWZeroes)
    Print #hOutputFile, sPrint;

    For iQIndex = miQueryIdMin To miQueryIdMax Step 1

        sPrint = vbTab & CStr(iQIndex) & vbTab & _
            arExecutionDtls(iSIndex, iQIndex).sStartTm &
vbTab & _

```

```

arExecutionDtls(iSIndex, iQIndex).sEndTm &
vbTab & _
            arExecutionDtls(iSIndex, iQIndex).sStartNextTm
& vbTab & _
            CStr(arExecutionDtls(iSIndex,
iQIndex).ElapsedTime) & vbTab & _
            CStr(arExecutionDtls(iSIndex,
iQIndex).ElapsedTpch) & vbTab & _
            Round(CStr(arExecutionDtls(iSIndex,
iQIndex).ElapsedTpch - arExecutionDtls(iSIndex,
iQIndex).ElapsedTime), miNumDecimalPlaces)
        Print #hOutputFile, sPrint
        Next iQIndex

    Print #hOutputFile,

Next iSIndex

Close hOutputFile
hOutputFile = 0

MsgBox "The report has been generated at " & gsSQ &
msOutput & gsSQ & "!"

Exit Sub

GenerateSelectedErr:
DisplayErrors

If hOutputFile <> 0 Then
    Close hOutputFile
End If

End Sub
Public Sub SFChanged()

    ' Called when the scale factor is changed - modifies the
number
' of streams depending on the scale factor
frmTPCHMetrics.cboStreams.ListIndex =
frmTPCHMetrics.cboSF.ListIndex

End Sub

```

Utility.bas

```

Attribute VB_Name = "Utility"
' FILE: Utility.bas
' Reporting Program for Microsoft TPC-H Kit Ver.
1.00
' Copyright Microsoft, 1999
' All Rights Reserved
'
' PURPOSE: Utility functions for TPCHMetrics report
generation program
' Contact: Reshma Tharamal (reshmat@microsoft.com)

```

Option Explicit

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

Public Const MAX_PATH = 255
Public Const gsEmptyString As String = ""
Public Const gsSQ As String = """"
Public Const gsPeriod As String = "."
Public Const gsDefDBFileExt As String = ".stp"
Public Const gsFileSeparator = "\"
Public Const gsPipe = "|"
Public Const gsNullValue = "null"

Private Const ms_DLG_TITLE_OPEN = "Open"

Private Enum EOpenFile
OFN_OVERWRITEPROMPT = &H2
OFN_HIDEREADONLY = &H4
OFN_FILEMUSTEXIST = &H1000
OFN_EXPLORER = &H80000
End Enum

Private Const ml_FILE_DB_FLAGS =
OFN_FILEMUSTEXIST
' Note: The flag below is meaningless, since it doesn't work
for open file dialogs
Private Const ml_FILE_OUTPUT_FLAGS =
OFN_OVERWRITEPROMPT

Private Const ms_FILE_ALL_FILTER = "|All Files (*.*)*.*)"

Private Const ms_FILE_DB_FILTER = "Stepmaster
Workspace Files (*.\" & gsDefDBFileExt & ")|*" &
gsDefDBFileExt
Private Const ms_FILE_OUTPUT_FILTER = "Text Files
(*.txt)|*.txt"
Public Function MakeStringFieldValid(strField As String) As
String
' Returns a string that can be appended to any insert
' or modify (sql) statement

' It checks whether the text is empty
' If so, it returns the string, "null"
If strField = gsEmptyString Then
MakeStringFieldValid = gsNullValue
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
MakeStringFieldValid = ReplaceSubString(strField,
gsSQ, gsSQ & gsSQ)

' Replace pipe characters with the corresponding chr
function
MakeStringFieldValid = ReplaceSubString(strField,
gsPipe, "" & Chr(124) & "")

' Enclose the string in single quotes
MakeStringFieldValid = gsSQ & strField & gsSQ

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

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

End Function

Public Function ShowFileDialog(ByVal strFilter As
String, _

```

    ByVal strDialogTitle As String, ByVal lngFlags As
Long, _
    Optional ByVal strOldFile As String = gsEmptyString)
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 ShowFileDialogErr

If Not strOldFile <> gsEmptyString Then
    intPos = InstrR(strOldFile, gsPeriod)
    If intPos > 0 Then
        strInitDir = Left$(strOldFile, intPos - 1)
    End If
End If

With opfile
    .StructSize = 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
    ShowFileDialog = Left$(opfile.lpstrFile,
InStr(opfile.lpstrFile, vbNullChar) - 1)
Else
    ShowFileDialog = strOldFile
End If

Exit Function

ShowFileDialogErr:
    Call DisplayErrors
    ' Reset the selection to the passed in file, if any
    ShowFileDialog = strOldFile

End Function
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

intPrev = intPos
intPos = InStr(1, strMain, strSearch)

Do While intPos > 0
    intPrev = intPos
    intPos = InStr(intPos + 1, strMain, strSearch)

```

```

Loop
InstrR = intPrev

End Function
Private Function MakeWindowsFilter(sFilter As String) As
String

Dim s As String, ch As String, iTemp As Integer

' 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

End Function
Public Function BrowseStpFile(ByVal strDefaultFile As
String) 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 ShowFileDialog to set these properties
and
' display the File Open dialog to the user

