



TPC Benchmark™ H
Full Disclosure Report
DELL PowerEdge T610/Quad-Core Intel® Xeon™
X5570/2.93GHz
8MB L2 Cache
Using
Microsoft Windows Server 2008 Enterprise x64 Edition™
SP1
and SQL Server 2008 Enterprise x64 Edition™ SP1

First Edition

Submitted for Review

June 2, 2009

Dell Inc. PowerEdge T610 Server with Microsoft Windows Server 2008 Enterprise x64 Edition SP1 and SQL Server 2008 Enterprise x64 Edition SP1

First Printing June 2009

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Abstract

This report document the methodology and results of the TPC Benchmark H test conducted on a PowerEdge T610 Server using Microsoft SQL Server 2008 Enterprise x64 Edition SP1 in conformance with the requirements of the TPC-H Benchmark Specification. The operating system used for the benchmark was Windows Server 2008 Enterprise x64 Edition SP1. The application was written in C and compiled using the Visual Studio Professional Edition compiler.

Hardware	Software	Total System Cost
Dell PowerEdge T610 with Dual Intel® Xeon™ X5570 QC 2.93GHz w/ 8M Cache FusionIO ioDrive	Microsoft Windows Server 2008 Enterprise x64 Edition™ SP1 SQL Server 2008 Enterprise x64 Edition™ SP1	\$41,998

TPC-H Power@100GB	TPC-H Throughput@100GB	<u>QphH@100GB</u>	\$/QphH@100GB
38,550.7	21,475.1	28,772.9	\$1.46

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 T610
 with SQL Server 2008 Enterprise
 x64 Edition™ SP1

TPC-H Revision 2.8.0

Report Date: **June 2, 2009**

Revision Date: **June 2, 2009**

Total System Cost
\$41,998 USD

TPC-H Composite Query per Hour
28,772.9 QphH@100GB

Price/Performance
\$1.46 USD/ QphH@100GB

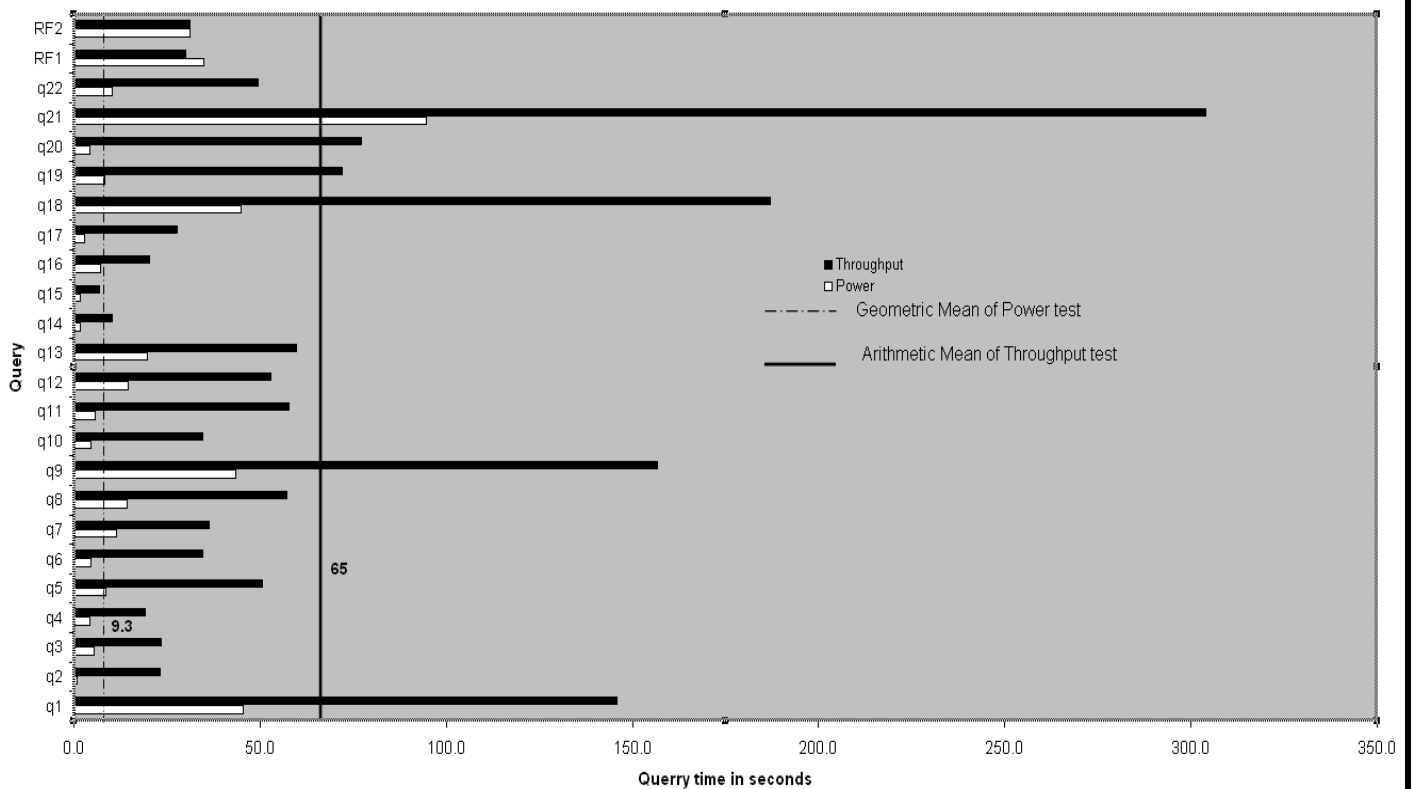
Database Size
100GB

Database Manager
 SQL Server 2008 Enterprise x64
 Edition™ SP1

Operating System
 Microsoft Windows Server
 2008 Enterprise x64
 Edition™ SP1

Other Software
 Visual C++ 2008
 Visual Studio Standard 2005

Availability Date
June 2, 2009



Database Load Time
 3:43:30

Total Disk/Database Size
 8.4

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 Intel® Xeon™ X5570 QC 2.93GHz w/ 8M L2 Cache
Memory: (per node) : 48GB RAM
Disk Drives: 4 FusionIO 80GB ioDrives & 8 – 73GB 15k SAS HDD

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



PowerEdge T610

TPC-H REV 2.7 EXECUTIVE SUMMARY

Server

Report Date: 02-June-09

Revision Date: 02-June-09

Description	Part Number	Third Party	Unit Price	Qty	Extended Price	3 yr. Maint. Price	
Server Hardware		Brand	Pricing				
PEt610 Tower Chasis, Up to 8 2.5in HDD & 2 Broadcom NICs	224-4854		\$849.00	1	\$849.00	\$540.00	
X5570, 2.93GHz, 8M, XN, 6.40GT/S Processor	317-0254		\$1,799.00	2	\$3,598.00		
HO Pwr Sply, Non-Redundant, 870W UPG	330-3550		\$30.00	1	\$30.00		
48GB, 12x4GB, 1066MH, 2R RDIMM, 2P, OPTIMIZED	317-0239		\$2,092.00	1	\$2,092.00		
PERC6i SAS RAID, Internal, Bat	341-5699		\$299.00	1	\$299.00		
73GB, SAS, 2.5-inch, 15K RPM HD	341-4727		\$339.00	8	\$2,712.00		
DELL E157FP, 15 IN, 15.0 VIS	320-5090		\$189.00	1	\$189.00		
				Subtotal	\$9,769.00	\$540.00	
Server Storage							
Fusion IO IoDrive 80GB	A2595165		\$3,591.00	6	\$21,546.00	\$0.00	
				Subtotal	\$21,546.00	\$0.00	
Server Software							
SQL Server 2008 Enterprise x64 Edition	810-07580	Microsoft	1	\$8,487.00	1	\$8,487.00	
SQL Server 2008 Client Licence **	359-01912	Microsoft	1	156	25	\$3,900.00	
Windows Server 2008 Enterprise x64 Server **	P72-03195	Microsoft	1	\$2,357.00	1	\$2,357.00	
Visual Studio Standard 2005	127-00012	Microsoft	1	\$250.00	1	\$250.00	
Professional Support (1 Incident)		Microsoft	1	\$245.00	1	\$245.00	
				Subtotal	\$14,994.00	\$245.00	
All components from Dell are discounted 16% based on total dollar volume of this configuration.			Other Discounts (16%)		\$5,096.80		
					Total	\$41,212	\$785
Notes:				Three-Year Cost of Ownership:		\$41,998 USD	
** All Microsoft maintenance is covered by the maintenance costs of Microsoft SQL Server							
Pricing: NIO = These components are Not Immediately Orderable; 1 = Microsoft, all others are Dell				OphH@100G		28,772.9	
Pricing may be verified by calling 1-800-BUY-DELL and referencing quote # 489414805 as a complex quote.							
Audited by Lorna Livingtree, Performance Metrics Inc.				\$ / OphH@100G:		\$1.46 USD	
<p>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.</p>							



DELL
PowerEdge T610
w/ SQL Server 2008 Enterprise
x64 Edition™ SP1

TPC-H Revision 2.8.0

Report Date: **June 2, 2009**

Revision Date: **June 2, 2009**

Numerical Quantities Summary

Measurement Results:

Database Scale Factor	100
Total Data Storage/Database Size	8.4
Start of Database Load	2009-05-06 08:33:41
End of Database Load	2009-05-06 12:17:11
Database Load Time	3:43:30
Query Streams for Throughput Test	5
TPC-H Power	38,550.7
TPC-H Throughput	21,475.1
TPC-H Composite Query-per-Hour Metric (QpH@100GB)	28,772.9
Total System Price Over 3 Years	\$41,998
TPC-H Price Performance Metric (\$/QpH@100GB)	\$1.46

Measurement Interval:

Measurement Interval in Throughput Test (Ts) = 1,844 seconds

Duration of stream execution:

	Seed	Start Date/Time	End Date/Time	Duration
Stream00	506121711	5/6/09 13:11:12	5/6/09 13:17:11	0:05:59
Stream01	506121712	5/6/09 13:17:43	5/6/09 13:43:12	0:25:29
Stream02	506121713	5/6/09 13:17:43	5/6/09 13:42:24	0:24:41
Stream03	506121714	5/6/09 13:17:43	5/6/09 13:42:10	0:24:27
Stream04	506121715	5/6/09 13:17:43	5/6/09 13:43:06	0:25:23
Stream05	506121716	5/6/09 13:17:43	5/6/09 13:43:16	0:25:33
Refresh00		5/6/09 13:10:29	5/6/09 13:11:04	0:00:35
		5/6/09 13:17:11	5/6/09 13:17:42	0:00:31
Refresh01		5/6/09 13:43:17	5/6/09 13:44:17	0:01:00
Refresh02		5/6/09 13:44:18	5/6/09 13:45:17	0:00:59
Refresh03		5/6/09 13:45:18	5/6/09 13:46:21	0:01:03
Refresh04		5/6/09 13:46:21	5/6/09 13:47:22	0:01:01
Refresh05		5/6/09 13:47:23	5/6/09 13:48:27	0:01:04



Numerical Quantities Summary

Timing Intervals in Seconds:

Query	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8
Stream00	45.6	0.9	5.3	4.2	8.7	4.7	11.5	14.4
Stream01	120.0	23.3	32.0	7.0	23.3	53.4	23.3	67.9
Stream02	148.4	6.8	19.4	7.3	65.3	17.5	25.3	115.3
Stream03	145.1	51.6	17.2	5.6	34.1	76.7	27.2	36.9
Stream04	170.6	3.5	27.2	44.5	102.4	8.8	44.3	26.8
Stream05	145.3	30.4	22.1	31.1	28.3	16.2	60.9	38.8
Min Qi	170.6	51.6	32.0	44.5	102.4	76.7	60.9	115.3
Max Qi	45.6	0.9	5.3	4.2	8.7	4.7	11.5	14.4
Avg Qi	129.2	19.4	20.5	16.6	43.7	29.6	32.1	50.0
Query	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16
Stream00	43.5	4.7	5.7	14.5	19.6	1.6	1.7	7.2
Stream01	108.9	21.1	29.0	39.0	111.8	5.6	6.1	28.1
Stream02	254.2	100.8	24.9	47.0	46.6	12.7	6.9	19.0
Stream03	110.4	28.8	79.4	46.9	64.2	19.1	7.6	17.8
Stream04	185.3	11.7	73.5	33.7	35.6	7.9	6.2	18.2
Stream05	124.4	11.0	81.5	97.6	40.4	6.3	7.3	18.7
Min Qi	254.2	100.8	81.5	97.6	111.8	19.1	7.6	28.1
Max Qi	43.5	4.7	5.7	14.5	19.6	1.6	1.7	7.2
Avg Qi	137.8	29.7	49.0	46.5	53.0	8.9	6.0	18.2
Query	Q17	Q18	Q19	Q20	Q21	Q22	RF1	RF2
Stream00	2.9	44.8	8.3	4.2	94.6	10.3	34.9	31.3
Stream01	8.5	221.9	96.5	112.5	337.7	52.5	29.4	30.4
Stream02	27.9	100.6	34.2	84.7	281.2	34.5	28.7	30.8
Stream03	58.7	235.5	77.2	9.8	281.7	35.9	30.6	32.0
Stream04	26.6	189.4	90.7	94.5	279.0	43.0	29.3	31.4
Stream05	16.6	188.0	61.4	84.9	340.4	81.6	31.6	31.5
Min Qi	58.7	235.5	96.5	112.5	340.4	81.6	34.9	32.0
Max Qi	2.9	44.8	8.3	4.2	94.6	10.3	28.7	30.4
Avg Qi	23.5	163.4	61.4	65.1	269.1	43.0	30.8	31.2

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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 T610 Server, depicted in the next diagram consists of:

- 2 - Intel® Xeon™ X5570 QC 2.93GHz 8MB L2 Cache.
- 48GB RAM.
- 4 – FusionIO 80GB ioDrive cards
- 8 – 73GB, 3GBPS 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.

PowerEdge T610

2-Intel® Xeon™ X5570 QC 2.93GHz
8MB L2 Cache
48GB Memory
4xFusionIO 80GB ioDrives
8x73GB, 3GBPS, 15k SAS

DBMS

SQL Server 2008 Enterprise
x64 Edition SP1

OS

Microsoft Windows Server
2008 Enterprise x64 Edition SP1

PowerEdge T610



Storage

No enclosures were used.

Measured Configuration

PowerEdge T610

2-Intel® Xeon™ X5570 QC 2.93GHz
8MB L2 Cache
48GB Memory
4xFusionIO 80GB ioDrives
8x73GB, 3GBPS, 15k SAS

DBMS

SQL Server 2008 Enterprise
x64 Edition SP1

OS

Microsoft Windows Server
2008 Enterprise x64 Edition SP1

PowerEdge T610



Storage

No enclosures were used.

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 2.8.0 of DBGEN and version 2.8.0 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 2.8.0 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 onboard enclosure containing re-do log files was removed. As all re-do log files resided on RAID 10 volumes, the test continued uninterrupted. Next, an ioDrive was detached and a checkpoint submitted. Errors followed and the test was halted. The transaction log was backed 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:

- 4 x 80GB FusionIO ioDrives
- 8 x 73GB, 3GBPS, 15k rpm, SAS disk drives

4 logical volumes were configured each spanning 1 80GB FusionIO ioDrive in a RAID0 formation. The server had 8 73GB SAS disks onboard for both the OS and database logs. Each logical volume had 1 NTFS partition. Each logical volume had 8 database filegroups on an NTFS partition and an NTFS partition for flat file and database backup storage. Volume3 had an additional NTFS partition for rf flat file storage.

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

Distribution of Storage

Windows 2008 Disk Administration	FusionIO ioDrive Configuration
Disk 0 74.93 GB	ioDrive # 0
NTFS Partition	Slot# 1
D:\mounthead\Fusion1	74.93 GB

Windows 2008 Disk Administration	FusionIO ioDrive Configuration
Disk 1 74.93 GB	ioDrive # 1
NTFS Partition	Slot# 2
D:\mounthead\Fusion1	74.93 GB

Windows 2008 Disk Administration	FusionIO ioDrive Configuration
Disk 2 74.93 GB	ioDrive # 2
NTFS Partition	Slot# 3
D:\mounthead\Fusion1	74.93 GB

Windows 2008 Disk Administration	FusionIO ioDrive Configuration
Disk 3 74.93 GB	ioDrive # 3
NTFS Partition	Slot# 4
D:\mounthead\Fusion1	74.93 GB

Windows 2003 Disk Administration			DELL PERC 6/I Configuration			
Disk 3 767.6 GB			Controller # 1			
Partition			Slot# 1	Channels		
1	2	3	SAS ID	A		
C: OS NTFS 40 GB	L: DB Logs NTFS 20 GB	D: Backup NTFS 211 GB	0	A0-1		
			1	A0-2		
			2	A0-3		
			3	A0-4		
			4	A0-5		
			5	A0-6		
			6	A0-7		
			7	A0-8		

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 2.8.0 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 3 hours 43 minutes 30 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

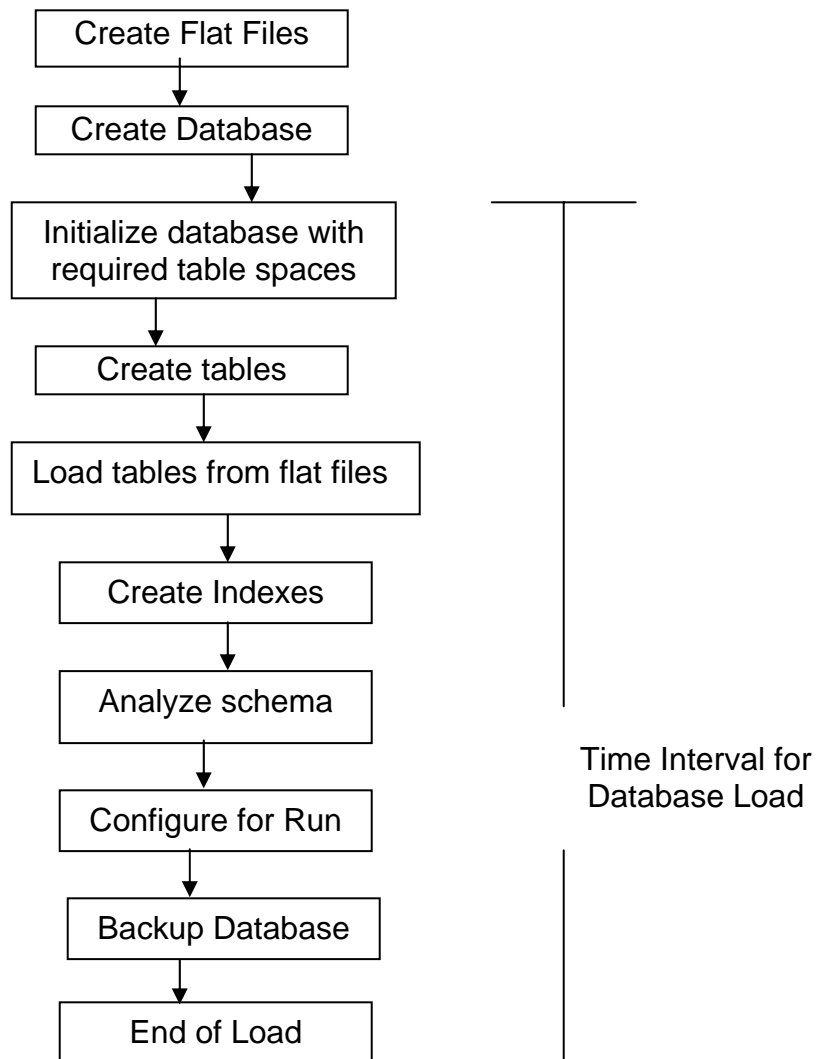
Disk Type	Number of Disks	Space per Disk	Subtotal Disk Space	Total Disk Storage	Data Storage Ratio
80GB	4	74.93GB	6006.6GB	299.72	
73GB 15k	8	67.75GB	542GB	272.96	
				841.72GB	8.4

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 1,844 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	39,260.7	21,663.0	29,163.4
2	38,550.7	21,475.1	28,772.9
Percent Difference	0.98%	0.99%	0.99%

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 not 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 Inc. 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 the Availability Date.

Orderability Date

For each of the components that are not orderable on the report date of the FDR, the following information must be included in the FDR:

- *Name and part number of the item that is not orderable*
- *The date when the component can be ordered (on or before the Availability Date)*
- *The method to be used to order the component (at or below the quoted price) when the date arrives*
- *The method for verifying the price*

Some components used in this benchmark are not orderable at the time of this publication. These items will be orderable on or before the stated Availability Date in this submission. For specific information regarding the orderable dates and prices of these items, please refer to the table below:

Orderable Information

Description	Part #	Order Date	Order Method	Price Verification
NA	NA	NA	1-800-BUY-DELL	Note 1
NA	NA	NA	1-800-BUY-DELL	Note 1

Note 1: These parts are not yet immediately orderable. For price verification before the stated Availability Date, please contact the Dell COC Pricing Department at: (512) 724-8493.

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) 482-0575
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



May 20, 2009

Mr. Gene Purdy
Dell, Inc.
One Dell Way
Round Rock, TX 78682

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

Platform: Dell PowerEdge T610
Database Manager: Microsoft SQL Server 2008 Enterprise x64 Edition
Operating System: Microsoft Windows Server 2008 Datacenter x64 Edition

CPU's	Memory	Total Disks	Qpph@ 100GB	QthH@100GB	QphH@100GB
2 Intel Xeon @ 2.93 Ghz	48 GB	4 @ 80 GB (SSD) 8 @ 73 GB	38,550.7	21,475.1	28,772.9

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 100 GB using DBGEN. The version of DBGEN was 2.8.0.
- The sample data produce by DBGEN was successfully compared to the reference data for this scale factor.
- The qualification database layout was identical to the tested database except for the number and size of the files.
- The query text was verified to use only compliant variants and minor modifications.
- The executable query text was generated by QGEN and submitted through SQL Server's standard interactive interface. The version of QGEN was 2.8.0. The sample parameters produced by QGEN were successfully compared to the reference data for this scale factor.
- 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 demonstrated and verified.
- The system pricing was checked for major components and maintenance and correct quotes.
- The executive summary pages of the FDR were verified for accuracy.

Auditor Notes:

None

Sincerely,

A handwritten signature in black ink that reads "Lorna Livingtree". The signature is written in a cursive, flowing style.

Lorna Livingtree
Auditor

Appendix A: Tunable Parameters

Server Configuration Parameters

Microsoft Windows 2008 Server Parameters

Microsoft SQL Server 2008 Startup Parameters

Microsoft SQL Server was started with the following command line options

```
sqlservr -c -x -E -T834 -T2301 -T2442
```

Microsoft SQL Server 2008 Configuration Parameters

name	minimum	maximum	run_value
access check cache bucket count	0	65536	0
access check cache quota	0	2147483647	0
Ad Hoc Distributed Queries	0	1	0
affinity I/O mask	-2147483648	2147483647	0
affinity mask	-2147483648	2147483647	65535
affinity64 I/O mask	-2147483648	2147483647	0
affinity64 mask	-2147483648	2147483647	0
Agent XPs	0	1	1
allow updates	0	1	1
awe enabled	0	1	1
backup compression default	0	1	0
blocked process threshold (s)	0	86400	0
c2 audit mode	0	1	0
clr enabled	0	1	0
common criteria compliance enabled	0	1	0
cost threshold for parallelism	0	32767	0
cross db ownership chaining	0	1	0
cursor threshold	-1	2147483647	-1
Database Mail XPs	0	1	0
default full-text language	0	2147483647	1033
default language	0	9999	0
default trace enabled	0	1	0
disallow results from triggers	0	1	0
EKM provider enabled	0	1	0
filestream access level	0	2	0
fill factor (%)	0	100	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
index create memory (KB)	704	2147483647	0
in-doubt xact resolution	0	2	0
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)	-1	2147483647	65536
max worker threads	128	32767	3200
media retention	0	365	0
min memory per query (KB)	512	2147483647	512
min server memory (MB)	0	2147483647	0
nested triggers	0	1	1
network packet size (B)	512	32767	32767
Ole Automation Procedures	0	1	0
open objects	0	2147483647	0
optimize for ad hoc workloads	0	1	0
PH timeout (s)	1	3600	60
precompute rank	0	1	0
priority boost	0	1	1
query governor cost limit	0	2147483647	0
query wait (s)	-1	2147483647	-1
recovery interval (min)	0	32767	32767
remote access	0	1	1
remote admin connections	0	1	0
remote login timeout (s)	0	2147483647	0
remote proc trans	0	1	0
remote query timeout (s)	0	2147483647	0
Replication XPs	0	1	0
scan for startup procs	0	1	0
server trigger recursion	0	1	1
set working set size	0	1	0
show advanced options	0	1	1
SMO and DMO XPs	0	1	1
SQL Mail XPs	0	1	0
transform noise words	0	1	0
two digit year cutoff	1753	9999	2049
user connections	0	32767	0
user options	0	32767	0
xp_cmdshell	0	1	0

System Information

System Information report written at: 05/18/09 16:06:47
System Name: T610
[System Summary]

Item	Value
OS Name	Microsoft® Windows Server® 2008 Enterprise
Version	6.0.6001 Service Pack 1 Build 6001
Other OS Description	Not Available
OS Manufacturer	Microsoft Corporation
System Name	T610
System Manufacturer	Dell Inc.
System Model	PowerEdge T610
System Type	x64-based PC
Processor	Intel(R) Xeon(R) CPU X5570 @ 2.93GHz, 2926 Mhz, 4 Core(s), 8 Logical Processor(s)
Processor	Intel(R) Xeon(R) CPU X5570 @ 2.93GHz, 2926 Mhz, 4 Core(s), 8 Logical Processor(s)
BIOS Version/Date	Dell Inc. 1.0.0, 2/17/2009
SMBIOS Version	2.6
Windows Directory	C:\Windows
System Directory	C:\Windows\system32
Boot Device	\Device\HarddiskVolume5
Locale	United States
Hardware Abstraction Layer	Version = "6.0.6001.18000"
User Name	T610\Administrator
Time Zone	Central Daylight Time
Installed Physical Memory (RAM)	48.0 GB
Total Physical Memory	3.99 GB
Available Physical Memory	44.4 GB
Total Virtual Memory	50.5 GB
Available Virtual Memory	48.3 GB
Page File Space	4.00 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	Intel(R) ICH9 Family USB Universal Host Controller - 2935
IRQ 20	Intel(R) ICH9 Family USB Universal Host Controller - 2939
IRQ 21	Intel(R) ICH9 Family USB Universal Host Controller - 2934
IRQ 21	Intel(R) ICH9 Family USB Universal Host Controller - 2936
IRQ 21	Intel(R) ICH9 Family USB2 Enhanced Host Controller - 293A
Memory Address 0xD9800000-0xD9FFFFFF	Intel(R) 82801 PCI Bridge - 244E
Memory Address 0xD9800000-0xD9FFFFFF	Standard VGA Graphics Adapter
Memory Address 0xDA000000-0xDDFFFFFF	Intel(R) 5520/5500/X58 I/O Hub PCI Express Root Port 1 - 3408
Memory Address 0xDA000000-0xDDFFFFFF	Broadcom BCM5709C NetXtreme II GigE
Memory Address 0xA0000-0xBFFFF	PCI bus
Memory Address 0xA0000-0xBFFFF	Standard VGA Graphics Adapter

[DMA]

Resource	Device	Status
Channel 4	Direct memory access 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
0x0000D000-0x0000FFFF	PCI bus	OK
0x0000F000-0x0000FFFF	Intel(R) 5520/5500/X58 I/O Hub PCI Express Root Port 10 - 3411	OK
0x0000FC00-0x0000FCFF	DELL PERC 6/i Integrated RAID Controller	OK
0x0000EC40-0x0000EC5F	Intel(R) ICH9 Family USB Universal Host Controller - 2937	OK
0x0000EC60-0x0000EC7F	Intel(R) ICH9 Family USB Universal Host Controller - 2938	OK
0x0000EC80-0x0000EC9F	Intel(R) ICH9 Family USB Universal Host Controller - 2934	OK
0x0000ECA0-0x0000ECBF	Intel(R) ICH9 Family USB Universal Host Controller - 2935	OK
0x0000ECC0-0x0000ECDF	Intel(R) ICH9 Family USB Universal Host Controller - 2936	OK
0x0000ECE0-0x0000ECFF	Intel(R) ICH9 Family USB Universal Host Controller - 2939	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
0x000003F8-0x000003FF	Communications Port (COM1)	OK
0x000002F8-0x000002FF	Communications Port (COM2)	OK
0x00000800-0x0000087F	System board	OK
0x000000E0-0x000000E7	System board	OK
0x00000880-0x000008FF	System board	OK
0x00000900-0x0000091F	System board	OK
0x00000920-0x00000923	System board	OK
0x00000924-0x00000924	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	Microsoft Generic IPMI Compliant Device	OK
0x00000CAC-0x00000CAC	Microsoft Generic IPMI Compliant Device	OK
0x0000EC10-0x0000EC17	Intel(R) ICH9 Family 2 port Serial ATA Storage Controller 1 - 2921	OK
0x0000EC08-0x0000EC0B	Intel(R) ICH9 Family 2 port Serial ATA Storage Controller 1 - 2921	OK
0x0000EC18-0x0000EC1F	Intel(R) ICH9 Family 2 port Serial ATA Storage Controller 1 - 2921	OK
0x0000EC0C-0x0000EC0F	Intel(R) ICH9 Family 2 port Serial ATA Storage Controller 1 - 2921	OK
0x0000EC20-0x0000EC2F	Intel(R) ICH9 Family 2 port Serial ATA Storage Controller 1 - 2921	OK
0x0000EC30-0x0000EC3F	Intel(R) ICH9 Family 2 port Serial ATA Storage Controller 1 - 2921	OK

[IRQs]

IRQ 20 Intel(R) ICH9 Family USB Universal Host Controller - 2935
OK
IRQ 20 Intel(R) ICH9 Family USB Universal Host Controller - 2939
OK
IRQ 13 Numeric data processor OK
IRQ 8 System CMOS/real time clock OK
IRQ 0 System timer OK
IRQ 4 Communications Port (COM1) OK
IRQ 3 Communications Port (COM2) OK
IRQ 23 Intel(R) ICH9 Family 2 port Serial ATA Storage Controller 1 -
2921 OK

[Memory]

Resource	Device	Status
0xA0000-0xBFFFF	PCI bus	OK
0xA0000-0xBFFFF	Standard VGA Graphics Adapter	OK
0x80000000-0xFDF00000	PCI bus	OK
0xFED40000-0xFED44000	PCI bus	OK
0xDA000000-0xDD000000	Intel(R) 5520/5500/X58 I/O Hub PCI Express Root Port 1 - 3408	OK
0xDA000000-0xDD000000	Broadcom BCM5709C NetXtreme II GigE	OK
0xDC000000-0xDD000000	Broadcom BCM5709C NetXtreme II GigE #2	OK
0xDF100000-0xDF200000	Intel(R) 5520/5500/X58 I/O Hub PCI Express Root Port 3 - 340A	OK
0xDF200000-0xDF200000	Fusion ioDrive	OK
0xDF300000-0xDF400000	Intel(R) 5520/X58 I/O Hub PCI Express Root Port 4 - 340B	OK
0xDF400000-0xDF400000	Fusion ioDrive	OK
0xDF500000-0xDF600000	Intel(R) 5520/X58 I/O Hub PCI Express Root Port 5 - 340C	OK
0xDF600000-0xDF600000	Fusion ioDrive	OK
0xDF700000-0xDF800000	Intel(R) 5520/5500/X58 I/O Hub PCI Express Root Port 7 - 340E	OK
0xDF800000-0xDF800000	Fusion ioDrive	OK
0xDF900000-0xDF900000	Intel(R) 5520/5500/X58 I/O Hub PCI Express Root Port 10 - 3411	OK
0xDF980000-0xDF9B0000	DELL PERC 6/i Integrated RAID Controller	OK
0xDF9C0000-0xDF9F0000	DELL PERC 6/i Integrated RAID Controller	OK
0xDF0FF800-0xDF0FFB00	Intel(R) ICH9 Family USB2 Enhanced Host Controller - 293C	OK
0xDF0FFC00-0xDF0FFF00	Intel(R) ICH9 Family USB2 Enhanced Host Controller - 293A	OK
0xDE000000-0xDE000000	Intel(R) 82801 PCI Bridge - 244E	OK
0xD9800000-0xD9800000	Intel(R) 82801 PCI Bridge - 244E	OK
0xD9800000-0xD9800000	Standard VGA Graphics Adapter	OK
0xDE7FC000-0xDE7FC000	Standard VGA Graphics Adapter	OK
0xDE800000-0xDE800000	Standard VGA Graphics Adapter	OK
0xE0000000-0xE0000000	Motherboard resources	OK
0xFED00000-0xFED003FF	High precision event timer	OK
0xFED90000-0xFED91FFF	Motherboard resources	OK

[Components]

[Multimedia]

[Audio Codecs]

CODEC	Manufacturer	Description	Status	File
	Version	Size	Creation Date	
c:\windows\system32\msg711.acm	Microsoft Corporation			
OK	C:\Windows\system32\MSG711.ACM			

6.0.6000.16386	14.00 KB (14,336 bytes)	1/19/2008
12:43 AM		
c:\windows\system32\msadp32.acm	Microsoft Corporation	
OK	C:\Windows\system32\MSADP32.ACM	
6.0.6000.16386	22.00 KB (22,528 bytes)	1/19/2008
12:43 AM		
c:\windows\system32\msgsm32.acm	Microsoft Corporation	
OK	C:\Windows\system32\MSGSM32.ACM	
6.0.6000.16386	28.00 KB (28,672 bytes)	1/19/2008
12:43 AM		
c:\windows\system32\imaadp32.acm	Microsoft Corporation	
OK	C:\Windows\system32\IMAADP32.ACM	
6.0.6000.16386	21.00 KB (21,504 bytes)	1/19/2008
12:43 AM		

[Video Codecs]

CODEC	Manufacturer	Description	Status	File
	Version	Size	Creation Date	
c:\windows\system32\iyuv_32.dll	Microsoft Corporation			
OK	C:\Windows\system32\IYUV_32.DLL			
6.0.6000.16386	52.50 KB (53,760 bytes)	1/19/2008		
12:34 AM				
c:\windows\system32\msyuv.dll	Microsoft Corporation			
OK	C:\Windows\system32\MSYUV.DLL			
6.0.6000.16386	24.50 KB (25,088 bytes)	1/19/2008		
12:34 AM				
c:\windows\system32\mrle32.dll	Microsoft Corporation			
OK	C:\Windows\system32\MRLE32.DLL			
6.0.6000.16386	15.50 KB (15,872 bytes)	1/19/2008		
12:43 AM				
c:\windows\system32\msvidc32.dll	Microsoft Corporation			
OK	C:\Windows\system32\MSVIDC32.DLL			
6.0.6001.18000	37.50 KB (38,400 bytes)	1/19/2008		
12:43 AM				
c:\windows\system32\tsbyuv.dll	Microsoft Corporation			
OK	C:\Windows\system32\TSBYUV.DLL			
6.0.6000.16386	13.50 KB (13,824 bytes)	1/19/2008		
12:34 AM				

[CD-ROM]

Item	Value
Drive	B:
Description	CD-ROM Drive
Media Loaded	No
Media Type	UNKNOWN
Name	HL-DT-ST DVD-ROM DH10N ATA Device
Manufacturer	(Standard CD-ROM drives)
Status	OK
Transfer Rate	-1.00 kbytes/sec
SCSI Target ID	0
PNP Device ID	IDE\CDROMHL-DT-ST_DVD-ROM_DH10N_____0D08____\5&334745AD&0&0.0.0
Driver	c:\windows\system32\drivers\cdrom.sys (6.0.6001.18000, 78.00 KB (79,872 bytes), 1/19/2008 12:29 AM)

[Sound Device]

Item	Value
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[Display]

Item	Value
Name	Standard VGA Graphics Adapter
PNP Device ID	PCI\VEN_102B&DEV_0532&SUBSYS_02371028&REV_0A\4&BBCD9ED&0&18F0
Adapter Type	Not Available, (Standard display types) compatible
Adapter Description	Standard VGA Graphics Adapter
Adapter RAM	Not Available
Installed Drivers	Not Available
Driver Version	6.0.6001.18000

INF File display.inf (vga section)
 Color Planes Not Available
 Color Table Entries Not Available
 Resolution Not Available
 Bits/Pixel Not Available
 Memory Address 0xD9800000-0xD9FFFFFF
 Memory Address 0xDE7FC000-0xDE7FFFFF
 Memory Address 0xDE800000-0xDEFFFFFF
 I/O Port 0x000003B0-0x000003BB
 I/O Port 0x000003C0-0x000003DF
 Memory Address 0xA0000-0xBF000
 Driver c:\windows\system32\drivers\vgapnp.sys (6.0.6001.18000, 28.50
 KB (29,184 bytes), 1/19/2008 3:38 AM)

[Infrared]

Item Value

[Input]

[Keyboard]

Item Value
 Description USB Human Interface Device
 Name Enhanced (101- or 102-key)
 Layout 00000409
 PNP Device ID
 USB\VID_0624&PID_0248&MI_00\6&289FB716&0&0000
 Number of Function Keys 12
 Driver c:\windows\system32\drivers\hidusb.sys (6.0.6001.18000, 15.50
 KB (15,872 bytes), 1/19/2008 12:33 AM)

Description USB Human Interface Device
 Name Enhanced (101- or 102-key)
 Layout 00000409
 PNP Device ID
 USB\VID_09AE&PID_0002&MI_00\6&8FA055B&0&0000
 Number of Function Keys 12
 Driver c:\windows\system32\drivers\hidusb.sys (6.0.6001.18000, 15.50
 KB (15,872 bytes), 1/19/2008 12:33 AM)

[Pointing Device]

Item Value
 Hardware Type USB Human Interface Device
 Number of Buttons 0
 Status OK
 PNP Device ID
 USB\VID_0624&PID_0248&MI_01\6&289FB716&0&0001
 Power Management Supported No
 Double Click Threshold Not Available
 Handedness Not Available
 Driver c:\windows\system32\drivers\hidusb.sys (6.0.6001.18000, 15.50
 KB (15,872 bytes), 1/19/2008 12:33 AM)

Hardware Type USB Human Interface Device
 Number of Buttons 0
 Status OK
 PNP Device ID
 USB\VID_09AE&PID_0002&MI_01\6&8FA055B&0&0001
 Power Management Supported No
 Double Click Threshold Not Available
 Handedness Not Available
 Driver c:\windows\system32\drivers\hidusb.sys (6.0.6001.18000, 15.50
 KB (15,872 bytes), 1/19/2008 12:33 AM)

[Modem]

Item Value

[Network]

[Adapter]

Item Value
 Name [00000000] WAN Miniport (SSTP)
 Adapter Type Not Available
 Product Type WAN Miniport (SSTP)
 Installed Yes
 PNP Device ID ROOT\MS_SSTPMINIORT\0000
 Last Reset 5/18/2009 3:36 PM
 Index 0
 Service Name RasSstp
 IP Address Not Available
 IP Subnet Not Available
 Default IP Gateway Not Available
 DHCP Enabled No
 DHCP Server Not Available
 DHCP Lease Expires Not Available
 DHCP Lease Obtained Not Available
 MAC Address Not Available
 Driver c:\windows\system32\drivers\rassstp.sys (6.0.6001.18000, 76.50
 KB (78,336 bytes), 1/19/2008 12:37 AM)

Name [00000001] WAN Miniport (L2TP)
 Adapter Type Not Available
 Product Type WAN Miniport (L2TP)
 Installed Yes
 PNP Device ID ROOT\MS_L2TPMINIORT\0000
 Last Reset 5/18/2009 3:36 PM
 Index 1
 Service Name Rasl2tp
 IP Address Not Available
 IP Subnet Not Available
 Default IP Gateway Not Available
 DHCP Enabled No
 DHCP Server Not Available
 DHCP Lease Expires Not Available
 DHCP Lease Obtained Not Available
 MAC Address Not Available
 Driver c:\windows\system32\drivers\rasl2tp.sys (6.0.6001.18000, 122.00
 KB (124,928 bytes), 1/19/2008 12:37 AM)

Name [00000002] WAN Miniport (PPTP)
 Adapter Type Wide Area Network (WAN)
 Product Type WAN Miniport (PPTP)
 Installed Yes
 PNP Device ID ROOT\MS_PPTPMINIORT\0000
 Last Reset 5/18/2009 3:36 PM
 Index 2
 Service Name PptpMiniport
 IP Address Not Available
 IP Subnet Not Available
 Default IP Gateway Not Available
 DHCP Enabled No
 DHCP Server Not Available
 DHCP Lease Expires Not Available
 DHCP Lease Obtained Not Available
 MAC Address 50:50:54:50:30:30
 Driver c:\windows\system32\drivers\raspptp.sys (6.0.6001.18000, 96.50
 KB (98,816 bytes), 1/19/2008 12:37 AM)

Name [00000003] WAN Miniport (PPPOE)
 Adapter Type Wide Area Network (WAN)
 Product Type WAN Miniport (PPPOE)
 Installed Yes
 PNP Device ID ROOT\MS_PPPOEMINIORT\0000
 Last Reset 5/18/2009 3:36 PM
 Index 3
 Service Name RasPppoe
 IP Address Not Available
 IP Subnet Not Available

Default IP Gateway Not Available
DHCP Enabled No
DHCP Server Not Available
DHCP Lease Expires Not Available
DHCP Lease Obtained Not Available
MAC Address 33:50:6F:45:30:30
Driver c:\windows\system32\drivers\rasppoe.sys (6.0.6001.18000, 49.00 KB (50,176 bytes), 1/19/2008 12:37 AM)

Name [00000004] WAN Miniport (IPv6)
Adapter Type Not Available
Product Type WAN Miniport (IPv6)
Installed Yes
PNP Device ID ROOT\MS_NDISWANIPV6\0000
Last Reset 5/18/2009 3:36 PM
Index 4
Service Name NdisWan
IP Address Not Available
IP Subnet Not Available
Default IP Gateway Not Available
DHCP Enabled No
DHCP Server Not Available
DHCP Lease Expires Not Available
DHCP Lease Obtained Not Available
MAC Address Not Available
Driver c:\windows\system32\drivers\ndiswan.sys (6.0.6001.18000, 165.50 KB (169,472 bytes), 1/19/2008 12:37 AM)

Name [00000005] WAN Miniport (Network Monitor)
Adapter Type Not Available
Product Type WAN Miniport (Network Monitor)
Installed Yes
PNP Device ID ROOT\MS_NDISWANBH\0000
Last Reset 5/18/2009 3:36 PM
Index 5
Service Name NdisWan
IP Address Not Available
IP Subnet Not Available
Default IP Gateway Not Available
DHCP Enabled No
DHCP Server Not Available
DHCP Lease Expires Not Available
DHCP Lease Obtained Not Available
MAC Address Not Available
Driver c:\windows\system32\drivers\ndiswan.sys (6.0.6001.18000, 165.50 KB (169,472 bytes), 1/19/2008 12:37 AM)

Name [00000006] Broadcom BCM5709C NetXtreme II GigE (NDIS VBD Client)
Adapter Type Ethernet 802.3
Product Type Broadcom BCM5709C NetXtreme II GigE (NDIS VBD Client)
Installed Yes
PNP Device ID B06BDRV\L2ND&PCI_163914E4&SUBSYS_02371028&REV_20\5&1FAB2208&0&20050100
Last Reset 5/18/2009 3:36 PM
Index 6
Service Name l2nd
IP Address 192.1.1.61, fe80::2cd1:c6ac:2c1b:1215
IP Subnet 255.255.255.0, 64
Default IP Gateway Not Available
DHCP Enabled No
DHCP Server Not Available
DHCP Lease Expires Not Available
DHCP Lease Obtained Not Available
MAC Address 00:22:19:AA:53:B4
Driver c:\windows\system32\drivers\bxnd60a.sys (4.6.14.0, 77.37 KB (79,224 bytes), 10/16/2008 1:09 PM)

Name [00000007] Microsoft ISATAP Adapter
Adapter Type Tunnel
Product Type Microsoft ISATAP Adapter

Installed Yes
PNP Device ID ROOT*ISATAP\0000
Last Reset 5/18/2009 3:36 PM
Index 7
Service Name tunnel
IP Address Not Available
IP Subnet Not Available
Default IP Gateway Not Available
DHCP Enabled No
DHCP Server Not Available
DHCP Lease Expires Not Available
DHCP Lease Obtained Not Available
MAC Address Not Available
Driver c:\windows\system32\drivers\tunnel.sys (6.0.6001.18000, 27.50 KB (28,160 bytes), 1/19/2008 12:36 AM)

Name [00000008] WAN Miniport (IP)
Adapter Type Not Available
Product Type WAN Miniport (IP)
Installed Yes
PNP Device ID ROOT\MS_NDISWANIP\0000
Last Reset 5/18/2009 3:36 PM
Index 8
Service Name NdisWan
IP Address Not Available
IP Subnet Not Available
Default IP Gateway Not Available
DHCP Enabled No
DHCP Server Not Available
DHCP Lease Expires Not Available
DHCP Lease Obtained Not Available
MAC Address Not Available
Driver c:\windows\system32\drivers\ndiswan.sys (6.0.6001.18000, 165.50 KB (169,472 bytes), 1/19/2008 12:37 AM)

Name [00000009] Broadcom BCM5709C NetXtreme II GigE (NDIS VBD Client)
Adapter Type Ethernet 802.3
Product Type Broadcom BCM5709C NetXtreme II GigE (NDIS VBD Client)
Installed Yes
PNP Device ID B06BDRV\L2ND&PCI_163914E4&SUBSYS_02371028&REV_20\5&288F6B0&0&20050100
Last Reset 5/18/2009 3:36 PM
Index 9
Service Name l2nd
IP Address 192.1.1.62, fe80::1090:6888:a9b8:2f9
IP Subnet 255.255.255.0, 64
Default IP Gateway Not Available
DHCP Enabled No
DHCP Server Not Available
DHCP Lease Expires Not Available
DHCP Lease Obtained Not Available
MAC Address 00:22:19:AA:53:B6
Driver c:\windows\system32\drivers\bxnd60a.sys (4.6.14.0, 77.37 KB (79,224 bytes), 10/16/2008 1:09 PM)