On Error GoTo BrowseStpFileErr

BrowseStpFile = ShowFileDialog( _
    ms_FILE_DB_FILTER & ms_FILE_ALL_FILTER, _
    ms_DLG_TITLE_OPEN, _
    ml_FILE_DB_FLAGS, _
    strDefaultFile)

Exit Function

BrowseStpFileErr:
    DisplayErrors
    BrowseStpFile = gsEmptyString

End Function
Public Function BrowseOutputFile(ByVal strDefaultFile As
String) 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 ShowFileDialog to set these properties
and
' display the File Open dialog to the user

```



```

On Error GoTo BrowseOutputFileErr

BrowseOutputFile = ShowFileOpenDialog( _
    ms_FILE_OUTPUT_FILTER &
ms_FILE_ALL_FILTER, _
    ms_DLG_TITLE_OPEN, _
    ml_FILE_OUTPUT_FLAGS, _
    strDefaultFile)

Exit Function

BrowseOutputFileErr:
    DisplayErrors
    BrowseOutputFile = gsEmptyString

End Function

Public Function MakePathValid(strFileName As String) As
String
    ' Makes the passed in file path valid

    Dim strFileDir As String
    Dim strTempDir As String
    Dim strTempFile As String
    Dim sTemp As String
    Dim intPos As Integer
    Dim intStart As Integer

    strTempFile = strFileName
    intPos = InstrR(strFileName, gsFileSeparator)

    If intPos > 0 Then
        strFileDir = Left$(strTempFile, intPos - 1)
        If Dir$(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, gsFileSeparator)
            If Mid(strFileDir, 2, 1) = ":" Then
                ' Remove drive from directory specification
                intStart = InStr(intStart + 1, strFileDir,
gsFileSeparator)
            End If

            Do While strTempDir <> strFileDir

                If intStart > 0 Then
                    strTempDir = Left$(strFileDir, intStart - 1)
                Else
                    strTempDir = strFileDir
                End If

                If 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
            End If
        End If
    End If

```

```

        intStart = InStr(intStart + 1, strFileDir,
gsFileSeparator)
    Loop

    ' Sanity check
    If Dir$(strFileDir, vbDirectory) <> "" Then
        ' We were unable to create the file directory
        MsgBox "Unable to create directory " & strFileDir
        MakePathValid = gsEmptyString
    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

End Function

```

MoveTempDB.sql

```

--
-- Copyright (c) 1999-2000 Intel Corporation
--
-- MoveTemp.sql

alter database tempdb modify file
    (name='tempdev',filename='T:\TempdB.mdf')

alter database tempdb modify file
    (name='templog',filename='T:\Templog.ldf')

```

AddTempDB.sql

```

alter database tempdb modify file
    (name=tempdev, filename='T:\TempdB.mdf,size=30000mb)
alter database tempdb modify file
    (name=templog, filename='T:\Templog.ldf,size=30000mb)
alter database tempdb add file
    (name=tempdev2, filename='U:\tempdev_2',size=15000mb),
    (name=tempdev3, filename='U:\tempdev_3',size=15000mb),
    (name=tempdev4, filename='U:\tempdev_4',size=15000mb),
    (name=tempdev5, filename='U:\tempdev_5',size=15000mb),
    (name=tempdev6, filename='X:\tempdev_6',size=15000mb),
    (name=tempdev7, filename='X:\tempdev_7',size=15000mb),
    (name=tempdev8, filename='F:\tempdev_8',size=15000mb),
    (name=tempdev9, filename='F:\tempdev_9',size=15000mb),

```

(name=tempdev10,
filename='Z:\tempdev_10',size=15000mb),
(name=tempdev11, filename='Z:\tempdev_11',size=15000mb)

Appendix G: Price Quotations

July 6, 2006

Dell
 Gene Purdy
 1 Dell Way
 Round Rock, TX 78664

Mr. Purdy:

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
810-04793	SQL Server 2005 Enterprise x64 Edition <i>Server License with 25 CALs</i> <i>Discount Schedule: Open Program - No Level</i> <i>Unit Price reflects a 39% discount from the retail unit price of \$13,969.</i>	\$8,487	1	\$8,487
359-01911	SQL Server 2005 Client License <i>Discount Schedule: Open Program - No Level</i> <i>Unit Price reflects a 4% discount from the retail unit price of \$163.</i>	\$156	25	\$3,900
P72-00274	Windows Server 2003 Enterprise x64 Edition <i>Server License Only - No CALs</i> <i>Discount Schedule: Open Program - No Level</i> <i>Unit Price reflects a 42% discount from the retail unit price of \$3,999.</i>	\$2,334	1	\$2,334
254-00170	Visual C++ Standard Edition <i>No Discounts Applied</i>	\$109	1	\$109
046-00856	Visual Basic 2003 .Net Professional <i>No Discounts Applied</i>	\$109	1	\$109
N/A	Microsoft Problem Resolution Services <i>Professional Support</i> <i>(1 Incident)</i>	\$245	1	\$245

All products are currently orderable through Microsoft's normal distribution channels. A list of Microsoft's authorized resellers can be found at:
<http://www.microsoft.com/products/info/render.aspx?view=22&type=mpn&content=22/licensing>.

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.

If we can be of any further assistance, please contact Jamie Reding at (425) 703-0510 or jamiere@microsoft.com.

Reference ID: PHgepu0604051336.

Please include this Reference ID in any correspondence regarding this price quote.