Name [00000010] Microsoft 6to4 Adapter
Adapter Type Tunnel
Product Type Microsoft 6to4 Adapter
Installed Yes
PNP Device ID ROOT*6TO4MP\0000
Last Reset 5/18/2009 3:36 PM
Index 10
Service Name tunnel
IP Address Not Available
IP Subnet Not Available
Default IP Gateway Not Available
DHCP Enabled No
DHCP Server Not Available
DHCP Lease Expires Not Available
DHCP Lease Obtained Not Available

MAC Address Not Available
Driver c:\windows\system32\drivers\tunnel.sys (6.0.6001.18000, 27.50
KB (28,160 bytes), 1/19/2008 12:36 AM)

Name [00000011] RAS Async Adapter
Adapter Type Not Available
Product Type RAS Async Adapter
Installed Yes
PNP Device ID Not Available
Last Reset 5/18/2009 3:36 PM
Index 11
Service Name AsyncMac
IP Address Not Available
IP Subnet Not Available
Default IP Gateway Not Available
DHCP Enabled No
DHCP Server Not Available
DHCP Lease Expires Not Available
DHCP Lease Obtained Not Available
MAC Address Not Available

Name [00000012] Microsoft ISATAP Adapter
Adapter Type Tunnel
Product Type Microsoft ISATAP Adapter
Installed Yes
PNP Device ID ROOT*ISATAP\0001
Last Reset 5/18/2009 3:36 PM
Index 12
Service Name tunnel
IP Address Not Available
IP Subnet Not Available
Default IP Gateway Not Available
DHCP Enabled No
DHCP Server Not Available
DHCP Lease Expires Not Available
DHCP Lease Obtained Not Available
MAC Address Not Available
Driver c:\windows\system32\drivers\tunnel.sys (6.0.6001.18000, 27.50
KB (28,160 bytes), 1/19/2008 12:36 AM)

[Protocol]

Item	Value
Name	MSAFD Tcpi [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 Tcpi [UDP/IP]
Connectionless Service	Yes
Guarantees Delivery	No
Guarantees Sequencing	No
Maximum Address Size	16 bytes
Maximum Message Size	63.99 KB (65,527 bytes)
Message Oriented	Yes
Minimum Address Size	16 bytes
Pseudo Stream Oriented	No
Supports Broadcasting	Yes
Supports Connect Data	No
Supports Disconnect Data	No

Supports Encryption	No
Supports Expedited Data	No
Supports Graceful Closing	No
Supports Guaranteed Bandwidth	No
Supports Multicasting	Yes

Name	MSAFD Tcpi [TCP/IPv6]
Connectionless Service	No
Guarantees Delivery	Yes
Guarantees Sequencing	Yes
Maximum Address Size	28 bytes
Maximum Message Size	0 bytes
Message Oriented	No
Minimum Address Size	28 bytes
Pseudo Stream Oriented	No
Supports Broadcasting	No
Supports Connect Data	No
Supports Disconnect Data	No
Supports Encryption	No
Supports Expedited Data	Yes
Supports Graceful Closing	Yes
Supports Guaranteed Bandwidth	No
Supports Multicasting	No

Name	MSAFD Tcpi [UDP/IPv6]
Connectionless Service	Yes
Guarantees Delivery	No
Guarantees Sequencing	No
Maximum Address Size	28 bytes
Maximum Message Size	63.99 KB (65,527 bytes)
Message Oriented	Yes
Minimum Address Size	28 bytes
Pseudo Stream Oriented	No
Supports Broadcasting	Yes
Supports Connect Data	No
Supports Disconnect Data	No
Supports Encryption	No
Supports Expedited Data	No
Supports Graceful Closing	No
Supports Guaranteed Bandwidth	No
Supports Multicasting	Yes

Name	RSVP TCPv6 Service Provider
Connectionless Service	No
Guarantees Delivery	Yes
Guarantees Sequencing	Yes
Maximum Address Size	28 bytes
Maximum Message Size	0 bytes
Message Oriented	No
Minimum Address Size	28 bytes
Pseudo Stream Oriented	No
Supports Broadcasting	No
Supports Connect Data	No
Supports Disconnect Data	No
Supports Encryption	Yes
Supports Expedited Data	Yes
Supports Graceful Closing	Yes
Supports Guaranteed Bandwidth	No
Supports Multicasting	No

Name	RSVP TCP Service Provider
Connectionless Service	No
Guarantees Delivery	Yes
Guarantees Sequencing	Yes
Maximum Address Size	16 bytes
Maximum Message Size	0 bytes
Message Oriented	No
Minimum Address Size	16 bytes
Pseudo Stream Oriented	No
Supports Broadcasting	No
Supports Connect Data	No
Supports Disconnect Data	No
Supports Encryption	Yes

Supports Expedited Data Yes
 Supports Graceful Closing Yes
 Supports Guaranteed Bandwidth No
 Supports Multicasting No

Name RSVP UDPv6 Service Provider
 Connectionless Service Yes
 Guarantees Delivery No
 Guarantees Sequencing No
 Maximum Address Size 28 bytes
 Maximum Message Size 63.99 KB (65,527 bytes)
 Message Oriented Yes
 Minimum Address Size 28 bytes
 Pseudo Stream Oriented No
 Supports Broadcasting Yes
 Supports Connect Data No
 Supports Disconnect Data No
 Supports Encryption Yes
 Supports Expedited Data No
 Supports Graceful Closing No
 Supports Guaranteed Bandwidth No
 Supports Multicasting Yes

Name RSVP UDP Service Provider
 Connectionless Service Yes
 Guarantees Delivery No
 Guarantees Sequencing No
 Maximum Address Size 16 bytes
 Maximum Message Size 63.99 KB (65,527 bytes)
 Message Oriented Yes
 Minimum Address Size 16 bytes
 Pseudo Stream Oriented No
 Supports Broadcasting Yes
 Supports Connect Data No
 Supports Disconnect Data No
 Supports Encryption Yes
 Supports Expedited Data No
 Supports Graceful Closing No
 Supports Guaranteed Bandwidth No
 Supports Multicasting Yes

[WinSock]

Item Value
 File c:\windows\syswow64\wsock32.dll
 Size 15.00 KB (15,360 bytes)
 Version 6.0.6001.18000

File c:\windows\system32\wsock32.dll
 Size 18.00 KB (18,432 bytes)
 Version 6.0.6001.18000

[Ports]

[Serial]

Item Value
 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 (6.0.6001.18000, 92.00 KB (94,208 bytes), 1/19/2008 12:28 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 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 0x000002F8-0x000002FF
 IRQ Channel IRQ 3

Driver c:\windows\system32\drivers\serial.sys (6.0.6001.18000, 92.00 KB (94,208 bytes), 1/19/2008 12:28 AM)

[Parallel]

Item Value

[Storage]

[Drives]

Item Value

Drive B:
Description CD-ROM Disc

Drive C:
Description Local Fixed Disk
Compressed No
File System NTFS
Size 40.00 GB (42,949,668,864 bytes)
Free Space 22.88 GB (24,572,325,888 bytes)
Volume Name
Volume Serial Number 720E5D7B

Drive D:
Description Local Fixed Disk
Compressed No
File System NTFS
Size 211.00 GB (226,555,265,024 bytes)
Free Space 21.03 GB (22,579,642,368 bytes)
Volume Name
Volume Serial Number F835FF21

Drive L:
Description Local Fixed Disk
Compressed No
File System NTFS
Size 20.00 GB (21,474,770,944 bytes)
Free Space 369.69 MB (387,645,440 bytes)
Volume Name Log
Volume Serial Number 16250B8E

[Disks]

Item Value

Description Disk drive
Manufacturer (Standard disk drives)
Model Fusion ioDrive 80GB
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 1
SCSI Bus 0
SCSI Logical Unit 6
SCSI Port 0
SCSI Target ID 0
Sectors/Track 64
Size 74.93 GB (80,455,139,328 bytes)
Total Cylinders 9,591
Total Sectors 157,138,944
Total Tracks 2,455,296
Tracks/Cylinder 256
Partition Disk #3, Partition #0
Partition Size 74.93 GB (80,455,139,328 bytes)
Partition Starting Offset 1,048,576 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model Fusion ioDrive 80GB
Bytes/Sector 512
Media Loaded Yes

Media Type Fixed hard disk

Partitions 1
SCSI Bus 0
SCSI Logical Unit 5
SCSI Port 0
SCSI Target ID 0
Sectors/Track 64
Size 74.93 GB (80,455,139,328 bytes)
Total Cylinders 9,591
Total Sectors 157,138,944
Total Tracks 2,455,296
Tracks/Cylinder 256
Partition Disk #2, Partition #0
Partition Size 74.93 GB (80,455,139,328 bytes)
Partition Starting Offset 1,048,576 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model Fusion ioDrive 80GB
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk

Partitions 1
SCSI Bus 0
SCSI Logical Unit 3
SCSI Port 0
SCSI Target ID 0
Sectors/Track 64
Size 74.93 GB (80,455,139,328 bytes)
Total Cylinders 9,591
Total Sectors 157,138,944
Total Tracks 2,455,296
Tracks/Cylinder 256
Partition Disk #0, Partition #0
Partition Size 74.93 GB (80,455,139,328 bytes)
Partition Starting Offset 1,048,576 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model Fusion ioDrive 80GB
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk

Partitions 1
SCSI Bus 0
SCSI Logical Unit 4
SCSI Port 0
SCSI Target ID 0
Sectors/Track 64
Size 74.93 GB (80,455,139,328 bytes)
Total Cylinders 9,591
Total Sectors 157,138,944
Total Tracks 2,455,296
Tracks/Cylinder 256
Partition Disk #1, Partition #0
Partition Size 74.93 GB (80,455,139,328 bytes)
Partition Starting Offset 1,048,576 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model DELL PERC 6/i 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 270.99 GB (290,977,505,280 bytes)
Total Cylinders 35,376
Total Sectors 568,315,440

Total Tracks 9,020,880
 Tracks/Cylinder 255
 Partition Disk #4, Partition #0
 Partition Size 40.00 GB (42,949,672,960 bytes)
 Partition Starting Offset 1,048,576 bytes
 Partition Disk #4, Partition #1
 Partition Size 20.00 GB (21,474,836,480 bytes)
 Partition Starting Offset 42,950,721,536 bytes
 Partition Disk #4, Partition #2
 Partition Size 211.00 GB (226,555,330,560 bytes)
 Partition Starting Offset 64,425,558,016 bytes
 Partition Disk #4, Partition #3
 Partition Size 1.00 MB (1,048,576 bytes)
 Partition Starting Offset 290,981,937,152 bytes

[SCSI]

Item Value
 Name DELL PERC 6/i Integrated RAID Controller
 Manufacturer DELL
 Status OK
 PNP Device ID
 PCI\VEN_1000&DEV_0060&SUBSYS_1F0C1028&REV_04\4&26420C98&0&0050
 Memory Address 0xDF980000-0xDF9BFFFF
 I/O Port 0x0000FC00-0x0000FCFF
 Memory Address 0xDF9C0000-0xDF9FFFFF
 IRQ Channel IRQ 41
 Driver c:\windows\system32\drivers\megasas.sys (2.13.0.64, 35.05 KB (35,896 bytes), 1/5/2008 5:22 AM)

Name Microsoft iSCSI Initiator
 Manufacturer Microsoft
 Status OK
 PNP Device ID ROOT\ISCSIPRT\0000
 Driver c:\windows\system32\drivers\msiscsi.sys (6.0.6001.18000, 210.05 KB (215,096 bytes), 1/19/2008 12:30 AM)

[IDE]

Item Value
 Name Intel(R) ICH9 Family 2 port Serial ATA Storage Controller 1 - 2921
 Manufacturer Intel
 Status OK
 PNP Device ID
 PCI\VEN_8086&DEV_2921&SUBSYS_02371028&REV_02\3&33FD14CA&0&FA
 I/O Port 0x0000EC10-0x0000EC17
 I/O Port 0x0000EC08-0x0000EC0B
 I/O Port 0x0000EC18-0x0000EC1F
 I/O Port 0x0000EC0C-0x0000EC0F
 I/O Port 0x0000EC20-0x0000EC2F
 I/O Port 0x0000EC30-0x0000EC3F
 IRQ Channel IRQ 23
 Driver c:\windows\system32\drivers\pciide.sys (6.0.6000.16386, 13.10 KB (13,416 bytes), 1/19/2008 12:28 AM)

Name ATA Channel 0
 Manufacturer (Standard IDE ATA/ATAPI controllers)
 Status OK
 PNP Device ID PCI\IDE\IDECHANNEL\4&B5CC01F&0&0
 Driver c:\windows\system32\drivers\atapi.sys (6.0.6001.18000, 22.05 KB (22,584 bytes), 1/19/2008 12:28 AM)

Name ATA Channel 1
 Manufacturer (Standard IDE ATA/ATAPI controllers)
 Status OK
 PNP Device ID PCI\IDE\IDECHANNEL\4&B5CC01F&0&1
 Driver c:\windows\system32\drivers\atapi.sys (6.0.6001.18000, 22.05 KB (22,584 bytes), 1/19/2008 12:28 AM)

[Printing]

Name	Driver	Port	Name	Server Name
Microsoft XPS Document Writer (redirected 2)	(redirected 2)		Microsoft XPS Document Writer	TS002
Microsoft XPS Document Writer (redirected 2)	Microsoft XPS Document Writer	TS001	Microsoft XPS Document Writer	Microsoft XPS Document Writer XPSPort:

[Problem Devices]

Device	PNP Device ID	Error Code
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[USB]

Device	PNP Device ID
Intel(R) ICH9 Family USB Universal Host Controller - 2937	PCI\VEN_8086&DEV_2937&SUBSYS_02371028&REV_02\3&33FD14CA&0&D0
Intel(R) ICH9 Family USB Universal Host Controller - 2938	PCI\VEN_8086&DEV_2938&SUBSYS_02371028&REV_02\3&33FD14CA&0&D1
Intel(R) ICH9 Family USB2 Enhanced Host Controller - 293C	PCI\VEN_8086&DEV_293C&SUBSYS_02371028&REV_02\3&33FD14CA&0&D7
Intel(R) ICH9 Family USB Universal Host Controller - 2934	PCI\VEN_8086&DEV_2934&SUBSYS_02371028&REV_02\3&33FD14CA&0&E8
Intel(R) ICH9 Family USB Universal Host Controller - 2935	PCI\VEN_8086&DEV_2935&SUBSYS_02371028&REV_02\3&33FD14CA&0&E9
Intel(R) ICH9 Family USB Universal Host Controller - 2936	PCI\VEN_8086&DEV_2936&SUBSYS_02371028&REV_02\3&33FD14CA&0&EA
Intel(R) ICH9 Family USB Universal Host Controller - 2939	PCI\VEN_8086&DEV_2939&SUBSYS_02371028&REV_02\3&33FD14CA&0&EB
Intel(R) ICH9 Family USB2 Enhanced Host Controller - 293A	PCI\VEN_8086&DEV_293A&SUBSYS_02371028&REV_02\3&33FD14CA&0&EF

[Software Environment]

[System Drivers]

Name	Description	File	Type	Started	Start Mode
		State	Status	Error Control	Accept Pause
acpi	Microsoft ACPI Driver	c:\windows\system32\drivers\acpi.sys	Kernel Driver	Yes	Boot Running OK
adp94xx	adp94xx	c:\windows\system32\drivers\adp94xx.sys	Kernel Driver	No	Disabled Stopped OK Normal No
adpahci	adpahci	c:\windows\system32\drivers\adpahci.sys	Kernel Driver	No	Disabled Stopped OK Normal No
adpu160m	adpu160m	c:\windows\system32\drivers\adpu160m.sys	Kernel Driver	No	Disabled Stopped OK Normal No
adpu320	adpu320	c:\windows\system32\drivers\adpu320.sys	Kernel Driver	No	Disabled Stopped OK Normal No
afd	Ancilliary Function Driver for Winsock	c:\windows\system32\drivers\afd.sys	Kernel Driver	Yes	System Running OK Normal No
agp440	Intel AGP Bus Filter	c:\windows\system32\drivers\agp440.sys	Kernel Driver	No	Manual Stopped OK Normal No

aic78xx Driver	aic78xx No No	c:\windows\system32\drivers\djsvs.sys	Kernel No	Disabled Stopped OK	Normal	No	circlass Kernel Driver Normal	Consumer IR Devices No No	c:\windows\system32\drivers\circlass.sys	Kernel Driver No No	Disabled Stopped OK	OK
aliide Driver	aliide No No	c:\windows\system32\drivers\aliide.sys	Kernel No	Disabled Stopped OK	Critical	No	clfs Driver	Common Log (CLFS) Yes Yes	c:\windows\system32\clfs.sys	Kernel OK Critical	Running OK	No
amdide Driver	amdide No No	c:\windows\system32\drivers\amdide.sys	Kernel No	Disabled Stopped OK	Critical	No	cmdide Driver	cmdide No No	c:\windows\system32\drivers\cmdide.sys	Kernel Disabled Stopped	OK OK	Critical No
amdK8	AMD K8 Processor Driver No No	c:\windows\system32\drivers\amdK8.sys	Kernel Driver No	Disabled Stopped OK	Normal	No	compbatt	Microsoft Composite Battery Driver No No	c:\windows\system32\drivers\compbatt.sys	Kernel Driver Disabled Stopped	OK OK	Critical No
arc Driver	arc No No	c:\windows\system32\drivers\arc.sys	Kernel No	Disabled Stopped OK	Normal	No	crdisk	Crdisk Filter Driver Kernel Driver Normal	c:\windows\system32\drivers\crdisk.sys	Yes Boot Running	OK OK	OK
arcsas Driver	arcsas No No	c:\windows\system32\drivers\arcsas.sys	Kernel No	Disabled Stopped OK	Normal	No	csc	Offline Files Driver Kernel Driver Normal	c:\windows\system32\drivers\csc.sys	No Disabled Stopped	OK OK	OK
asynmac	RAS Asynchronous Media Driver No No	c:\windows\system32\drivers\asynmac.sys	Kernel Driver No	Manual Stopped OK	Normal	No	dfsc	DFS Namespace Client Driver Yes	c:\windows\system32\drivers\dfsc.sys	File System Driver System Running	OK OK	Normal No
atapi	IDE Channel Kernel Driver Critical	c:\windows\system32\drivers\atapi.sys	Kernel Driver Yes Boot Running	OK OK	OK	atapi	atapi	atapi	c:\windows\system32\drivers\atapi.sys	Kernel Driver Yes Boot Running	OK OK	OK
b06bdrv	Broadcom NetXtreme II VBD Yes Yes	c:\windows\system32\drivers\b06bdrv.sys	Kernel Driver No	Manual Stopped OK	Normal	No	dxgkml	LDDM Graphics Subsystem No No	c:\windows\system32\drivers\dxgkml.sys	Kernel Driver Manual Stopped	OK OK	Ignore No
blbdrive Driver	blbdrive No No	c:\windows\system32\drivers\blbdrive.sys	Kernel No	Disabled Stopped OK	Normal	No	e1g60	Intel(R) PRO/1000 NDIS 6 Adapter Driver No No	c:\windows\system32\drivers\e1g6032e.sys	Kernel Driver Manual Stopped	OK OK	Normal No
blfp	Broadcom Advanced Server Program Driver No No	c:\windows\system32\drivers\blfp.sys	Kernel Driver No	Manual Stopped OK	Normal	No	elxstor Driver	elxstor No No	c:\windows\system32\drivers\elxstor.sys	Kernel Disabled Stopped	OK OK	Normal No
bowser System Driver	Bowser Yes No	c:\windows\system32\drivers\bowser.sys	File Yes Manual Running	OK OK	Normal	bowser	bowser	bowser	c:\windows\system32\drivers\bowser.sys	File Yes Manual Running	OK OK	Normal No
brfiltlo	Brother USB Mass-Storage Lower Filter Driver No No	c:\windows\system32\drivers\brfiltlo.sys	Kernel Driver No	Manual Stopped OK	Normal	No	exfat	exFAT File System Driver No	c:\windows\system32\drivers\exfat.sys	File System Driver Manual Stopped	OK OK	Normal No
brfiltup	Brother USB Mass-Storage Upper Filter Driver No No	c:\windows\system32\drivers\brfiltup.sys	Kernel Driver No	Manual Stopped OK	Normal	No	fastfat	FAT12/16/32 File System Driver No	c:\windows\system32\drivers\fastfat.sys	File System Driver Manual Stopped	OK OK	Normal No
brserid	Brother MFC Serial Port Interface Driver (WDM) No No	c:\windows\system32\drivers\brserid.sys	Kernel Driver No	Disabled Stopped OK	Normal	No	fdc	Floppy Disk Controller Driver No No	c:\windows\system32\drivers\fdc.sys	Kernel Driver Disabled Stopped	OK OK	Normal No
brserwdm	Brother WDM Serial driver No No	c:\windows\system32\drivers\brserwdm.sys	Kernel Driver No	Disabled Stopped OK	Normal	No	fileinfo	File Information FS MiniFilter No	c:\windows\system32\drivers\fileinfo.sys	File System Driver Manual Stopped	OK OK	Normal No
brusbmdm	Brother MFC USB Fax Only Modem No No	c:\windows\system32\drivers\brusbmdm.sys	Kernel Driver No	Disabled Stopped OK	Normal	No	filetrace System Driver	FileTrace No No	c:\windows\system32\drivers\filetrace.sys	File No Manual Stopped	OK OK	Normal
brusbser	Brother MFC USB Serial WDM Driver No No	c:\windows\system32\drivers\brusbser.sys	Kernel Driver No	Manual Stopped OK	Normal	No	fiodrive	Fusion ioDrive Device Driver Yes Yes	c:\windows\system32\drivers\fiodrive.sys	Kernel Driver Boot Running	OK OK	Normal No
cdfs	CD/DVD File System Reader Yes Yes	c:\windows\system32\drivers\cdfs.sys	File System Driver No	Disabled Running OK	Normal	No	flpydisk	Floppy Disk Driver Kernel Driver Normal	c:\windows\system32\drivers\flpydisk.sys	No Disabled Stopped	OK OK	OK
cdrom	CD-ROM Driver Kernel Driver Normal	c:\windows\system32\drivers\cdrom.sys	File System Driver Yes System Running	OK OK	OK	cdrom	cdrom	cdrom	c:\windows\system32\drivers\cdrom.sys	File System Driver Yes System Running	OK OK	OK
							fltMgr System Driver	fltMgr No	c:\windows\system32\drivers\fltMgr.sys	File Yes Boot Running	OK OK	Critical
							gagp30kx	Microsoft Generic AGPv3.0 Filter for K8 Processor Platforms No	c:\windows\system32\drivers\gagp30kx.sys	Kernel Driver		

mrxsmb	SMB MiniRedirector Wrapper and Engine	c:\windows\system32\drivers\mrxsmb.sys	File System Driver	Yes	Manual	Running	OK	Normal	No	null	Null	c:\windows\system32\drivers\null.sys	Kernel Driver	Yes	System	Running	OK	Normal	No
mrxsmb10	SMB 1.x MiniRedirector	c:\windows\system32\drivers\mrxsmb10.sys	File System Driver	Yes	Manual	Running	OK	Normal	No	nvraid	NVIDIA nForce RAID Driver	c:\windows\system32\drivers\nvraid.sys	Kernel Driver	No	Disabled	Stopped	OK	Normal	No
mrxsmb20	SMB 2.0 MiniRedirector	c:\windows\system32\drivers\mrxsmb20.sys	File System Driver	Yes	Manual	Running	OK	Normal	No	nvstor	nvstor	c:\windows\system32\drivers\nvstor.sys	Kernel Driver	No	Disabled	Stopped	OK	Critical	No
msahci	msahci	c:\windows\system32\drivers\msahci.sys	Kernel Driver	No	Disabled	Stopped	OK	Critical	No	nv_agp	NVIDIA nForce AGP Bus Filter	c:\windows\system32\drivers\nv_agp.sys	Kernel Driver	No	Manual	Stopped	OK	Normal	No
msdsm	Microsoft Multi-Path Device Specific Module	c:\windows\system32\drivers\msdsm.sys	Kernel Driver	No	Disabled	Stopped	OK	Normal	No	ohci1394	NEC FireWarden OHCI Compliant IEEE 1394 Host Controller	c:\windows\system32\drivers\ohci1394.sys	Kernel Driver	No	Disabled	Stopped	OK	Normal	No
msfs	Msfs	c:\windows\system32\drivers\msfs.sys	File System Driver	Yes	System	Running	OK	Normal	No	parport	Parallel port driver	c:\windows\system32\drivers\parport.sys	Kernel Driver	No	Disabled	Stopped	OK	Normal	No
msisadrv	ISA/EISA Class Driver	c:\windows\system32\drivers\msisadrv.sys	Kernel Driver	Yes	Boot	Running	OK	Critical	No	partmgr	Partition Manager	c:\windows\system32\drivers\partmgr.sys	Kernel Driver	Yes	Boot	Running	OK	Critical	No
msrpc	MsRPC	c:\windows\system32\drivers\msrpc.sys	Kernel Driver	No	Manual	Stopped	OK	Normal	No	pci	PCI Bus Driver	c:\windows\system32\drivers\pci.sys	Kernel Driver	Yes	Boot	Running	OK	Critical	No
mssmbios	Microsoft System Management BIOS Driver	c:\windows\system32\drivers\mssmbios.sys	Kernel Driver	Yes	Manual	Running	OK	Normal	No	pciide	pciide	c:\windows\system32\drivers\pciide.sys	Kernel Driver	Yes	Boot	Running	OK	Critical	No
mup	Mup	c:\windows\system32\drivers\mup.sys	File System Driver	Yes	Boot	Running	OK	Normal	No	pcmcia	pcmcia	c:\windows\system32\drivers\pcmcia.sys	Kernel Driver	No	Disabled	Stopped	OK	Normal	No
ndis	NDIS System Driver	c:\windows\system32\drivers\ndis.sys	Kernel Driver	Yes	Boot	Running	OK	Critical	No	peauth	PEAUTH	c:\windows\system32\drivers\peauth.sys	Kernel Driver	Yes	Auto	Running	OK	Normal	No
ndistapi	Remote Access NDIS TAPI Driver	c:\windows\system32\drivers\ndistapi.sys	Kernel Driver	Yes	Manual	Running	OK	Normal	No	pptpminiport	WAN Miniport (PPTP)	c:\windows\system32\drivers\raspptp.sys	Kernel Driver	Yes	Manual	Running	OK	Normal	No
ndisuiio	NDIS Usermode I/O Protocol	c:\windows\system32\drivers\ndisuiio.sys	Kernel Driver	No	Manual	Stopped	OK	Normal	No	processor	Processor Driver	c:\windows\system32\drivers\processr.sys	Kernel Driver	No	Disabled	Stopped	OK	Normal	No
ndiswan	Remote Access NDIS WAN Driver	c:\windows\system32\drivers\ndiswan.sys	Kernel Driver	Yes	Manual	Running	OK	Normal	No	psched	QoS Packet Scheduler	c:\windows\system32\drivers\pacer.sys	Kernel Driver	Yes	System	Running	OK	Normal	No
ndproxy	NDIS Proxy	c:\windows\system32\drivers\ndproxy.sys	Kernel Driver	Yes	Manual	Running	OK	Normal	No	ql2300	QLogic Fibre Channel Miniport Driver	c:\windows\system32\drivers\ql2300.sys	Kernel Driver	No	Disabled	Stopped	OK	Normal	No
netbios	NetBIOS Interface	c:\windows\system32\drivers\netbios.sys	File System Driver	Yes	System	Running	OK	Normal	No	ql40xx	QLogic iSCSI Miniport Driver	c:\windows\system32\drivers\ql40xx.sys	Kernel Driver	No	Disabled	Stopped	OK	Normal	No
netbt	NETBT	c:\windows\system32\drivers\netbt.sys	Kernel Driver	Yes	System	Running	OK	Normal	No	rasacd	Remote Access Auto Connection Driver	c:\windows\system32\drivers\rasacd.sys	Kernel Driver	Yes	System	Running	OK	Normal	No
nfrd960	nfrd960	c:\windows\system32\drivers\nfrd960.sys	Kernel Driver	No	Disabled	Stopped	OK	Normal	No	rasl2tp	WAN Miniport (L2TP)	c:\windows\system32\drivers\rasl2tp.sys	Kernel Driver	Yes	Manual	Running	OK	Normal	No
npfs	Npfs	c:\windows\system32\drivers\npfs.sys	File System Driver	Yes	System	Running	OK	Normal	No	raspppoe	Remote Access PPPOE Driver	c:\windows\system32\drivers\raspppoe.sys	Kernel Driver	Yes	Manual	Running	OK	Normal	No
nsiproxy	NSI proxy service	c:\windows\system32\drivers\nsiproxy.sys	Kernel Driver	Yes	System	Running	OK	Normal	No	rasstp	WAN Miniport (SSTP)	c:\windows\system32\drivers\rassttp.sys	Kernel Driver	Yes	Manual	Running	OK	Normal	No
ntfs	Ntfs	c:\windows\system32\drivers\ntfs.sys	File System Driver	Yes	Manual	Running	OK	Normal	No	rdbss	Redirected Buffering Sub System	c:\windows\system32\drivers\rdbss.sys	File System Driver	Yes	System	Running	OK	Normal	No

	No	Manual	Stopped	OK	Normal	No	volmgr	Volume Manager Driver							
	No							c:\windows\system32\drivers\volmgr.sys	Kernel Driver						
udfs	udfs	c:\windows\system32\drivers\udfs.sys	File					Yes	Boot	Running	OK	Critical	No		
System Driver	No	Disabled	Stopped	OK	Normal			Yes							
	No						volmgrx	Dynamic Volume Manager							
uliagpkx	Uli AGP Bus Filter	c:\windows\system32\drivers\uliagpkx.sys	Kernel Driver	No	Manual	Stopped	OK	Yes	Boot	Running	OK	Critical	No		
	Normal	No	No					Yes							
uliahci	uliahci	c:\windows\system32\drivers\uliahci.sys	Kernel												
Driver	No	Disabled	Stopped	OK	Normal	No		volsnap	Storage volumes	c:\windows\system32\drivers\volsnap.sys					
	No							Kernel Driver	Yes	Boot	Running	OK			
	No							Critical	No	Yes					
ulsata	Ulsata	c:\windows\system32\drivers\ulsata.sys	Kernel					vsmraid	vsmraid	c:\windows\system32\drivers\vsmraid.sys	Kernel				
Driver	No	Disabled	Stopped	OK	Normal	No		Driver	No	Disabled	Stopped	OK	Normal	No	
	No							No							
ulsata2	ulsata2	c:\windows\system32\drivers\ulsata2.sys	Kernel					wacompen	Wacom Serial Pen HID Driver						
Driver	No	Disabled	Stopped	OK	Normal	No			c:\windows\system32\drivers\wacompen.sys	Kernel Driver					
	No							No	Disabled	Stopped	OK	Normal	No		
umbus	UMBus Enumerator Driver							wanarp	Remote Access IP ARP Driver						
	c:\windows\system32\drivers\umbus.sys	Kernel Driver							c:\windows\system32\drivers\wanarp.sys	Kernel Driver					
	Yes	Manual	Running	OK	Normal	No			No	Manual	Stopped	OK	Normal	No	
	Yes								No						
umpass	Microsoft UMPass Driver							wanarpv6	Remote Access IPv6 ARP Driver						
	c:\windows\system32\drivers\umpass.sys	Kernel Driver							c:\windows\system32\drivers\wanarp.sys	Kernel Driver					
	No	Disabled	Stopped	OK	Normal	No			Yes	System	Running	OK	Normal	No	
	No								Yes						
usbccgp	Microsoft USB Generic Parent Driver							wd	Microsoft Watchdog Timer Driver						
	c:\windows\system32\drivers\usbccgp.sys	Kernel Driver							c:\windows\system32\drivers\wd.sys	Kernel Driver					
	Yes	Manual	Running	OK	Normal	No			No	Disabled	Stopped	OK	Normal	No	
	Yes								No						
usbcir	eHome Infrared Receiver (USBCIR)							wdf01000	Kernel Mode Driver Frameworks service						
	c:\windows\system32\drivers\usbcir.sys	Kernel Driver							c:\windows\system32\drivers\wdf01000.sys	Kernel Driver					
	No	Disabled	Stopped	OK	Normal	No			Yes	Boot	Running	OK	Normal	No	
	No								Yes						
usbhci	Microsoft USB 2.0 Enhanced Host Controller Miniport Driver							wmiacpi	Microsoft Windows Management Interface for ACPI						
	c:\windows\system32\drivers\usbhci.sys	Kernel Driver							c:\windows\system32\drivers\wmiacpi.sys	Kernel Driver					
	Yes	Manual	Running	OK	Normal	No			No	Disabled	Stopped	OK	Normal	No	
	Yes								No						
usbhub	Microsoft USB Standard Hub Driver							ws2ifsl	Winsock IFS driver	c:\windows\system32\drivers\ws2ifsl.sys					
	c:\windows\system32\drivers\usbhub.sys	Kernel Driver							Kernel Driver	No	Disabled	Stopped	OK		
	Yes	Manual	Running	OK	Normal	No			Normal	No	No				
	Yes														
usbohci	Microsoft USB Open Host Controller Miniport Driver														
	c:\windows\system32\drivers\usbohci.sys	Kernel Driver													
	No	Disabled	Stopped	OK	Normal	No									
	No														
usbprint	Microsoft USB PRINTER Class														
	c:\windows\system32\drivers\usbprint.sys	Kernel Driver													
	No	Disabled	Stopped	OK	Normal	No									
	No														
usbstor	USB Mass Storage Driver														
	c:\windows\system32\drivers\usbstor.sys	Kernel Driver													
	No	Manual	Stopped	OK	Normal	No									
	No														
usbuhci	Microsoft USB Universal Host Controller Miniport Driver														
	c:\windows\system32\drivers\usbuhci.sys	Kernel Driver													
	Yes	Manual	Running	OK	Normal	No									
	Yes														
vga	vga	c:\windows\system32\drivers\vgapnp.sys	Kernel												
Driver	Yes	Manual	Running	OK	Ignore	No									
	Yes														
vgasave	VgaSave	c:\windows\system32\drivers\vga.sys	Kernel												
Driver	Yes	System	Running	OK	Ignore	No									
	Yes														
viaide	viaide	c:\windows\system32\drivers\viaide.sys	Kernel												
Driver	No	Disabled	Stopped	OK	Critical	No									
	No														
vid	Virtualization Infrastructure Driver														
	c:\windows\system32\drivers\vid.sys	Kernel Driver													
	No	Disabled	Stopped	OK	Normal	No									
	No														
vmbus	VMBus	c:\windows\system32\drivers\vmbus.sys	Kernel												
Driver	No	Disabled	Stopped	OK	Normal	No									
	No														

[Signed Drivers]

Device Name	Signed	Device Class	Driver Version
Driver Date	Manufacturer	INF Name	Driver
Name	Device ID		
Generic volume	Yes	VOLUME 6.0.6001.18000	6/21/2006
		Microsoft volume.inf Not Available	
		STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE50BD2EF	
		AOFFSETF00100000LENGTH34BFC00000	
Generic volume	Yes	VOLUME 6.0.6001.18000	6/21/2006
		Microsoft volume.inf Not Available	
		STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE50BD2EF	
		AOFFSETA00100000LENGTH500000000	
Generic volume	Yes	VOLUME 6.0.6001.18000	6/21/2006
		Microsoft volume.inf Not Available	
		STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE50BD2EF	
		AOFFSET100000LENGTHA00000000	
Generic volume	Yes	VOLUME 6.0.6001.18000	6/21/2006
		Microsoft volume.inf Not Available	
		STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE592C6158	
		OFFSET100000LENGTH12BB800000	
Generic volume	Yes	VOLUME 6.0.6001.18000	6/21/2006
		Microsoft volume.inf Not Available	
		STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE592C6147	
		OFFSET100000LENGTH12BB800000	
Generic volume	Yes	VOLUME 6.0.6001.18000	6/21/2006
		Microsoft volume.inf Not Available	
		STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE592C6146	
		OFFSET100000LENGTH12BB800000	
Generic volume	Yes	VOLUME 6.0.6001.18000	6/21/2006
		Microsoft volume.inf Not Available	

STORAGE\VOLUME\1&19F7E59C&0&SIGNATURE592C6145
 OFFSET10000LENGTH12BB800000
 Volume Manager Yes SYSTEM 6.0.6001.18000 6/21/2006
 (Standard system devices) machine.inf Not Available
 Available ROOT\VOLMGR\0000
 UMBus Enumerator Yes SYSTEM 6.0.6001.18000 6/21/2006
 Microsoft umbus.inf Not Available
 UMB\UMB\1&841921D&0&TSBUS
 UMBus Root Bus Enumerator Yes SYSTEM 6.0.6001.18000
 6/21/2006 Microsoft umbus.inf Not Available
 ROOT\UMBUS\0000
 Microsoft System Management BIOS Driver Yes SYSTEM
 6.0.6001.18000 6/21/2006 (Standard system devices)
 machine.inf Not Available
 ROOT\SYSTEM\0002
 Plug and Play Software Device Enumerator Yes SYSTEM
 6.0.6001.18000 6/21/2006 (Standard system devices)
 machine.inf Not Available
 ROOT\SYSTEM\0000
 Terminal Server Mouse Driver Yes SYSTEM 6.0.6001.18000
 6/21/2006 (Standard system devices) machine.inf
 Not Available ROOT\RDP_MOU\0000
 Terminal Server Keyboard Driver Yes SYSTEM
 6.0.6001.18000 6/21/2006 (Standard system devices)
 machine.inf Not Available
 ROOT\RDP_KBD\0000
 Terminal Server Device Redirector Yes SYSTEM
 6.0.6001.18000 6/21/2006 (Standard system devices)
 machine.inf Not Available ROOT\RDPDR\0000
 WAN Miniport (SSTP) Yes NET 6.0.6001.18000
 6/21/2006 Microsoft netsstpa.inf Not Available
 ROOT\MS_SSTPMINIPORT\0000
 WAN Miniport (PPTP) Yes NET 6.0.6001.18000
 6/21/2006 Microsoft netrasa.inf Not Available
 ROOT\MS_PPTPMINIPORT\0000
 WAN Miniport (PPPOE) Yes NET 6.0.6001.18000
 6/21/2006 Microsoft netrasa.inf Not Available
 ROOT\MS_PPPOEMINIPORT\0000
 WAN Miniport (IPv6) Yes NET 6.0.6001.18000 6/21/2006
 Microsoft netrasa.inf Not Available
 ROOT\MS_NDISWANIPV6\0000
 WAN Miniport (IP) Yes NET 6.0.6001.18000 6/21/2006
 Microsoft netrasa.inf Not Available
 ROOT\MS_NDISWANIP\0000
 WAN Miniport (Network Monitor) Yes NET
 6.0.6001.18000 6/21/2006 Microsoft netrasa.inf Not
 Available ROOT\MS_NDISWANBH\0000
 WAN Miniport (L2TP) Yes NET 6.0.6001.18000
 6/21/2006 Microsoft netrasa.inf Not Available
 ROOT\MS_L2TPMINIPORT\0000
 Kernel Mode Driver Frameworks service Not Available
 LEGACYDRIVER Not Available Not Available
 Not Available Not Available Not Available
 ROOT\LEGACY_WDF01000\0000
 Remote Access IPv6 ARP Driver Not Available LEGACYDRIVER
 Not Available Not Available Not Available
 Not Available Not Available Not Available
 ROOT\LEGACY_WANARPV6\0000
 Storage volumes Not Available LEGACYDRIVER Not
 Available Not Available Not Available Not Available
 Not Available Not Available Not Available
 ROOT\LEGACY_VOLSNAP\0000
 Dynamic Volume Manager Not Available LEGACYDRIVER
 Not Available Not Available Not Available
 Not Available Not Available Not Available
 ROOT\LEGACY_VOLMGRX\0000
 VgaSave Not Available LEGACYDRIVER Not Available
 Not Available Not Available Not Available
 Not Available Not Available Not Available
 ROOT\LEGACY_VGASAVE\0000
 Terminal Services Security Filter Driver Not Available
 LEGACYDRIVER Not Available Not Available
 Not Available Not Available Not Available
 ROOT\LEGACY_TSSECSRV\0000

NetIO Legacy TDI Support Driver Not Available
 LEGACYDRIVER Not Available Not Available
 Not Available Not Available Not Available
 ROOT\LEGACY_TDX\0000
 TDTCP Not Available LEGACYDRIVER Not Available
 Not Available Not Available Not Available
 Not Available ROOT\LEGACY_TDTCP\0000
 TCP/IP Registry Compatibility Not Available LEGACYDRIVER
 Not Available Not Available Not Available
 Not Available Not Available Not Available
 ROOT\LEGACY_TCPIPREG\0000
 TCP/IP Protocol Driver Not Available LEGACYDRIVER
 Not Available Not Available Not Available
 Not Available Not Available Not Available
 ROOT\LEGACY_TCPIP\0000
 Disk VMBUS Acceleration Filter Driver Not Available
 LEGACYDRIVER Not Available Not Available
 Not Available Not Available Not Available
 ROOT\LEGACY_STORFLT\0000
 Security Processor Loader Driver Not Available LEGACYDRIVER
 Not Available Not Available Not Available
 Not Available Not Available Not Available
 ROOT\LEGACY_SPLDR\0000
 Message-oriented TCP/IP and TCP/IPv6 Protocol (SMB session) Not
 Available LEGACYDRIVER Not Available Not Available
 Not Available Not Available Not Available
 ROOT\LEGACY_SMB\0000
 Security Driver Not Available LEGACYDRIVER Not
 Available Not Available Not Available Not Available
 Not Available Not Available Not Available
 ROOT\LEGACY_SECDRV\0000
 Link-Layer Topology Discovery Responder Not Available
 LEGACYDRIVER Not Available Not Available
 Not Available Not Available Not Available
 ROOT\LEGACY_RSPNDR\0000
 RDP Winstation Driver Not Available LEGACYDRIVER
 Not Available Not Available Not Available
 Not Available Not Available Not Available
 ROOT\LEGACY_RDPWD\0000
 RDP Encoder Mirror Driver Not Available LEGACYDRIVER
 Not Available Not Available Not Available
 Not Available Not Available Not Available
 ROOT\LEGACY_RDPENCDD\0000
 RDPCDD Not Available LEGACYDRIVER Not Available
 Not Available Not Available Not Available
 Not Available Not Available Not Available
 ROOT\LEGACY_RDPCDD\0000
 Remote Access Auto Connection Driver Not Available
 LEGACYDRIVER Not Available Not Available
 Not Available Not Available Not Available
 ROOT\LEGACY_RASACD\0000
 QoS Packet Scheduler Not Available LEGACYDRIVER Not
 Available Not Available Not Available Not Available
 Not Available Not Available Not Available
 ROOT\LEGACY_PSCHED\0000
 PEAUTH Not Available LEGACYDRIVER Not Available
 Not Available Not Available Not Available
 Not Available Not Available Not Available
 ROOT\LEGACY_PEAUTH\0000
 Null Not Available LEGACYDRIVER Not Available
 Not Available Not Available Not Available
 Not Available Not Available Not Available
 ROOT\LEGACY_NULL\0000
 NSI proxy service Not Available LEGACYDRIVER Not
 Available Not Available Not Available Not Available
 Not Available Not Available Not Available
 ROOT\LEGACY_NSIPROXY\0000
 NETBT Not Available LEGACYDRIVER Not Available
 Not Available Not Available Not Available
 Not Available Not Available Not Available
 ROOT\LEGACY_NETBT\0000
 NDProxy Not Available LEGACYDRIVER Not Available
 Not Available Not Available Not Available
 Not Available Not Available Not Available
 ROOT\LEGACY_NDPROXY\0000
 NDIS System Driver Not Available LEGACYDRIVER Not
 Available Not Available Not Available Not Available
 Not Available Not Available Not Available
 ROOT\LEGACY_NDIS\0000
 ISA/EISA Class Driver Not Available LEGACYDRIVER
 Not Available Not Available Not Available

Not Available	Not Available				Communications Port	Yes	PORTS	6.0.6001.18000	6/21/2006
ROOT\LEGACY_MSISADRV\0000					(Standard port types)		msports.inf		Not Available
Windows Firewall Authorization Driver	Not Available				ACPI\PNP0501\1				
LEGACYDRIVER	Not Available	Not Available	Not Available		System timer	Yes	SYSTEM	6.0.6001.18000	6/21/2006
Not Available	Not Available	Not Available	Not Available		(Standard system devices)		machine.inf		Not
ROOT\LEGACY_MPSDRV\0000					Available		ACPI\PNP0100\4&13C667F4&0		
Mount Point Manager	Not Available	LEGACYDRIVER	Not		System CMOS/real time clock	Yes	SYSTEM	6.0.6001.18000	
Available	Not Available	Not Available	Not Available		6/21/2006 (Standard system devices)		machine.inf		
Not Available	Not Available	ROOT\LEGACY_MOUNTMGR\0000			Not Available		ACPI\PNP0B00\4&13C667F4&0		
Link-Layer Topology Discovery Mapper I/O Driver	Not Available				System board	Yes	SYSTEM	6.0.6001.18000	6/21/2006
LEGACYDRIVER	Not Available	Not Available	Not Available		(Standard system devices)		machine.inf		Not
Not Available	Not Available	Not Available	Not Available		Available		ACPI\PNP0C01\2		
ROOT\LEGACY_LLTDIO\0000					Programmable interrupt controller	Yes	SYSTEM		
KSecDD	Not Available	LEGACYDRIVER	Not Available		6.0.6001.18000	6/21/2006 (Standard system devices)			
Not Available	Not Available	Not Available	Not Available		machine.inf		Not Available		
Not Available	Not Available	ROOT\LEGACY_KSECDD\0000			ACPI\PNP0000\4&13C667F4&0				
HTTP	Not Available	LEGACYDRIVER	Not Available		Numeric data processor	Yes	SYSTEM	6.0.6001.18000	
Not Available	Not Available	Not Available	Not Available		6/21/2006 (Standard system devices)		machine.inf		
Not Available	Not Available	ROOT\LEGACY_HTTP\0000			Not Available		ACPI\PNP0C04\4&13C667F4&0		
Crcdisk Filter Driver	Not Available	LEGACYDRIVER	Not		Direct memory access controller	Yes	SYSTEM	6.0.6001.18000	
Available	Not Available	Not Available	Not Available		6/21/2006 (Standard system devices)		machine.inf		
Not Available	Not Available	ROOT\LEGACY_CRCDISK\0000			Not Available		ACPI\PNP0200\4&13C667F4&0		
Common Log (CLFS)	Not Available	LEGACYDRIVER	Not		Intel(R) ICH9 LPC Interface Controller - 2918	No	SYSTEM		
Available	Not Available	Not Available	Not Available		9.1.1.1013 1/21/2009 Intel		oem11.inf	Not Available	
Not Available	Not Available	ROOT\LEGACY_CLFS\0000			PCI\VEN_8086&DEV_2918&SUBSYS_02371028&REV_02\3&33FD14CA&0&F8				
Ancillary Function Driver for Winsock	Not Available				Generic Non-PnP Monitor	Yes	MONITOR		
LEGACYDRIVER	Not Available	Not Available	Not Available		6.0.6001.18000	6/21/2006 (Standard monitor types)			
Not Available	Not Available	Not Available	Not Available		monitor.inf		Not Available		
ROOT\LEGACY_AFD\0000					DISPLAY\DEFAULT_MONITOR\5&39C4506A&0&12345678&08&03				
Microsoft iSCSI Initiator	Yes	SCSIADAPTER			Standard VGA Graphics Adapter	Yes	DISPLAY	6.0.6001.18000	
Available	6.0.6001.18000	6/21/2006 Microsoft iscsi.inf	Not		6/21/2006 (Standard display types)		display.inf		Not
Available	ROOT\ISCSIPRT\0000				Available		PCI\VEN_102B&DEV_0532&SUBSYS_02371028&REV_0A\4&BBCD9ED&0&18F0		
ACPI Fixed Feature Button	Yes	SYSTEM	6.0.6001.18000		Intel(R) 82801 PCI Bridge - 244E	Yes	SYSTEM		
6/21/2006 (Standard system devices)		machine.inf			6.0.6001.18000	6/21/2006 Intel	machine.inf		
Not Available	ACPI\FIXEDBUTTON\2&DABA3FF&1				Not Available				
Motherboard resources	Yes	SYSTEM	6.0.6001.18000		PCI\VEN_8086&DEV_244E&SUBSYS_02371028&REV_92\3&33FD14CA&0&F0				
6/21/2006 (Standard system devices)		machine.inf			USB Root Hub	Yes	USB	6.0.6001.18000	6/21/2006
Not Available	ACPI\PNP0C02\0				(Standard USB Host Controller)		usbport.inf	Not Available	
High precision event timer	Yes	SYSTEM	6.0.6001.18000		USB\ROOT_HUB20\4&C9F4614&0				
6/21/2006 (Standard system devices)		machine.inf			Intel(R) ICH9 Family USB2 Enhanced Host Controller - 293A	Yes			
Not Available	ACPI\PNP0103\0				USB	6.0.6001.18000	6/21/2006 Intel	usbport.inf	
Motherboard resources	Yes	SYSTEM	6.0.6001.18000		Not Available				
6/21/2006 (Standard system devices)		machine.inf			PCI\VEN_8086&DEV_293A&SUBSYS_02371028&REV_02\3&33FD14CA&0&EF				
Not Available	ACPI\PNP0C02\0				USB Root Hub	Yes	USB	6.0.6001.18000	6/21/2006
IDE Channel	Yes	HDC	6.0.6001.18000	6/21/2006	(Standard USB Host Controller)		usbport.inf	Not Available	
(Standard IDE ATA/ATAPI controllers)		mshdc.inf	Not		USB\ROOT_HUB\4&1B71667F&0				
Available	PCI\IDE\IDECHANNEL\4&B5CC01F&0&1				Intel(R) ICH9 Family USB Universal Host Controller - 2939	Yes			
CD-ROM Drive	Yes	CDROM	6.0.6001.18000	6/21/2006	USB	6.0.6001.18000	6/21/2006 Intel	usbport.inf	
(Standard CD-ROM drives)		cdrom.inf	Not Available		Not Available				
IDE\CDROMHL-DT-ST_DVD-					PCI\VEN_8086&DEV_2939&SUBSYS_02371028&REV_02\3&33FD14CA&0&EB				
ROM_DH10N_____0D08_____5&334745AD&0&0.0.0					HID-compliant mouse	Yes	MOUSE	6.0.6001.18000	6/21/2006
IDE Channel	Yes	HDC	6.0.6001.18000	6/21/2006	Microsoft		mmouse.inf	Not Available	
(Standard IDE ATA/ATAPI controllers)		mshdc.inf	Not		HID\VID_09AE&PID_0002&MI_01\7&FDD9F08&0&0000				
Available	PCI\IDE\IDECHANNEL\4&B5CC01F&0&0				USB Human Interface Device	Yes	HIDCLASS		
Intel(R) ICH9 Family 2 port Serial ATA Storage Controller 1 - 2921	No	HDC	8.6.1.1001 1/30/2008 Intel	oem12.inf	6.0.6001.18000	6/21/2006 (Standard system devices)			
Not Available					input.inf	Not Available			
PCI\VEN_8086&DEV_2921&SUBSYS_02371028&REV_02\3&33FD14CA&0&FA					USB\VID_09AE&PID_0002&MI_01\6&8FA055B&0&0001				
System board	Yes	SYSTEM	6.0.6001.18000	6/21/2006	HID Keyboard Device	Yes	KEYBOARD		
(Standard system devices)		machine.inf	Not		6.0.6001.18000	6/21/2006 (Standard keyboards)			
Available	ACPI\PNP0C01\1				keyboard.inf	Not Available			
Microsoft Generic IPMI Compliant Device	Yes	SYSTEM			HID\VID_09AE&PID_0002&MI_00\7&38484CD1&0&0000				
6.0.6001.18000	6/21/2006 Microsoft	ipmivrv.inf			USB Human Interface Device	Yes	HIDCLASS		
Not Available	ACPI\IP0001\5				6.0.6001.18000	6/21/2006 (Standard system devices)			
System board	Yes	SYSTEM	6.0.6001.18000	6/21/2006	input.inf	Not Available			
(Standard system devices)		machine.inf	Not		USB\VID_09AE&PID_0002&MI_00\6&8FA055B&0&0000				
Available	ACPI\PNP0C01\0				6.0.6001.18000	6/21/2006 (Standard system devices)			
Communications Port	Yes	PORTS	6.0.6001.18000	6/21/2006	input.inf	Not Available			
(Standard port types)		msports.inf	Not Available		USB\VID_09AE&PID_0002&MI_00\6&8FA055B&0&0000				
ACPI\PNP0501\2									

USB Composite Device Yes USB 6.0.6001.18000
6/21/2006 (Standard USB Host Controller) usb.inf Not Available

USB Root Hub Yes USB 6.0.6001.18000 6/21/2006
(Standard USB Host Controller) usbport.inf Not Available
USB\ROOT_HUB\4&3402FF37&0

Intel(R) ICH9 Family USB Universal Host Controller - 2936 Yes
USB 6.0.6001.18000 6/21/2006 Intel usbport.inf
Not Available
PCI\VEN_8086&DEV_2936&SUBSYS_02371028&REV_02\3&33FD14CA&0&EA

USB Root Hub Yes USB 6.0.6001.18000 6/21/2006
(Standard USB Host Controller) usbport.inf Not Available
USB\ROOT_HUB\4&1F93D2E&0

Intel(R) ICH9 Family USB Universal Host Controller - 2935 Yes
USB 6.0.6001.18000 6/21/2006 Intel usbport.inf
Not Available
PCI\VEN_8086&DEV_2935&SUBSYS_02371028&REV_02\3&33FD14CA&0&E9

HID-compliant mouse Yes MOUSE 6.0.6001.18000 6/21/2006
Microsoft msmouse.inf Not Available
HID\VID_0624&PID_0248&MI_01\7&8401AFE&0&0000

USB Human Interface Device Yes HIDCLASS
6.0.6001.18000 6/21/2006 (Standard system devices)
input.inf Not Available
USB\VID_0624&PID_0248&MI_01\6&289FB716&0&0001

HID Keyboard Device Yes KEYBOARD
6.0.6001.18000 6/21/2006 (Standard keyboards)
keyboard.inf Not Available
HID\VID_0624&PID_0248&MI_00\7&2C1758C0&0&0000

USB Human Interface Device Yes HIDCLASS
6.0.6001.18000 6/21/2006 (Standard system devices)
input.inf Not Available
USB\VID_0624&PID_0248&MI_00\6&289FB716&0&0000

USB Composite Device Yes USB 6.0.6001.18000
6/21/2006 (Standard USB Host Controller) usb.inf Not Available

USB Root Hub Yes USB 6.0.6001.18000 6/21/2006
(Standard USB Host Controller) usbport.inf Not Available
USB\ROOT_HUB\4&176885A1&0

Intel(R) ICH9 Family USB Universal Host Controller - 2934 Yes
USB 6.0.6001.18000 6/21/2006 Intel usbport.inf
Not Available
PCI\VEN_8086&DEV_2934&SUBSYS_02371028&REV_02\3&33FD14CA&0&E8

Generic USB Hub Yes USB 6.0.6001.18000 6/21/2006
(Generic USB Hub) usb.inf Not Available
USB\VID_0424&PID_2514\5&42D8A8C&0&3

USB Root Hub Yes USB 6.0.6001.18000 6/21/2006
(Standard USB Host Controller) usbport.inf Not Available
USB\ROOT_HUB2\4&116A8DA0&0

Intel(R) ICH9 Family USB2 Enhanced Host Controller - 293C Yes
USB 6.0.6001.18000 6/21/2006 Intel usbport.inf
Not Available
PCI\VEN_8086&DEV_293C&SUBSYS_02371028&REV_02\3&33FD14CA&0&D7

USB Root Hub Yes USB 6.0.6001.18000 6/21/2006
(Standard USB Host Controller) usbport.inf Not Available
USB\ROOT_HUB\4&385B4F29&0

Intel(R) ICH9 Family USB Universal Host Controller - 2938 Yes
USB 6.0.6001.18000 6/21/2006 Intel usbport.inf
Not Available
PCI\VEN_8086&DEV_2938&SUBSYS_02371028&REV_02\3&33FD14CA&0&D1

USB Root Hub Yes USB 6.0.6001.18000 6/21/2006
(Standard USB Host Controller) usbport.inf Not Available
USB\ROOT_HUB\4&22EC06B6&0

Intel(R) ICH9 Family USB Universal Host Controller - 2937 Yes
USB 6.0.6001.18000 6/21/2006 Intel usbport.inf
Not Available
PCI\VEN_8086&DEV_2937&SUBSYS_02371028&REV_02\3&33FD14CA&0&D0

Intel(R) 5520/5500/X58 I/O Hub Control Status and RAS Registers - 3423
No SYSTEM 9.1.0.1005 7/30/2008 Intel oem13.inf
Not Available
PCI\VEN_8086&DEV_3423&SUBSYS_00000000&REV_13\3&33FD14CA&0&A2

Intel(R) 5520/5500/X58 I/O Hub GPIO and Scratch Pad Registers - 3422
No SYSTEM 9.1.0.1005 7/30/2008 Intel oem13.inf
Not Available
PCI\VEN_8086&DEV_3422&SUBSYS_00000000&REV_13\3&33FD14CA&0&A1

Intel(R) 5520/5500/X58 I/O Hub System Management Registers - 342E
No SYSTEM 9.1.0.1005 7/30/2008 Intel oem13.inf
Not Available
PCI\VEN_8086&DEV_342E&SUBSYS_00000000&REV_13\3&33FD14CA&0&A0

LSI RAID Virtual Device Yes SYSTEM 2.4.0.64 8/23/2006
LSI megasas2.inf Not Available
SCSI\OTHER&VEN__RAID&PROD__DUMMYDEVICE\5&10C5778A&0&014000

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006
(Standard disk drives) disk.inf Not Available
SCSI\DISK&VEN_DELL&PROD_PERC_6/T/5&10C5778A&0&010000

DELL PERC 6/i Integrated RAID Controller Yes SCSIADAPTER
2.13.0.64 5/11/2007 DELL megasas.inf Not Available

Available
PCI\VEN_1000&DEV_0060&SUBSYS_1F0C1028&REV_04\4&26420C98&0&0050

Intel(R) 5520/5500/X58 I/O Hub PCI Express Root Port 10 - 3411 No
SYSTEM 9.1.0.1005 7/30/2008 Intel oem13.inf Not Available

Available
PCI\VEN_8086&DEV_3411&SUBSYS_02371028&REV_13\3&33FD14CA&0&50

Intel(R) 5520/5500/X58 I/O Hub PCI Express Root Port 9 - 3410 No
SYSTEM 9.1.0.1005 7/30/2008 Intel oem13.inf Not Available

Available
PCI\VEN_8086&DEV_3410&SUBSYS_02371028&REV_13\3&33FD14CA&0&48

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006
(Standard disk drives) disk.inf Not Available
PCIE\DISK FUSION IO_IODRIVE_80GB__0001\5&1E23A0F9&0

Fusion ioDrive No FUSION-IO DEVICES 1.2.4.3
1/19/2009 Fusion-io oem10.inf Not Available
PCI\VEN_1AED&DEV_1003&SUBSYS_10101AED&REV_01\4&2EA8C9DF&0&0038

Intel(R) 5520/5500/X58 I/O Hub PCI Express Root Port 7 - 340E No
SYSTEM 9.1.0.1005 7/30/2008 Intel oem13.inf Not Available

Available
PCI\VEN_8086&DEV_340E&SUBSYS_02371028&REV_13\3&33FD14CA&0&38

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006
(Standard disk drives) disk.inf Not Available
PCIE\DISK FUSION IO_IODRIVE_80GB__0001\5&24FA8D4F&0

Fusion ioDrive No FUSION-IO DEVICES 1.2.4.3
1/19/2009 Fusion-io oem10.inf Not Available
PCI\VEN_1AED&DEV_1003&SUBSYS_10101AED&REV_01\4&5BEFE3D&0&0028

Intel(R) 5520/X58 I/O Hub PCI Express Root Port 5 - 340C No
SYSTEM 9.1.0.1005 7/30/2008 Intel oem13.inf Not Available

Available
PCI\VEN_8086&DEV_340C&SUBSYS_02371028&REV_13\3&33FD14CA&0&28

Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006
(Standard disk drives) disk.inf Not Available
PCIE\DISK FUSION IO_IODRIVE_80GB__0001\5&381439C6&0

Fusion ioDrive No FUSION-IO DEVICES 1.2.4.3
1/19/2009 Fusion-io oem10.inf Not Available
PCI\VEN_1AED&DEV_1003&SUBSYS_10101AED&REV_01\4&F50063B&0&0020

Intel(R) 5520/X58 I/O Hub PCI Express Root Port 4 - 340B No
SYSTEM 9.1.0.1005 7/30/2008 Intel oem13.inf Not
Available
PCI\VEN_8086&DEV_340B&SUBSYS_02371028&REV_13\3&
33FD14CA&0&20
Disk drive Yes DISKDRIVE 6.0.6001.18000 6/21/2006
(Standard disk drives) disk.inf Not Available
PCI\DISKFISSIONIO_IDRIVE_80GB___0001\5&2A55720A
&0
Fusion ioDrive No FUSION-IO DEVICES 1.2.4.3
1/19/2009 Fusion-io oem10.inf Not Available
PCI\VEN_1AED&DEV_1003&SUBSYS_10101AED&REV_01\4
&34BFA549&0&0018
Intel(R) 5520/5500/X58 I/O Hub PCI Express Root Port 3 - 340A No
SYSTEM 9.1.0.1005 7/30/2008 Intel oem13.inf Not
Available
PCI\VEN_8086&DEV_340A&SUBSYS_02371028&REV_13\3&
33FD14CA&0&18
Broadcom BCM5709C NetXtreme II GigE (NDIS VBD Client) No
NET 4.6.14.0 10/16/2008 Broadcom
Corporation oem3.inf Not Available
B06BDRV\L2ND&PCI_163914E4&SUBSYS_02371028&REV_
20\5&288F6B0&0&20050100
Broadcom BCM5709C NetXtreme II GigE No SYSTEM 4.6.55.0
1/27/2009 Broadcom Corporation oem1.inf Not
Available
PCI\VEN_14E4&DEV_1639&SUBSYS_02371028&REV_20\FE
AA53B601
Broadcom BCM5709C NetXtreme II GigE (NDIS VBD Client) No
NET 4.6.14.0 10/16/2008 Broadcom
Corporation oem3.inf Not Available
B06BDRV\L2ND&PCI_163914E4&SUBSYS_02371028&REV_
20\5&1FAB2208&0&20050100
Broadcom BCM5709C NetXtreme II GigE No SYSTEM 4.6.55.0
1/27/2009 Broadcom Corporation oem1.inf Not
Available
PCI\VEN_14E4&DEV_1639&SUBSYS_02371028&REV_20\FE
AA53B400
Intel(R) 5520/5500/X58 I/O Hub PCI Express Root Port 1 - 3408 No
SYSTEM 9.1.0.1005 7/30/2008 Intel oem13.inf Not
Available
PCI\VEN_8086&DEV_3408&SUBSYS_02371028&REV_13\3&
33FD14CA&0&0&8
Intel(R) 5520/5500/X58 I/O Hub to ESI Port - 3406 No SYSTEM
9.1.0.1005 7/30/2008 Intel oem13.inf Not Available
PCI\VEN_8086&DEV_3406&SUBSYS_02371028&REV_13\3&
33FD14CA&0&0&0
PCI bus Yes SYSTEM 6.0.6001.18000 6/21/2006 (Standard
system devices) machine.inf Not Available
ACPI\PNP0A08\2&DABA3FF&1
Microsoft Hardware Error Device Yes SYSTEM
6.0.6001.18000 6/21/2006 Microsoft acpi.inf Not
Available ACPI\PNP0C33\WHEA
Intel Processor Yes PROCESSOR 6.0.6001.18000
6/21/2006 Intel cpu.inf Not Available
ACPI\GENUINEINTEL_-_EM64T_FAMILY_6_MODEL_26\15
Intel Processor Yes PROCESSOR 6.0.6001.18000
6/21/2006 Intel cpu.inf Not Available
ACPI\GENUINEINTEL_-_EM64T_FAMILY_6_MODEL_26\14
Intel Processor Yes PROCESSOR 6.0.6001.18000
6/21/2006 Intel cpu.inf Not Available
ACPI\GENUINEINTEL_-_EM64T_FAMILY_6_MODEL_26\13
Intel Processor Yes PROCESSOR 6.0.6001.18000
6/21/2006 Intel cpu.inf Not Available
ACPI\GENUINEINTEL_-_EM64T_FAMILY_6_MODEL_26\12
Intel Processor Yes PROCESSOR 6.0.6001.18000
6/21/2006 Intel cpu.inf Not Available
ACPI\GENUINEINTEL_-_EM64T_FAMILY_6_MODEL_26\11
Intel Processor Yes PROCESSOR 6.0.6001.18000
6/21/2006 Intel cpu.inf Not Available
ACPI\GENUINEINTEL_-_EM64T_FAMILY_6_MODEL_26\10

Intel Processor Yes PROCESSOR 6.0.6001.18000
6/21/2006 Intel cpu.inf Not Available
ACPI\GENUINEINTEL_-_EM64T_FAMILY_6_MODEL_26\9
Intel Processor Yes PROCESSOR 6.0.6001.18000
6/21/2006 Intel cpu.inf Not Available
ACPI\GENUINEINTEL_-_EM64T_FAMILY_6_MODEL_26\8
Intel Processor Yes PROCESSOR 6.0.6001.18000
6/21/2006 Intel cpu.inf Not Available
ACPI\GENUINEINTEL_-_EM64T_FAMILY_6_MODEL_26\7
Intel Processor Yes PROCESSOR 6.0.6001.18000
6/21/2006 Intel cpu.inf Not Available
ACPI\GENUINEINTEL_-_EM64T_FAMILY_6_MODEL_26\6
Intel Processor Yes PROCESSOR 6.0.6001.18000
6/21/2006 Intel cpu.inf Not Available
ACPI\GENUINEINTEL_-_EM64T_FAMILY_6_MODEL_26\5
Intel Processor Yes PROCESSOR 6.0.6001.18000
6/21/2006 Intel cpu.inf Not Available
ACPI\GENUINEINTEL_-_EM64T_FAMILY_6_MODEL_26\4
Intel Processor Yes PROCESSOR 6.0.6001.18000
6/21/2006 Intel cpu.inf Not Available
ACPI\GENUINEINTEL_-_EM64T_FAMILY_6_MODEL_26\3
Intel Processor Yes PROCESSOR 6.0.6001.18000
6/21/2006 Intel cpu.inf Not Available
ACPI\GENUINEINTEL_-_EM64T_FAMILY_6_MODEL_26\2
Intel Processor Yes PROCESSOR 6.0.6001.18000
6/21/2006 Intel cpu.inf Not Available
ACPI\GENUINEINTEL_-_EM64T_FAMILY_6_MODEL_26\1
Intel Processor Yes PROCESSOR 6.0.6001.18000
6/21/2006 Intel cpu.inf Not Available
ACPI\GENUINEINTEL_-_EM64T_FAMILY_6_MODEL_26\0
Microsoft ACPI-Compliant System Yes SYSTEM
6.0.6001.18000 6/21/2006 Microsoft acpi.inf Not
Available ACPI_HAL\PNP0C08\0
ACPI x64-based PC Yes COMPUTER 6.0.6001.18000
6/21/2006 (Standard computers) hal.inf Not Available
ROOT\ACPI_HAL\0000
Microsoft ISATAP Adapter Yes NET 6.0.6001.18000
6/21/2006 Microsoft nettun.inf Not Available
ROOT*ISATAP\0001
Microsoft ISATAP Adapter Yes NET 6.0.6001.18000
6/21/2006 Microsoft nettun.inf Not Available
ROOT*ISATAP\0000
Microsoft 6to4 Adapter Yes NET 6.0.6001.18000
6/21/2006 Microsoft nettun.inf Not Available
ROOT*6TO4MP\0000
Not Available Not Available Not Available Not
Available Not Available Not Available Not
Available Not Available HTREE\ROOT\0
Not Available Yes Not Available 2:6.0 Not
Available Not Available Not Available Not Available
Microsoft XPS Document Writer (redirected 2) (redirected 2)
Not Available Yes Not Available 2:6.0 Not
Available Not Available Not Available Not Available
Microsoft XPS Document Writer (redirected 2)
Not Available Yes Not Available 2:6.0 Not
Available Not Available Not Available Not Available
Microsoft XPS Document Writer

[Environment Variables]

Variable	Value	User Name
ComSpec	%SystemRoot%\system32\cmd.exe	<SYSTEM>
FP_NO_HOST_CHECK	NO	<SYSTEM>
NUMBER_OF_PROCESSORS	16	<SYSTEM>
OS	Windows_NT	<SYSTEM>
Path	%SystemRoot%\system32;%SystemRoot%;%SystemRoot%\System32\Wbem;%SYSTEMROOT%\System32\WindowsPowerShell\v1.0;C:\Program Files\Microsoft SQL Server\MSSQL10.MSSQLSERVER\MSSQL\Binn;.C:\Program Files (x86)\StepMaster;C:\Program Files (x86)\Microsoft SQL Server\100\Tools\Binn;.C:\Program Files\Microsoft SQL Server\100\Tools\Binn;.C:\Program Files\Microsoft SQL	

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Server\100\DTS\Binn\C:\Program Files (x86)\Microsoft SQL
Server\100\Tools\Binn\VSShell\Common7\IDE\C:\Program Files
(x86)\Microsoft SQL Server\100\DTS\Binn\ <SYSTEM>
PATHEXT
.COM;.EXE;.BAT;.CMD;.VBS;.VBE;.JS;.JSE;.WSF;.WSH;.MSC
<SYSTEM>
PROCESSOR_ARCHITECTURE AMD64 <SYSTEM>
PROCESSOR_IDENTIFIER Intel64 Family 6 Model 26 Stepping 4,
GenuineIntel <SYSTEM>
PROCESSOR_LEVEL 6 <SYSTEM>
PROCESSOR_REVISION 1a04 <SYSTEM>
TEMP %SystemRoot%\TEMP <SYSTEM>
TMP %SystemRoot%\TEMP <SYSTEM>
USERNAME SYSTEM <SYSTEM>
windir %SystemRoot% <SYSTEM>
TEMP %USERPROFILE%\AppData\Local\Temp NT
AUTHORITY\SYSTEM
TMP %USERPROFILE%\AppData\Local\Temp NT
AUTHORITY\SYSTEM
TEMP %USERPROFILE%\AppData\Local\Temp NT
AUTHORITY\LOCAL SERVICE
TMP %USERPROFILE%\AppData\Local\Temp NT
AUTHORITY\LOCAL SERVICE
TEMP %USERPROFILE%\AppData\Local\Temp NT
AUTHORITY\NETWORK SERVICE
TMP %USERPROFILE%\AppData\Local\Temp NT
AUTHORITY\NETWORK SERVICE
TEMP %USERPROFILE%\AppData\Local\Temp T610\Administrator
TMP %USERPROFILE%\AppData\Local\Temp T610\Administrator

```

[Print Jobs]

Document	Size	Owner	Notify	Status	Time Submitted
Job ID	Priority	Parameters	Driver	Print Processor	Host Print Queue

[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
system	Not Available	4	8	Not Available	Not Available
smss.exe	Not Available	528	11	200	1380
csrss.exe	c:\windows\system32\csrss.exe	612	13	200	7.50 KB
csrss.exe	c:\windows\system32\csrss.exe	656	13	200	7.50 KB
wininit.exe	c:\windows\system32\wininit.exe	664	13	200	121.00 KB
services.exe	c:\windows\system32\services.exe	9	200	1380	700
winlogon.exe	c:\windows\system32\winlogon.exe	13	200	1380	724

lsass.exe	c:\windows\system32\lsass.exe	748	9	200	11.00 KB
lsm.exe	c:\windows\system32\lsm.exe	756	8	200	258.50 KB
svchost.exe	c:\windows\system32\svchost.exe	8	200	1380	916
svchost.exe	c:\windows\system32\svchost.exe	8	200	1380	976
logonui.exe	c:\windows\system32\logonui.exe	13	200	1380	412
svchost.exe	c:\windows\system32\svchost.exe	8	200	1380	424
svchost.exe	c:\windows\system32\svchost.exe	8	200	1380	548
svchost.exe	c:\windows\system32\svchost.exe	8	200	1380	580
slsvc.exe	c:\windows\system32\slsvc.exe	584	8	200	2.06 MB
svchost.exe	c:\windows\system32\svchost.exe	8	200	1380	692
svchost.exe	c:\windows\system32\svchost.exe	8	200	1380	1032
svchost.exe	c:\windows\system32\svchost.exe	8	200	1380	1060
svchost.exe	c:\windows\system32\svchost.exe	8	200	1380	1220
taskeng.exe	c:\windows\system32\taskeng.exe	6	200	1380	1352
spoolsv.exe	c:\windows\system32\spoolsv.exe	8	200	1380	1624
svchost.exe	c:\windows\system32\svchost.exe	8	200	1380	1764
svchost.exe	c:\windows\system32\svchost.exe	8	200	1380	1780
sqlwriter.exe	c:\program files\microsoft sql server\90\shared\sqlwriter.exe	1812	8	200	1380
svchost.exe	c:\windows\system32\svchost.exe	8	200	1380	1920

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msdtc.exe c:\windows\system32\msdtc.exe 2720 8 200
1380 5/18/2009 3:39 PM 2001.12.6931.18000 104.00 KB
(106,496 bytes) 1/19/2008 12:27 AM
csrss.exe c:\windows\system32\csrss.exe 2824 13 200
1380 5/18/2009 3:39 PM 6.0.6001.18000 7.50 KB
(7,680 bytes) 1/18/2008 11:59 PM
winlogon.exe c:\windows\system32\winlogon.exe 2848
13 200 1380 5/18/2009 3:39 PM
6.0.6001.18000 396.50 KB (406,016 bytes) 1/19/2008
12:18 AM
taskeng.exe c:\windows\system32\taskeng.exe 3068
8 200 1380 5/18/2009 3:39 PM
6.0.6001.18000 259.00 KB (265,216 bytes) 1/19/2008
12:13 AM
rdpclip.exec c:\windows\system32\rdpclip.exe 1404 8 200
1380 5/18/2009 3:39 PM 6.0.6001.18000 187.00 KB
(191,488 bytes) 1/19/2008 7:51 AM
dwm.exe c:\windows\system32\dwm.exe 2432 8 200
1380 5/18/2009 3:39 PM 6.0.6001.18000 96.50 KB
(98,816 bytes) 1/19/2008 12:10 AM
explorer.exe c:\windows\explorer.exe 2184 8
200 1380 5/18/2009 3:39 PM 6.0.6001.18000
2.94 MB (3,080,704 bytes) 1/19/2008 12:22 AM
bacstray.exe c:\program files\broadcom\bacs\bacstray.exe 2572
8 200 1380 5/18/2009 3:39 PM 11.6.10.0
432.31 KB (442,688 bytes) 2/4/2009 3:30 PM
wuauclt.exe c:\windows\system32\wuauclt.exe 2664
8 200 1380 5/18/2009 3:40 PM
7.0.6001.18000 44.50 KB (45,568 bytes) 1/19/2008
1:09 AM
cmd.exe c:\windows\system32\cmd.exe 2464 8 200
1380 5/18/2009 3:45 PM 6.0.6001.18000 354.50 KB
(363,008 bytes) 1/19/2008 12:05 AM
sqlservr.exe c:\program files\microsoft sql
server\mssql10.mssqlserver\mssql\binn\sqlservr.exe 2488 13
200 1380 5/18/2009 3:45 PM 2007.100.1600.22
55.14 MB (57,820,696 bytes) 7/10/2008 5:31 AM
msinfo32.exe c:\windows\syswow64\msinfo32.exe 2316
8 200 1380 5/18/2009 4:05 PM
6.0.6001.18000 398.50 KB (408,064 bytes) 1/18/2008
11:33 PM
wmiprvse.exe c:\windows\system32\wbem\wmiprvse.exe 2456
8 200 1380 5/18/2009 4:05 PM
6.0.6001.18000 340.50 KB (348,672 bytes) 1/19/2008
12:13 AM
wmiprvse.exe c:\windows\syswow64\wbem\wmiprvse.exe 2996
8 200 1380 5/18/2009 4:05 PM
6.0.6001.18000 239.50 KB (245,248 bytes) 1/18/2008
11:39 PM
wmiprvse.exe c:\windows\syswow64\wbem\wmiprvse.exe 2172
8 200 1380 5/18/2009 4:05 PM
6.0.6001.18000 239.50 KB (245,248 bytes) 1/18/2008
11:39 PM

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[Loaded Modules]

Name	Version	Size	File Date	Manufacturer	Path
csrss	6.0.6001.18000	7.50 KB (7,680 bytes)	1/18/2008 11:59 PM	Microsoft Corporation	c:\windows\system32\csrss.exe
ntdll	6.0.6001.18000	1.49 MB (1,559,696 bytes)	1/18/2008 11:54 PM	Microsoft Corporation	c:\windows\system32\ntdll.dll
csrssrv	6.0.6001.18000	83.50 KB (85,504 bytes)	1/18/2008 11:59 PM	Microsoft Corporation	c:\windows\system32\csrssrv.dll
basesrv	6.0.6001.18000	78.50 KB (80,384 bytes)	1/18/2008 11:59 PM	Microsoft Corporation	c:\windows\system32\basesrv.dll
winsrv	6.0.6001.18000	439.50 KB (450,048 bytes)	1/19/2008 12:08 AM	Microsoft Corporation	c:\windows\system32\winsrv.dll
user32	6.0.6001.18000	801.00 KB (820,224 bytes)	1/19/2008 12:08 AM	Microsoft Corporation	c:\windows\system32\user32.dll
kernel32	6.0.6001.18000	1.16 MB (1,213,952 bytes)	1/19/2008 12:01 AM	Microsoft Corporation	c:\windows\system32\kernel32.dll

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gdi32 6.0.6001.18000 379.00 KB (388,096 bytes) 1/19/2008
12:08 AM Microsoft Corporation c:\windows\system32\gdi32.dll
advapi32 6.0.6001.18000 1.01 MB (1,062,400 bytes) 1/19/2008
1:13 AM Microsoft Corporation
c:\windows\system32\advapi32.dll
rpcrt4 6.0.6001.18000 1.22 MB (1,281,024 bytes) 1/19/2008
12:28 AM Microsoft Corporation c:\windows\system32\rpcrt4.dll
lpk 6.0.6001.18000 32.00 KB (32,768 bytes) 1/19/2008
12:08 AM Microsoft Corporation c:\windows\system32\lpk.dll
usp10 1.626.6001.18000 607.50 KB (622,080 bytes) 1/19/2008
12:08 AM Microsoft Corporation c:\windows\system32\usp10.dll
msvcr7 7.0.6001.18000 606.50 KB (621,056 bytes) 1/18/2008
11:52 PM Microsoft Corporation c:\windows\system32\msvcr7.dll
sxs 6.0.6001.18000 560.50 KB (573,952 bytes) 1/19/2008
12:00 AM Microsoft Corporation c:\windows\system32\sxs.dll
wininit 6.0.6001.18000 121.00 KB (123,904 bytes) 1/19/2008
12:17 AM Microsoft Corporation c:\windows\system32\wininit.exe
userenv 6.0.6001.18000 134.00 KB (137,216 bytes) 1/19/2008
12:16 AM Microsoft Corporation c:\windows\system32\userenv.dll
secur32 6.0.6001.18000 92.00 KB (94,208 bytes) 1/19/2008
12:16 AM Microsoft Corporation c:\windows\system32\secur32.dll
imm32 6.0.6001.18000 160.00 KB (163,840 bytes) 1/19/2008
12:07 AM Microsoft Corporation c:\windows\system32\imm32.dll
mctcf 6.0.6001.18000 1,016.00 KB (1,040,384 bytes) 1/19/2008
12:09 AM Microsoft Corporation c:\windows\system32\mctcf.dll
apphelp 6.0.6001.18000 195.50 KB (200,192 bytes) 1/18/2008
11:52 PM Microsoft Corporation c:\windows\system32\apphelp.dll
ws2_32 6.0.6001.18000 259.00 KB (265,216 bytes) 1/19/2008
12:38 AM Microsoft Corporation c:\windows\system32\ws2_32.dll
nsi 6.0.6001.18000 11.00 KB (11,264 bytes) 1/19/2008
12:36 AM Microsoft Corporation c:\windows\system32\nsi.dll
msock 6.0.6001.18000 297.00 KB (304,128 bytes) 1/19/2008
12:38 AM Microsoft Corporation
c:\windows\system32\msock.dll
wshtcpip 6.0.6001.18000 12.50 KB (12,800 bytes) 1/19/2008
12:36 AM Microsoft Corporation
c:\windows\system32\wshtcpip.dll
wship6 6.0.6001.18000 11.00 KB (11,264 bytes) 1/19/2008
12:36 AM Microsoft Corporation c:\windows\system32\wship6.dll
credssp 6.0.6001.18000 18.00 KB (18,432 bytes) 1/19/2008
12:16 AM Microsoft Corporation c:\windows\system32\credssp.dll
crypt32 6.0.6001.18000 1.20 MB (1,254,400 bytes) 1/19/2008
12:15 AM Microsoft Corporation c:\windows\system32\crypt32.dll
msasn1 6.0.6001.18000 79.00 KB (80,896 bytes) 1/19/2008
12:57 AM Microsoft Corporation c:\windows\system32\msasn1.dll
schannel 6.0.6001.18000 326.50 KB (334,336 bytes) 1/19/2008
12:16 AM Microsoft Corporation
c:\windows\system32\schannel.dll
netapi32 6.0.6001.18000 633.50 KB (648,704 bytes) 1/19/2008
12:19 AM Microsoft Corporation
c:\windows\system32\netapi32.dll
psapi 6.0.6001.18000 16.50 KB (16,896 bytes) 1/19/2008
12:40 AM Microsoft Corporation c:\windows\system32\psapi.dll
services 6.0.6001.18000 375.50 KB (384,512 bytes) 1/19/2008
12:03 AM Microsoft Corporation
c:\windows\system32\services.exe
scserv 6.0.6001.18000 390.00 KB (399,360 bytes) 1/19/2008
12:15 AM Microsoft Corporation c:\windows\system32\scserv.dll
authz 6.0.6001.18000 139.50 KB (142,848 bytes) 1/19/2008
12:16 AM Microsoft Corporation c:\windows\system32\authz.dll
ncobjapi 6.0.6001.18000 68.50 KB (70,144 bytes) 1/19/2008
12:13 AM Microsoft Corporation
c:\windows\system32\ncobjapi.dll
ntmarta 6.0.6001.18000 155.50 KB (159,232 bytes) 1/19/2008
12:16 AM Microsoft Corporation c:\windows\system32\ntmarta.dll
wldap32 6.0.6001.18000 321.00 KB (328,704 bytes) 1/19/2008
12:20 AM Microsoft Corporation
c:\windows\system32\wldap32.dll
samlib 6.0.6001.18000 97.00 KB (99,328 bytes) 1/19/2008
12:19 AM Microsoft Corporation c:\windows\system32\samlib.dll
ole32 6.0.6001.18000 1.83 MB (1,923,072 bytes) 1/19/2008
12:30 AM Microsoft Corporation c:\windows\system32\ole32.dll

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winlogon	6.0.6001.18000	396.50 KB (406,016 bytes)	1/19/2008	oleaut32	6.0.6001.18000	828.00 KB (847,872 bytes)	1/19/2008
12:18 AM Microsoft Corporation	c:\windows\system32\winlogon.exe			12:27 AM Microsoft Corporation	c:\windows\system32\oleaut32.dll		
winsta	6.0.6001.18000	200.50 KB (205,312 bytes)	1/19/2008	scecli	6.0.6001.18000	230.00 KB (235,520 bytes)	1/19/2008
12:43 AM Microsoft Corporation	c:\windows\system32\winsta.dll			12:15 AM Microsoft Corporation	c:\windows\system32\scecli.dll		
shsvcs	6.0.6001.18000	294.50 KB (301,568 bytes)	1/19/2008	rassfm	6.0.6001.18000	25.50 KB (26,112 bytes)	1/19/2008
12:21 AM Microsoft Corporation	c:\windows\system32\shsvcs.dll			7:51 AM Microsoft Corporation	c:\windows\system32\rassfm.dll		
lsass	6.0.6001.18000	11.00 KB (11,264 bytes)	1/19/2008	dssenh	6.0.6001.18000	197.55 KB (202,296 bytes)	1/19/2008
12:16 AM Microsoft Corporation	c:\windows\system32\lsass.exe			12:18 AM Microsoft Corporation	c:\windows\system32\dssenh.dll		
lsasrv	6.0.6001.18000	1.61 MB (1,692,160 bytes)	1/19/2008	cryptnet	6.0.6001.18000	127.00 KB (130,048 bytes)	1/19/2008
1:21 AM Microsoft Corporation	c:\windows\system32\lsasrv.dll			12:15 AM Microsoft Corporation	c:\windows\system32\cryptnet.dll		
samsrv	6.0.6001.18000	651.00 KB (666,624 bytes)	1/19/2008	sensapi	6.0.6001.18000	12.50 KB (12,800 bytes)	1/19/2008
12:19 AM Microsoft Corporation	c:\windows\system32\samsrv.dll			12:27 AM Microsoft Corporation	c:\windows\system32\sensapi.dll		
cryptdll	6.0.6001.18000	63.50 KB (65,024 bytes)	1/19/2008	shlwapi	6.0.6001.18000	443.50 KB (454,144 bytes)	1/19/2008
12:15 AM Microsoft Corporation	c:\windows\system32\cryptdll.dll			12:21 AM Microsoft Corporation	c:\windows\system32\shlwapi.dll		
dnsapi	6.0.6001.18000	214.50 KB (219,648 bytes)	1/19/2008	comctl32	6.10.6001.18000	1.95 MB (2,049,024 bytes)	1/19/2008
12:20 AM Microsoft Corporation	c:\windows\system32\dnsapi.dll			3:51 AM Microsoft Corporation	c:\windows\winsxs\amd64_microsoft.windows.common-controls_6595b64144ccf1df_6.0.6001.18000_none_152e7382f3bd50c6\comctl32.dll		
ntdsapi	6.0.6001.18000	143.00 KB (146,432 bytes)	1/19/2008	lsm	6.0.6001.18000	258.50 KB (264,704 bytes)	1/19/2008
12:20 AM Microsoft Corporation	c:\windows\system32\ntdsapi.dll			12:43 AM Microsoft Corporation	c:\windows\system32\lsm.exe		
feclnt	6.0.6001.18000	67.00 KB (68,608 bytes)	1/19/2008	wmsgapi	6.0.6000.16386	14.00 KB (14,336 bytes)	1/19/2008
12:18 AM Microsoft Corporation	c:\windows\system32\feclnt.dll			12:17 AM Microsoft Corporation	c:\windows\system32\wmsgapi.dll		
mpr	6.0.6001.18000	83.50 KB (85,504 bytes)	1/19/2008	clbcatq	2001.12.6931.18000	597.00 KB (611,328 bytes)	1/19/2008
12:38 AM Microsoft Corporation	c:\windows\system32\mpr.dll			12:28 AM Microsoft Corporation	c:\windows\system32\clbcatq.dll		
slc	6.0.6001.18000	146.50 KB (150,016 bytes)	1/19/2008	lsmproxy	6.0.6001.18000	43.50 KB (44,544 bytes)	1/19/2008
1:32 AM Microsoft Corporation	c:\windows\system32\slc.dll			12:42 AM Microsoft Corporation	c:\windows\system32\lsmproxy.dll		
sysntfy	6.0.6000.16386	21.00 KB (21,504 bytes)	1/19/2008	svchost	6.0.6001.18000	27.00 KB (27,648 bytes)	1/19/2008
12:17 AM Microsoft Corporation	c:\windows\system32\sysntfy.dll			12:02 AM Microsoft Corporation	c:\windows\system32\svchost.exe		
wevtapi	6.0.6001.18000	384.50 KB (393,728 bytes)	1/19/2008	umpnprmgr	6.0.6001.18000	304.50 KB (311,808 bytes)	1/18/2008
12:12 AM Microsoft Corporation	c:\windows\system32\wevtapi.dll			11:59 PM Microsoft Corporation	c:\windows\system32\umpnprmgr.dll		
iphlpapi	6.0.6001.18000	124.00 KB (126,976 bytes)	1/19/2008	powrprof	6.0.6001.18000	118.50 KB (121,344 bytes)	1/19/2008
12:36 AM Microsoft Corporation	c:\windows\system32\iphlpapi.dll			12:23 AM Microsoft Corporation	c:\windows\system32\powrprof.dll		
dhcpcsvc	6.0.6001.18000	262.00 KB (268,288 bytes)	1/19/2008	rpcss	6.0.6001.18000	697.00 KB (713,728 bytes)	1/19/2008
12:35 AM Microsoft Corporation	c:\windows\system32\dhcpcsvc.dll			12:27 AM Microsoft Corporation	c:\windows\system32\rpcss.dll		
winnsi	6.0.6001.18000	21.50 KB (22,016 bytes)	1/19/2008	FirewallAPI	6.0.6001.18000	685.00 KB (701,440 bytes)	1/19/2008
12:36 AM Microsoft Corporation	c:\windows\system32\winnsi.dll			12:35 AM Microsoft Corporation	c:\windows\system32\firewallapi.dll		
dhcpcsvc6	6.0.6001.18000	155.00 KB (158,720 bytes)	1/19/2008	version	6.0.6001.18000	26.50 KB (27,136 bytes)	1/19/2008
12:35 AM Microsoft Corporation	c:\windows\system32\dhcpcsvc6.dll			12:24 AM Microsoft Corporation	c:\windows\system32\version.dll		
cngaudit	6.0.6000.16386	14.50 KB (14,848 bytes)	1/19/2008	wtsapi32	6.0.6001.18000	30.50 KB (31,232 bytes)	1/19/2008
12:15 AM Microsoft Corporation	c:\windows\system32\cngaudit.dll			12:42 AM Microsoft Corporation	c:\windows\system32\wtsapi32.dll		
ncrypt	6.0.6001.18000	247.50 KB (253,440 bytes)	1/19/2008	cabinet	6.0.6001.18000	91.00 KB (93,184 bytes)	1/19/2008
12:15 AM Microsoft Corporation	c:\windows\system32\ncrypt.dll			12:23 AM Microsoft Corporation	c:\windows\system32\cabinet.dll		
bcrypt	6.0.6001.18000	299.50 KB (306,688 bytes)	1/19/2008	fwpuclnt	6.0.6001.18000	761.50 KB (779,776 bytes)	1/19/2008
12:15 AM Microsoft Corporation	c:\windows\system32\bcrypt.dll			12:36 AM Microsoft Corporation	c:\windows\system32\fwpuclnt.dll		
msprvs	6.0.6000.16386	2.00 KB (2,048 bytes)	1/19/2008	logonui	6.0.6001.18000	20.50 KB (20,992 bytes)	1/19/2008
12:16 AM Microsoft Corporation	c:\windows\system32\msprvs.dll			12:17 AM Microsoft Corporation	c:\windows\system32\logonui.exe		
kerberos	6.0.6001.18000	639.50 KB (654,848 bytes)	1/19/2008	authui	6.0.6001.18000	2.17 MB (2,271,744 bytes)	1/19/2008
12:17 AM Microsoft Corporation	c:\windows\system32\kerberos.dll			12:25 AM Microsoft Corporation	c:\windows\system32\authui.dll		
msv1_0	6.0.6001.18000	259.50 KB (265,728 bytes)	1/19/2008	msimg32	6.0.6001.18000	8.00 KB (8,192 bytes)	1/19/2008
12:16 AM Microsoft Corporation	c:\windows\system32\msv1_0.dll			12:07 AM Microsoft Corporation	c:\windows\system32\msimg32.dll		
netlogon	6.0.6001.18000	700.00 KB (716,800 bytes)	1/19/2008	uxtheme	6.0.6001.18000	310.00 KB (317,440 bytes)	1/19/2008
12:19 AM Microsoft Corporation	c:\windows\system32\netlogon.dll			12:21 AM Microsoft Corporation	c:\windows\system32\uxtheme.dll		
winbrand	6.0.6001.18000	851.00 KB (871,424 bytes)	1/19/2008	gdiplus	5.2.6001.18000	2.09 MB (2,190,848 bytes)	1/19/2008
12:02 AM Microsoft Corporation	c:\windows\system32\winbrand.dll			3:50 AM Microsoft Corporation	c:\windows\winsxs\amd64_microsoft.windows.gdiplus_6595b64144ccf1df_1.0.6001.18000_none_56c7f783b549f0ed\gdiplus.dll		
wdigest	6.0.6001.18000	193.00 KB (197,632 bytes)	1/19/2008	duser	6.0.6001.18000	244.50 KB (250,368 bytes)	1/19/2008
12:16 AM Microsoft Corporation	c:\windows\system32\wdigest.dll			12:09 AM Microsoft Corporation	c:\windows\system32\duser.dll		
rsaenh	6.0.6001.18000	283.05 KB (289,848 bytes)	1/19/2008				
12:18 AM Microsoft Corporation	c:\windows\system32\rsaenh.dll						
tspkg	6.0.6001.18000	77.00 KB (78,848 bytes)	1/19/2008				
12:16 AM Microsoft Corporation	c:\windows\system32\tspkg.dll						
gpapi	6.0.6001.18000	82.50 KB (84,480 bytes)	1/19/2008				
12:20 AM Microsoft Corporation	c:\windows\system32\gpapi.dll						
setupapi	6.0.6001.18000	1.83 MB (1,921,536 bytes)	1/19/2008				
12:00 AM Microsoft Corporation	c:\windows\system32\setupapi.dll						

xmllite	1.2.1009.0	176.00 KB (180,224 bytes)	1/19/2008 1:13 AM	Microsoft Corporation	c:\windows\system32\xmllite.dll
SmartCardCredentialProvider	6.0.6001.18000	157.00 KB (160,768 bytes)	1/19/2008 12:15 AM	Microsoft Corporation	c:\windows\system32\smartcardcredentialprovider.dll
rasplap	6.0.6001.18000	380.50 KB (389,632 bytes)	1/19/2008 12:37 AM	Microsoft Corporation	c:\windows\system32\rasplap.dll
rasapi32	6.0.6001.18000	329.50 KB (337,408 bytes)	1/19/2008 12:37 AM	Microsoft Corporation	c:\windows\system32\rasapi32.dll
rasman	6.0.6001.18000	90.50 KB (92,672 bytes)	1/19/2008 12:37 AM	Microsoft Corporation	c:\windows\system32\rasman.dll
tapi32	6.0.6000.16386	238.00 KB (243,712 bytes)	1/19/2008 1:13 AM	Microsoft Corporation	c:\windows\system32\tapi32.dll
rtutils	6.0.6001.18000	49.50 KB (50,688 bytes)	1/19/2008 12:37 AM	Microsoft Corporation	c:\windows\system32\rtutils.dll
winmm	6.0.6001.18000	207.00 KB (211,968 bytes)	1/19/2008 12:44 AM	Microsoft Corporation	c:\windows\system32\winmm.dll
oleacc	4.2.5406.0	300.50 KB (307,712 bytes)	1/19/2008 12:08 AM	Microsoft Corporation	c:\windows\system32\oleacc.dll
shell32	6.0.6001.18000	12.30 MB (12,895,744 bytes)	1/19/2008 1:32 AM	Microsoft Corporation	c:\windows\system32\shell32.dll
winscard	6.0.6001.18000	186.00 KB (190,464 bytes)	1/19/2008 12:15 AM	Microsoft Corporation	c:\windows\system32\winscard.dll
shgina	6.0.6001.18000	82.50 KB (84,480 bytes)	1/19/2008 12:22 AM	Microsoft Corporation	c:\windows\system32\shgina.dll
shacct	6.0.6001.18000	96.00 KB (98,304 bytes)	1/19/2008 12:22 AM	Microsoft Corporation	c:\windows\system32\shacct.dll
propsys	6.0.6001.18000	895.50 KB (916,992 bytes)	1/19/2008 12:21 AM	Microsoft Corporation	c:\windows\system32\propsys.dll
hid	6.0.6001.18000	28.50 KB (29,184 bytes)	1/19/2008 12:33 AM	Microsoft Corporation	c:\windows\system32\hid.dll
wintrust	6.0.6001.18000	213.00 KB (218,112 bytes)	1/19/2008 12:15 AM	Microsoft Corporation	c:\windows\system32\wintrust.dll
imagehlp	6.0.6001.18000	72.50 KB (74,240 bytes)	1/19/2008 12:40 AM	Microsoft Corporation	c:\windows\system32\imagehlp.dll
wevtvsc	6.0.6001.18000	1.42 MB (1,486,336 bytes)	1/19/2008 12:13 AM	Microsoft Corporation	c:\windows\system32\wevtvsc.dll
lmhsvc	6.0.6001.18000	23.50 KB (24,064 bytes)	1/19/2008 12:36 AM	Microsoft Corporation	c:\windows\system32\lmhsvc.dll
gpsvc	6.0.6001.18000	701.50 KB (718,336 bytes)	1/19/2008 12:20 AM	Microsoft Corporation	c:\windows\system32\gpsvc.dll
nlaapi	6.0.6001.18000	60.00 KB (61,440 bytes)	1/19/2008 12:36 AM	Microsoft Corporation	c:\windows\system32\nlaapi.dll
profsvc	6.0.6001.18000	174.50 KB (178,688 bytes)	1/19/2008 12:16 AM	Microsoft Corporation	c:\windows\system32\profsvc.dll
atl	3.5.2284.0	85.50 KB (87,552 bytes)	1/19/2008 1:09 AM	Microsoft Corporation	c:\windows\system32\atl.dll
sens	6.0.6001.18000	60.50 KB (61,952 bytes)	1/19/2008 12:27 AM	Microsoft Corporation	c:\windows\system32\sens.dll
schedsvc	6.0.6001.18000	824.00 KB (843,776 bytes)	1/19/2008 12:13 AM	Microsoft Corporation	c:\windows\system32\schedsvc.dll
ktmw32	6.0.6001.18000	14.50 KB (14,848 bytes)	1/18/2008 11:52 PM	Microsoft Corporation	c:\windows\system32\ktmw32.dll
comctl32	5.82.6001.18000	619.00 KB (633,856 bytes)	1/19/2008 3:48 AM	Microsoft Corporation	c:\windows\winsxs\amd64_microsoft.windows.common-controls_6595b64144ccf1df_5.82.6001.18000_none_40ba501d3c2b20ff\comctl32.dll
taskcomp	6.0.6001.18000	400.00 KB (409,600 bytes)	1/19/2008 12:13 AM	Microsoft Corporation	c:\windows\system32\taskcomp.dll
TSChannel	6.0.6000.16386	18.50 KB (18,944 bytes)	1/19/2008 12:12 AM	Microsoft Corporation	c:\windows\system32\tschannel.dll
aelupsvc	6.0.6000.16386	26.00 KB (26,624 bytes)	1/18/2008 11:52 PM	Microsoft Corporation	c:\windows\system32\aelupsvc.dll
ikeext	6.0.6001.18000	444.00 KB (454,656 bytes)	1/19/2008 12:36 AM	Microsoft Corporation	c:\windows\system32\ikeext.dll
seclogon	6.0.6001.18000	28.00 KB (28,672 bytes)	1/19/2008 12:18 AM	Microsoft Corporation	c:\windows\system32\seclogon.dll
wmivsc	6.0.6001.18000	216.50 KB (221,696 bytes)	1/19/2008 12:13 AM	Microsoft Corporation	c:\windows\system32\wbem\wmivsc.dll
wbemcomn	6.0.6001.18000	516.00 KB (528,384 bytes)	1/19/2008 12:13 AM	Microsoft Corporation	c:\windows\system32\wbemcomn.dll
srvsvc	6.0.6001.18000	172.50 KB (176,640 bytes)	1/19/2008 12:18 AM	Microsoft Corporation	c:\windows\system32\srvsvc.dll
iphlpvc	6.0.6001.18000	218.00 KB (223,232 bytes)	1/19/2008 12:36 AM	Microsoft Corporation	c:\windows\system32\iphlpvc.dll
sqmapi	6.0.6001.18000	172.00 KB (176,128 bytes)	1/19/2008 12:11 AM	Microsoft Corporation	c:\windows\system32\sqmapi.dll
sscore	6.0.6000.16386	12.00 KB (12,288 bytes)	1/19/2008 12:18 AM	Microsoft Corporation	c:\windows\system32\sscore.dll
clusapi	6.0.6001.18000	237.50 KB (243,200 bytes)	1/19/2008 12:05 AM	Microsoft Corporation	c:\windows\system32\clusapi.dll
activeds	6.0.6001.18000	259.50 KB (265,728 bytes)	1/19/2008 12:19 AM	Microsoft Corporation	c:\windows\system32\activeds.dll
adslidpc	6.0.6001.18000	224.00 KB (229,376 bytes)	1/19/2008 12:19 AM	Microsoft Corporation	c:\windows\system32\adslidpc.dll
credui	6.0.6001.18000	186.50 KB (190,976 bytes)	1/19/2008 12:18 AM	Microsoft Corporation	c:\windows\system32\credui.dll
resutils	6.0.6001.18000	76.00 KB (77,824 bytes)	1/19/2008 12:04 AM	Microsoft Corporation	c:\windows\system32\resutils.dll
winhttp	6.0.6001.18000	429.50 KB (439,808 bytes)	1/19/2008 12:26 AM	Microsoft Corporation	c:\windows\system32\winhttp.dll
vssapi	6.0.6001.18000	1.43 MB (1,494,528 bytes)	1/19/2008 12:30 AM	Microsoft Corporation	c:\windows\system32\vssapi.dll
vsstrace	6.0.6001.18000	90.00 KB (92,160 bytes)	1/19/2008 12:29 AM	Microsoft Corporation	c:\windows\system32\vsstrace.dll
wbemcore	6.0.6001.18000	1.12 MB (1,171,456 bytes)	1/19/2008 12:14 AM	Microsoft Corporation	c:\windows\system32\wbem\wbemcore.dll
esscli	6.0.6001.18000	418.00 KB (428,032 bytes)	1/19/2008 12:12 AM	Microsoft Corporation	c:\windows\system32\wbem\esscli.dll
fastprox	6.0.6001.18000	869.50 KB (890,368 bytes)	1/19/2008 12:13 AM	Microsoft Corporation	c:\windows\system32\wbem\fastprox.dll
wmiutils	6.0.6001.18000	128.50 KB (131,584 bytes)	1/19/2008 12:12 AM	Microsoft Corporation	c:\windows\system32\wbem\wmiutils.dll
repdrvfs	6.0.6001.18000	372.50 KB (381,440 bytes)	1/19/2008 12:13 AM	Microsoft Corporation	c:\windows\system32\wbem\repdrvfs.dll
wmiprvsd	6.0.6001.18000	671.50 KB (687,616 bytes)	1/19/2008 12:13 AM	Microsoft Corporation	c:\windows\system32\wbem\wmiprvsd.dll
wbemess	6.0.6001.18000	501.00 KB (513,024 bytes)	1/19/2008 12:13 AM	Microsoft Corporation	c:\windows\system32\wbem\wbemess.dll
winnr	6.0.6001.18000	27.00 KB (27,648 bytes)	1/19/2008 12:19 AM	Microsoft Corporation	c:\windows\system32\winnr.dll
napinsp	6.0.6001.18000	61.50 KB (62,976 bytes)	1/19/2008 12:37 AM	Microsoft Corporation	c:\windows\system32\napinsp.dll
rasadhlp	6.0.6001.18000	13.00 KB (13,312 bytes)	1/19/2008 12:37 AM	Microsoft Corporation	c:\windows\system32\rasadhlp.dll
certprop	6.0.6001.18000	48.00 KB (49,152 bytes)	1/19/2008 12:15 AM	Microsoft Corporation	c:\windows\system32\certprop.dll
sessenv	6.0.6001.18000	73.00 KB (74,752 bytes)	1/19/2008 12:43 AM	Microsoft Corporation	c:\windows\system32\sessenv.dll

ncprov	6.0.6001.18000	77.50 KB (79,360 bytes)	1/19/2008	hnetcfg	6.0.6001.18000	423.50 KB (433,664 bytes)	1/19/2008
12:13 AM	Microsoft Corporation			12:35 AM	Microsoft Corporation	c:\windows\system32\hnetcfg.dll	
	c:\windows\system32\wbem\ncprov.dll			netcfgx	6.0.6001.18000	492.00 KB (503,808 bytes)	1/19/2008
qmgr	7.0.6001.18000	1.03 MB (1,082,368 bytes)	1/19/2008	12:35 AM	Microsoft Corporation	c:\windows\system32\netcfgx.dll	
12:12 AM	Microsoft Corporation			wbemprox	6.0.6001.18000	42.50 KB (43,520 bytes)	1/19/2008
shfolder	6.0.6001.18000	10.00 KB (10,240 bytes)	1/19/2008	12:12 AM	Microsoft Corporation		
12:22 AM	Microsoft Corporation				c:\windows\system32\wbem\wbemprox.dll		
	c:\windows\system32\shfolder.dll			dnssrslvr	6.0.6001.18000	115.00 KB (117,760 bytes)	1/19/2008
bitsperf	7.0.6000.16386	22.50 KB (23,040 bytes)	1/19/2008	12:20 AM	Microsoft Corporation	c:\windows\system32\dnssrslvr.dll	
12:11 AM	Microsoft Corporation			cryptsvc	6.0.6001.18000	161.50 KB (165,376 bytes)	1/19/2008
	c:\windows\system32\bitsperf.dll			12:15 AM	Microsoft Corporation		
bitsigd	7.0.6001.18000	45.50 KB (46,592 bytes)	1/19/2008		c:\windows\system32\cryptsvc.dll		
12:11 AM	Microsoft Corporation			nlasvc	6.0.6001.18000	201.50 KB (206,336 bytes)	1/19/2008
wuaueng	7.0.6001.18000	2.06 MB (2,156,544 bytes)	1/19/2008	12:36 AM	Microsoft Corporation	c:\windows\system32\nlasvc.dll	
1:11 AM	Microsoft Corporation			ncsi	6.0.6001.18000	106.50 KB (109,056 bytes)	1/19/2008
	c:\windows\system32\wuaueng.dll			12:35 AM	Microsoft Corporation	c:\windows\system32\ncsi.dll	
esent	6.0.6001.18000	2.41 MB (2,522,624 bytes)	1/19/2008	ssdpapi	6.0.6000.16386	49.00 KB (50,176 bytes)	1/19/2008
12:17 AM	Microsoft Corporation			12:38 AM	Microsoft Corporation	c:\windows\system32\ssdpapi.dll	
	c:\windows\system32\esent.dll			termsrv	6.0.6001.18000	534.00 KB (546,816 bytes)	1/19/2008
winspool	6.0.6001.18000	333.50 KB (341,504 bytes)	1/19/2008	12:43 AM	Microsoft Corporation	c:\windows\system32\termsrv.dll	
1:11 AM	Microsoft Corporation			icaapi	6.0.6000.16386	20.00 KB (20,480 bytes)	1/19/2008
	c:\windows\system32\winspool.drvc			12:42 AM	Microsoft Corporation	c:\windows\system32\icaapi.dll	
mspatcha	6.0.6001.18000	45.50 KB (46,592 bytes)	1/19/2008	regapi	6.0.6001.18000	87.00 KB (89,088 bytes)	1/19/2008
12:05 AM	Microsoft Corporation			12:42 AM	Microsoft Corporation	c:\windows\system32\regapi.dll	
	c:\windows\system32\mspachtdll			rdpwsx	6.0.6001.18000	115.00 KB (117,760 bytes)	1/19/2008
wbemsv	6.0.6001.18000	121.00 KB (123,904 bytes)	1/19/2008	12:42 AM	Microsoft Corporation	c:\windows\system32\rdpwsx.dll	
12:12 AM	Microsoft Corporation			mstlsapi	6.0.6001.18000	135.00 KB (138,240 bytes)	1/19/2008
	c:\windows\system32\wbem\wbemsv.dll			12:42 AM	Microsoft Corporation		
wups2	7.0.6001.18000	33.00 KB (33,792 bytes)	1/19/2008		c:\windows\system32\mstlsapi.dll		
1:09 AM	Microsoft Corporation			msdtckrm	2001.12.6931.18000	386.00 KB (395,264 bytes)	1/19/2008
slsvc	6.0.6001.18000	2.06 MB (2,161,664 bytes)	1/19/2008	12:27 AM	Microsoft Corporation		
1:33 AM	Microsoft Corporation				c:\windows\system32\msdtckrm.dll		
	c:\windows\system32\slsvc.exe			wsmvc	6.0.6001.18000	1.04 MB (1,091,072 bytes)	1/19/2008
es	2001.12.6931.18000	346.00 KB (354,304 bytes)	1/19/2008	12:14 AM	Microsoft Corporation	c:\windows\system32\wsmvc.dll	
12:27 AM	Microsoft Corporation			wsmprov	6.0.6001.18000	71.50 KB (73,216 bytes)	1/19/2008
nsisvc	6.0.6001.18000	24.00 KB (24,576 bytes)	1/19/2008	12:13 AM	Microsoft Corporation		
12:36 AM	Microsoft Corporation				c:\windows\system32\wsmprov.dll		
wkssvc	6.0.6001.18000	198.00 KB (202,752 bytes)	1/19/2008	winsmgr	6.0.6001.18000	294.00 KB (301,056 bytes)	1/19/2008
12:18 AM	Microsoft Corporation			12:14 AM	Microsoft Corporation		
w32time	6.0.6001.18000	364.00 KB (372,736 bytes)	1/19/2008		c:\windows\system32\winsmgr.dll		
12:15 AM	Microsoft Corporation			httpapi	6.0.6001.18000	32.50 KB (33,280 bytes)	1/19/2008
	c:\windows\system32\w32time.dll			12:35 AM	Microsoft Corporation	c:\windows\system32\httpapi.dll	
netprofm	6.0.6001.18000	297.00 KB (304,128 bytes)	1/19/2008	wsmres	6.0.6001.18000	13.00 KB (13,312 bytes)	1/19/2008
12:38 AM	Microsoft Corporation			12:13 AM	Microsoft Corporation	c:\windows\system32\wsmres.dll	
	c:\windows\system32\netprofm.dll			wevtfwd	6.0.6001.18000	104.50 KB (107,008 bytes)	1/19/2008
npmproxy	6.0.6000.16386	31.50 KB (32,256 bytes)	1/19/2008	12:12 AM	Microsoft Corporation		
12:38 AM	Microsoft Corporation				c:\windows\system32\wevtfd.dll		
	c:\windows\system32\npmproxy.dll			bfe	6.0.6001.18000	447.50 KB (458,240 bytes)	1/19/2008
uxsms	6.0.6001.18000	32.00 KB (32,768 bytes)	1/19/2008	12:36 AM	Microsoft Corporation	c:\windows\system32\bfe.dll	
12:10 AM	Microsoft Corporation			mpssvc	6.0.6001.18000	587.00 KB (601,088 bytes)	1/19/2008
trkwks	6.0.6001.18000	114.50 KB (117,248 bytes)	1/19/2008	12:35 AM	Microsoft Corporation	c:\windows\system32\mpssvc.dll	
12:27 AM	Microsoft Corporation			wfapigp	6.0.6001.18000	20.00 KB (20,480 bytes)	1/19/2008
umrdp	6.0.6001.18000	247.00 KB (252,928 bytes)	1/19/2008	12:35 AM	Microsoft Corporation		
7:52 AM	Microsoft Corporation				c:\windows\system32\wfapigp.dll		
umb	6.0.6001.18000	58.50 KB (59,904 bytes)	1/19/2008	dps	6.0.6001.18000	136.00 KB (139,264 bytes)	1/19/2008
12:06 AM	Microsoft Corporation			12:03 AM	Microsoft Corporation	c:\windows\system32\dps.dll	
	c:\windows\system32\umb.dll			taskschd	6.0.6001.18000	640.50 KB (655,872 bytes)	1/19/2008
printui	6.0.6001.18000	957.50 KB (980,480 bytes)	1/19/2008	12:13 AM	Microsoft Corporation		
1:12 AM	Microsoft Corporation				c:\windows\system32\taskschd.dll		
cfgmgr32	6.0.6001.18000	17.50 KB (17,920 bytes)	1/18/2008	pnpts	6.0.6001.18000	11.50 KB (11,776 bytes)	1/19/2008
11:59 PM	Microsoft Corporation			12:03 AM	Microsoft Corporation	c:\windows\system32\pnpts.dll	
	c:\windows\system32\cfgmgr32.dll			taskeng	6.0.6001.18000	259.00 KB (265,216 bytes)	1/19/2008
puiapi	6.0.6001.18000	185.50 KB (189,952 bytes)	1/19/2008	12:13 AM	Microsoft Corporation		
1:12 AM	Microsoft Corporation				c:\windows\system32\taskeng.exe		
wdi	6.0.6001.18000	80.00 KB (81,920 bytes)	1/19/2008	dimsjob	6.0.6001.18000	43.00 KB (44,032 bytes)	1/19/2008
12:03 AM	Microsoft Corporation			12:18 AM	Microsoft Corporation	c:\windows\system32\dimsjob.dll	
	c:\windows\system32\wdi.dll			pautoenr	6.0.6000.16386	46.00 KB (47,104 bytes)	1/19/2008
radartd	6.0.6000.16386	77.50 KB (79,360 bytes)	1/19/2008	12:18 AM	Microsoft Corporation		
7:52 AM	Microsoft Corporation				c:\windows\system32\pautoenr.dll		
netman	6.0.6001.18000	340.00 KB (348,160 bytes)	1/19/2008	certcli	6.0.6001.18000	434.00 KB (444,416 bytes)	1/19/2008
12:35 AM	Microsoft Corporation			12:16 AM	Microsoft Corporation	c:\windows\system32\certcli.dll	
	c:\windows\system32\netman.dll						
netshell	6.0.6001.18000	3.19 MB (3,341,312 bytes)	1/19/2008				
12:35 AM	Microsoft Corporation						
	c:\windows\system32\netshell.dll						
rasdlg	6.0.6001.18000	890.00 KB (911,360 bytes)	1/19/2008				
12:37 AM	Microsoft Corporation						
	c:\windows\system32\rasdlg.dll						
mprapi	6.0.6001.18000	126.50 KB (129,536 bytes)	1/19/2008				
12:37 AM	Microsoft Corporation						
	c:\windows\system32\mprapi.dll						

CertEnroll	6.0.6001.18000	1.58 MB (1,658,368 bytes)	1/19/2008	c:\windows\winsxs\amd64_microsoft.vc80.crt_1fc8b3b9a1e18e3b_8.0.50727.3053_none_88e044e32fae7230\msvcr80.dll
12:19 AM	Microsoft Corporation			sqlwvss 2007.100.1600.22 384.02 KB (393,240 bytes) 7/10/2008
wininet	7.0.6001.18000	988.00 KB (1,011,712 bytes)	1/19/2008	5:31 AM Microsoft Corporation c:\program files\microsoft sql server\90\shared\sqlwvss.dll
12:27 AM	Microsoft Corporation			msvcp80 8.0.50727.3053 1.02 MB (1,071,616 bytes) 4/2/2009
normaliz	6.0.6000.16386	3.00 KB (3,072 bytes)	1/18/2008 11:59 PM	5:49 PM Microsoft Corporation
	Microsoft Corporation			c:\windows\winsxs\amd64_microsoft.vc80.crt_1fc8b3b9a1e18e3b_8.0.50727.3053_none_88e044e32fae7230\msvcp80.dll
iertutil	7.0.6001.18000	366.00 KB (374,784 bytes)	1/19/2008	wersvc 6.0.6001.18000 118.00 KB (120,832 bytes) 1/19/2008
12:25 AM	Microsoft Corporation			12:11 AM Microsoft Corporation c:\windows\system32\wersvc.dll
spoolsv	6.0.6001.18000	261.00 KB (267,264 bytes)	1/19/2008	msdte 2001.12.6931.18000 104.00 KB (106,496 bytes) 1/19/2008
1:11 AM	Microsoft Corporation			12:27 AM Microsoft Corporation c:\windows\system32\msdte.exe
spoolss	6.0.6001.18000	236.00 KB (241,664 bytes)	1/19/2008	msdctm 2001.12.6931.18000 1.43 MB (1,497,088 bytes) 1/19/2008
1:34 AM	Microsoft Corporation			12:28 AM Microsoft Corporation
localspl	6.0.6001.18000	770.00 KB (788,480 bytes)	1/19/2008	c:\windows\system32\msdctm.dll
1:20 AM	Microsoft Corporation			msdteprx 2001.12.6931.18000 708.50 KB (725,504 bytes) 1/19/2008
sfc	6.0.6000.16386	6.00 KB (6,144 bytes)	1/18/2008 11:59 PM	12:27 AM Microsoft Corporation
	Microsoft Corporation			c:\windows\system32\msdteprx.dll
tcpmon	6.0.6001.18000	165.00 KB (168,960 bytes)	1/19/2008	mtxclu 2001.12.6931.18000 350.50 KB (358,912 bytes) 1/19/2008
1:11 AM	Microsoft Corporation			12:27 AM Microsoft Corporation c:\windows\system32\mtxclu.dll
snmpapi	6.0.6000.16386	27.00 KB (27,648 bytes)	1/19/2008	msdctlog 2001.12.6931.18000 113.00 KB (115,712 bytes) 1/19/2008
12:37 AM	Microsoft Corporation			12:27 AM Microsoft Corporation
wsnmp32	6.0.6001.18000	60.50 KB (61,952 bytes)	1/19/2008	c:\windows\system32\msdctlog.dll
12:37 AM	Microsoft Corporation			xolehlp 2001.12.6931.18000 47.00 KB (48,128 bytes) 1/19/2008
				12:27 AM Microsoft Corporation c:\windows\system32\xolehlp.dll
msxml6	6.20.1076.0	1.65 MB (1,728,512 bytes)	1/19/2008	comres 2001.12.6931.18000 1.23 MB (1,291,264 bytes) 1/19/2008
1:14 AM	Microsoft Corporation			12:27 AM Microsoft Corporation c:\windows\system32\comres.dll
tcpmib	6.0.6000.16386	33.50 KB (34,304 bytes)	1/19/2008	msdteVSp1res 2001.12.6931.18000 20.50 KB (20,992 bytes) 1/19/2008 12:27 AM Microsoft Corporation
1:11 AM	Microsoft Corporation			c:\windows\system32\msdteVSp1res.dll
mgmtapi	6.0.6000.16386	22.00 KB (22,528 bytes)	1/19/2008	mtxoci 2001.12.6931.18000 148.00 KB (151,552 bytes) 1/19/2008
12:37 AM	Microsoft Corporation			12:27 AM Microsoft Corporation c:\windows\system32\mtxoci.dll
usbmon	6.0.6001.18000	43.00 KB (44,032 bytes)	1/19/2008	MsCtfMonitor 6.0.6000.16386 25.50 KB (26,112 bytes) 1/19/2008 12:08 AM Microsoft Corporation
1:11 AM	Microsoft Corporation			c:\windows\system32\msctfmonitor.dll
wls0wndh	6.0.6000.16386	9.50 KB (9,728 bytes)	1/19/2008 12:17 AM	msutb 6.0.6001.18000 222.50 KB (227,840 bytes) 1/19/2008
	Microsoft Corporation			12:08 AM Microsoft Corporation c:\windows\system32\msutb.dll
wsdmon	6.0.6001.18000	209.00 KB (214,016 bytes)	1/19/2008	dwmapi 6.0.6001.18000 38.50 KB (39,424 bytes) 1/19/2008
1:11 AM	Microsoft Corporation			12:10 AM Microsoft Corporation c:\windows\system32\dwmapi.dll
wsdapi	6.0.6001.18000	427.00 KB (437,248 bytes)	1/19/2008	PlaySndSrv 6.0.6000.16386 74.50 KB (76,288 bytes) 1/19/2008 12:43 AM Microsoft Corporation
12:07 AM	Microsoft Corporation			c:\windows\system32\playsndsrv.dll
fundisc	6.0.6001.18000	162.50 KB (166,400 bytes)	1/19/2008	mmdevapi 6.0.6001.18000 197.50 KB (202,240 bytes) 1/19/2008
12:06 AM	Microsoft Corporation			12:44 AM Microsoft Corporation
msxml3	8.100.1043.0	1.72 MB (1,807,360 bytes)	1/19/2008	c:\windows\system32\mmdevapi.dll
1:14 AM	Microsoft Corporation			qagent 6.0.6001.18000 245.00 KB (250,880 bytes) 1/19/2008
win32spl	6.0.6001.18000	641.50 KB (656,896 bytes)	1/19/2008	12:35 AM Microsoft Corporation c:\windows\system32\qagent.dll
1:12 AM	Microsoft Corporation			qutil 6.0.6001.18000 97.00 KB (99,328 bytes) 1/19/2008
netrap	6.0.6001.18000	21.00 KB (21,504 bytes)	1/19/2008	12:34 AM Microsoft Corporation c:\windows\system32\qutil.dll
12:18 AM	Microsoft Corporation			rdpclip 6.0.6001.18000 187.00 KB (191,488 bytes) 1/19/2008
printcom	6.0.6001.18000	43.50 KB (44,544 bytes)	1/19/2008	7:51 AM Microsoft Corporation c:\windows\system32\rdpclip.exe
1:10 AM	Microsoft Corporation			urlmon 7.0.6001.18000 1.35 MB (1,417,728 bytes) 1/19/2008
unidrvui	0.3.6001.18000	863.50 KB (884,224 bytes)	1/19/2008	12:27 AM Microsoft Corporation c:\windows\system32\urlmon.dll
3:38 AM	Microsoft Corporation			dwm 6.0.6001.18000 96.50 KB (98,816 bytes) 1/19/2008
ipsecsvc	6.0.6001.18000	519.00 KB (531,456 bytes)	1/19/2008	12:10 AM Microsoft Corporation c:\windows\system32\dwm.exe
12:36 AM	Microsoft Corporation			dwmredir 6.0.6001.18000 100.00 KB (102,400 bytes) 1/19/2008
FwRemoteSvr	6.0.6001.18000	49.00 KB (50,176 bytes)	1/19/2008 12:35 AM	12:10 AM Microsoft Corporation
	Microsoft Corporation			c:\windows\system32\dwmredir.dll
regsvc	6.0.6001.18000	201.50 KB (206,336 bytes)	1/19/2008	slwga 6.0.6001.18000 14.00 KB (14,336 bytes) 1/19/2008
12:03 AM	Microsoft Corporation			12:17 AM Microsoft Corporation c:\windows\system32\slwga.dll
sqlwriter	2007.100.1600.22	154.02 KB (157,720 bytes)	7/10/2008	explorer 6.0.6001.18000 2.94 MB (3,080,704 bytes) 1/19/2008
5:31 AM	Microsoft Corporation			12:22 AM Microsoft Corporation c:\windows\explorer.exe
server\90\shared\sqlwriter.exe				shdocvw 6.0.6001.18000 1.14 MB (1,195,008 bytes) 1/19/2008
msvcr80	8.0.50727.3053	787.00 KB (805,888 bytes)	4/2/2009	12:22 AM Microsoft Corporation
5:49 PM	Microsoft Corporation			c:\windows\system32\shdocvw.dll
				browseui 6.0.6001.18000 1.58 MB (1,654,784 bytes) 1/19/2008
				12:22 AM Microsoft Corporation
				c:\windows\system32\browseui.dll
				WindowsCodecs 6.0.6001.18000 821.50 KB (841,216 bytes) 1/19/2008 12:11 AM Microsoft Corporation
				c:\windows\system32\windowscodecs.dll

iconcodecservice	6.0.6000.16386	12.50 KB (12,800 bytes)		sqlservr	2007.100.1600.22	55.14 MB (57,820,696 bytes)	7/10/2008
	1/19/2008 7:51 AM	Microsoft Corporation		5:31 AM	Microsoft Corporation	c:\program files\microsoft sql	
		c:\windows\system32\iconcodecservice.dll		server\mssql10.mssqlserver\mssql\binn\sqlservr.exe			
timedate	6.0.6001.18000	860.50 KB (881,152 bytes)	1/19/2008	sqlos	2007.100.1600.22	18.02 KB (18,456 bytes)	7/10/2008
12:23 AM	Microsoft Corporation			5:31 AM	Microsoft Corporation	c:\program files\microsoft sql	
		c:\windows\system32\timedate.cpl		server\mssql10.mssqlserver\mssql\binn\sqlos.dll			
actxprxy	6.0.6001.18000	979.00 KB (1,002,496 bytes)	1/19/2008	pdh	6.0.6001.18000	301.50 KB (308,736 bytes)	1/19/2008
1:13 AM	Microsoft Corporation			12:03 AM	Microsoft Corporation	c:\windows\system32\pdh.dll	
		c:\windows\system32\actxprxy.dll		opends60	2007.100.1600.22	23.52 KB (24,088 bytes)	7/10/2008
ieframe	7.0.6001.18000	6.68 MB (7,004,672 bytes)	1/19/2008	4:46 AM	Microsoft Corporation	c:\program files\microsoft sql	
12:32 AM	Microsoft Corporation			server\mssql10.mssqlserver\mssql\binn\opends60.dll			
ExplorerFrame	6.0.6001.18000	39.00 KB (39,936 bytes)		batchparser	2007.100.1600.22	170.52 KB (174,616 bytes)	
	1/19/2008 12:21 AM	Microsoft Corporation		7/10/2008 4:38 AM	Microsoft Corporation	c:\program	
		c:\windows\system32\explorerframe.dll		files\microsoft sql server\mssql10.mssqlserver\mssql\binn\batchparser.dll			
networkexplorer	6.0.6001.18000	2.14 MB (2,247,168 bytes)		instapi10	2007.100.1600.22	42.52 KB (43,544 bytes)	7/10/2008
	1/19/2008 12:35 AM	Microsoft Corporation		4:39 AM	Microsoft Corporation	c:\program files\microsoft sql	
		c:\windows\system32\networkexplorer.dll		server\100\shared\instapi10.dll			
cscapi	6.0.6001.18000	38.00 KB (38,912 bytes)	1/18/2008	sqllevn70	2007.100.1600.22	1.99 MB (2,090,008 bytes)	7/10/2008
11:55 PM	Microsoft Corporation			4:58 AM	Microsoft Corporation	c:\program files\microsoft sql	
		c:\windows\system32\cscapi.dll		server\mssql10.mssqlserver\mssql\binn/resources\1033\sqllevn70.rll			
stobject	6.0.6001.18000	731.00 KB (748,544 bytes)	1/19/2008	mscoree	2.0.50727.3053	397.00 KB (406,528 bytes)	4/2/2009
12:23 AM	Microsoft Corporation			5:49 PM	Microsoft Corporation	c:\windows\system32\mscoree.dll	
batmeter	6.0.6001.18000	727.50 KB (744,960 bytes)	1/19/2008	security	6.0.6000.16386	5.50 KB (5,632 bytes)	1/19/2008 12:16 AM
12:23 AM	Microsoft Corporation				Microsoft Corporation	c:\windows\system32\security.dll	
		c:\windows\system32\batmeter.dll		sqlncli10	2007.100.1600.22	3.01 MB (3,158,552 bytes)	7/10/2008
SndVolSSO	6.0.6000.16386	173.50 KB (177,664 bytes)		5:31 AM	Microsoft Corporation	c:\windows\system32\sqlncli10.dll	
	1/19/2008 12:44 AM	Microsoft Corporation		comdlg32	6.0.6001.18000	536.50 KB (549,376 bytes)	1/19/2008
		c:\windows\system32\sndvolss0.dll		12:21 AM	Microsoft Corporation	c:\windows\system32\comdlg32.dll	
pnidui	6.0.6001.18000	1.93 MB (2,024,960 bytes)	1/19/2008	sqlnclir10	2007.100.1600.22	224.02 KB (229,400 bytes)	7/10/2008
12:35 AM	Microsoft Corporation			4:58 AM	Microsoft Corporation	c:\windows\system32\1033\sqlnclir10.rll	
		c:\windows\system32\pnidui.dll		xpstar	2007.100.1600.22	536.52 KB (549,400 bytes)	7/10/2008
wlanutil	6.0.6000.16386	10.00 KB (10,240 bytes)	1/19/2008	5:31 AM	Microsoft Corporation	c:\program files\microsoft sql	
12:34 AM	Microsoft Corporation			server\mssql10.mssqlserver\mssql\binn\xpstar.dll			
		c:\windows\system32\wlanutil.dll		sqlscm	2007.100.1600.22	38.52 KB (39,448 bytes)	7/10/2008
cscui	6.0.6001.18000	656.50 KB (672,256 bytes)	1/19/2008	5:31 AM	Microsoft Corporation	c:\program files\microsoft sql	
7:51 AM	Microsoft Corporation			server\mssql10.mssqlserver\mssql\binn\sqlscm.dll			
		c:\windows\system32\cscui.dll		odbc32	6.0.6001.18000	448.00 KB (458,752 bytes)	1/19/2008
cscdll	6.0.6001.18000	28.00 KB (28,672 bytes)	1/18/2008	12:56 AM	Microsoft Corporation	c:\windows\system32\odbc32.dll	
11:55 PM	Microsoft Corporation			atl80	8.0.50727.1833	110.50 KB (113,152 bytes)	4/2/2009
		c:\windows\system32\cscdll.dll		6:07 PM	Microsoft Corporation	c:\windows\winsxs\amd64_microsoft.vc80.atl_1fc8b3b9a1e18e3b	
srchadmin	6.0.6001.18000	292.00 KB (299,008 bytes)	1/19/2008	_8.0.50727.1833_none_8a17faaf2edd3e00_atl80.dll			
12:23 AM	Microsoft Corporation			odbcint	6.0.6000.16386	224.00 KB (229,376 bytes)	1/19/2008
		c:\windows\system32\srchadmin.dll		12:56 AM	Microsoft Corporation	c:\windows\system32\odbcint.dll	
webcheck	7.0.6001.18000	284.00 KB (290,816 bytes)	1/19/2008	xpstar	2007.100.1600.22	151.02 KB (154,648 bytes)	7/10/2008
12:26 AM	Microsoft Corporation			4:58 AM	Microsoft Corporation	c:\program files\microsoft sql	
		c:\windows\system32\webcheck.dll		server\mssql10.mssqlserver\mssql\binn/resources\1033\xpstar.rll			
imapi2	6.0.6001.18000	396.00 KB (405,504 bytes)	1/19/2008	msinfo32	6.0.6001.18000	398.50 KB (408,064 bytes)	1/18/2008
12:29 AM	Microsoft Corporation			11:33 PM	Microsoft Corporation	c:\windows\syswow64\msinfo32.exe	
		c:\windows\system32\imapi2.dll		wow64	6.0.6001.18000	229.00 KB (234,496 bytes)	1/18/2008
bthprops	6.0.6001.18000	993.50 KB (1,017,344 bytes)	1/19/2008	11:59 PM	Microsoft Corporation	c:\windows\system32\wow64.dll	
12:23 AM	Microsoft Corporation			wow64win	6.0.6001.18000	294.50 KB (301,568 bytes)	1/19/2008
		c:\windows\system32\bthprops.cpl		12:08 AM	Microsoft Corporation	c:\windows\system32\wow64win.dll	
twext	6.0.6001.18000	114.00 KB (116,736 bytes)	1/19/2008	wow64cpu	6.0.6001.18000	17.00 KB (17,408 bytes)	1/18/2008
7:51 AM	Microsoft Corporation			11:59 PM	Microsoft Corporation	c:\windows\system32\wow64cpu.dll	
		c:\windows\system32\twext.dll		wmiprvse	6.0.6001.18000	340.50 KB (348,672 bytes)	1/19/2008
ntshrui	6.0.6001.18000	347.00 KB (355,328 bytes)	1/19/2008	12:13 AM	Microsoft Corporation	c:\windows\system32\wbem\wmiprvse.exe	
12:24 AM	Microsoft Corporation			cimwin32	6.0.6001.18000	1.99 MB (2,082,304 bytes)	1/19/2008
		c:\windows\system32\ntshrui.dll		12:14 AM	Microsoft Corporation	c:\windows\system32\wbem\cimwin32.dll	
thumbcache	6.0.6001.18000	102.00 KB (104,448 bytes)		framedynos	6.0.6001.18000	275.00 KB (281,600 bytes)	
	1/19/2008 12:22 AM	Microsoft Corporation		1/19/2008 12:13 AM	Microsoft Corporation	c:\windows\system32\framedynos.dll	
		c:\windows\system32\thumbcache.dll		wmi	6.0.6001.18000	5.50 KB (5,632 bytes)	1/19/2008 1:13 AM
zipfldr	6.0.6001.18000	377.50 KB (386,560 bytes)	1/19/2008		Microsoft Corporation	c:\windows\system32\wmi.dll	
12:23 AM	Microsoft Corporation						
		c:\windows\system32\zipfldr.dll					
mmcshext	6.0.6001.18000	124.50 KB (127,488 bytes)	1/19/2008				
12:11 AM	Microsoft Corporation						
		c:\windows\system32\mmcshext.dll					
hhsetup	6.0.6000.16386	52.00 KB (53,248 bytes)	1/19/2008				
12:57 AM	Microsoft Corporation						
		c:\windows\system32\hhsetup.dll					
bacstray	11.6.10.0	432.31 KB (442,688 bytes)	2/4/2009 3:30 PM				
	Broadcom Corporation						
		c:\program					
files\broadcom\bacs\bacstray.exe							
wuaucht	7.0.6001.18000	44.50 KB (45,568 bytes)	1/19/2008				
1:09 AM	Microsoft Corporation						
		c:\windows\system32\wuaucht.exe					
wucltux	7.0.6001.18000	1.64 MB (1,717,248 bytes)	1/19/2008				
1:09 AM	Microsoft Corporation						
		c:\windows\system32\wucltux.dll					
cmd	6.0.6001.18000	354.50 KB (363,008 bytes)	1/19/2008				
12:05 AM	Microsoft Corporation						
		c:\windows\system32\cmd.exe					

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ntevt 6.0.6001.18000 250.00 KB (256,000 bytes) 1/19/2008
12:13 AM Microsoft Corporation
c:\windows\system32\wbem\ntevt.dll
provthrd 6.0.6001.18000 327.50 KB (335,360 bytes) 1/19/2008
12:13 AM Microsoft Corporation
c:\windows\system32\provthrd.dll
msvcirt 7.0.6000.16386 78.50 KB (80,384 bytes) 1/18/2008
11:52 PM Microsoft Corporation c:\windows\system32\msvcirt.dll
wsock32 6.0.6001.18000 18.00 KB (18,432 bytes) 1/19/2008
12:37 AM Microsoft Corporation
c:\windows\system32\wsock32.dll
drprov 6.0.6001.18000 23.50 KB (24,064 bytes) 1/19/2008
12:43 AM Microsoft Corporation c:\windows\system32\drprov.dll
ntlanman 6.0.6001.18000 116.00 KB (118,784 bytes) 1/19/2008
12:14 AM Microsoft Corporation
c:\windows\system32\ntlanman.dll
wmiprvse 6.0.6001.18000 239.50 KB (245,248 bytes) 1/18/2008
11:39 PM Microsoft Corporation
c:\windows\syswow64\wbem\wmiprvse.exe

```

[Services]

Display Name	Name	State	Start Mode	Service Type
Path	Error Control	Start Name	Tag ID	
Application Experience	AeLookupSvc	Running	Auto	Share Process
Application Layer Gateway Service	ALG	Stopped	Manual	Own Process
Application Information	Appinfo	Stopped	Manual	Share Process
Application Management	AppMgmt	Stopped	Manual	Share Process
Windows Audio Endpoint Builder	AudioEndpointBuilder	Stopped	Manual	Share Process
Windows Audio	AudioSrv	Stopped	Manual	Share Process
Base Filtering Engine	BFE	Running	Auto	Share Process
Background Intelligent Transfer Service	BITS	Running	Auto	Share Process
Computer Browser	Browser	Stopped	Disabled	Share Process
Certificate Propagation	CertPropSvc	Running	Manual	Share Process
Microsoft .NET Framework NGEN v2.0.50727_X86	clr_optimization_v2.0.50727_32	Stopped	Manual	Own Process
Microsoft .NET Framework NGEN v2.0.50727_X64	clr_optimization_v2.0.50727_64	Stopped	Manual	Own Process
COM+ System Application	COMSysApp	Stopped	Manual	Own Process
Cryptographic Services	CryptSvc	Running	Auto	Share Process
Offline Files	CscService	Stopped	Disabled	Share Process

```

DCOM Server Process Launcher DcomLaunch Running Auto
Share Process c:\windows\system32\svchost.exe -k
dcomlaunch Normal LocalSystem 0
DHCP Client Dhcp Running Auto Share Process
c:\windows\system32\svchost.exe -k localservicenetworkrestricted
Normal NT Authority\LocalService 0
DNS Client Dnscache Running Auto Share Process
c:\windows\system32\svchost.exe -k networkservice Normal
NT AUTHORITY\NetworkService 0
Wired AutoConfig dot3svc Stopped Manual Share Process
c:\windows\system32\svchost.exe -k localsystemnetworkrestricted
Normal localSystem 0
Diagnostic Policy Service DPS Running Auto Share
Process c:\windows\system32\svchost.exe -k localservicenonetwork
Normal NT AUTHORITY\LocalService 0
Extensible Authentication Protocol EapHost Stopped Manual
Share Process c:\windows\system32\svchost.exe -k netsvcs
Normal localSystem 0
Windows Event Log EventLog Running Auto Share Process
c:\windows\system32\svchost.exe -k localservicenetworkrestricted
Normal NT AUTHORITY\LocalService 0
COM+ Event System EventSystem Running Auto Share
Process c:\windows\system32\svchost.exe -k localservice Normal
NT AUTHORITY\LocalService 0
Microsoft Fibre Channel Platform Registration Service FCRegSvc Stopped
Manual Share Process
c:\windows\system32\svchost.exe -k localservicenetworkrestricted
Normal NT AUTHORITY\LocalService 0
Function Discovery Provider Host fdpHost Stopped Manual
Share Process c:\windows\system32\svchost.exe -k
localservice Normal NT AUTHORITY\LocalService 0
Function Discovery Resource Publication FDResPub Stopped Manual
Share Process c:\windows\system32\svchost.exe -k
localservice Normal NT AUTHORITY\LocalService 0
Windows Presentation Foundation Font Cache 3.0.0.0 FontCache3.0.0.0
Stopped Manual Own Process
c:\windows\microsoft.net\framework64\v3.0\wpf\presentationfontc
ache.exe Normal NT Authority\LocalService 0
Group Policy Client gpsvc Running Auto Own Process
c:\windows\system32\svchost.exe -k gpsvcgroup Normal
LocalSystem 0
Human Interface Device Access hidserv Stopped Manual Share
Process c:\windows\system32\svchost.exe -k localsystemnetworkrestricted
Normal LocalSystem 0
Health Key and Certificate Management hkmsvc Stopped Manual
Share Process c:\windows\system32\svchost.exe -k netsvcs
Normal localSystem 0
Windows CardSpace idsvc Stopped Manual Share Process
"c:\windows\microsoft.net\framework64\v3.0\windows
communication foundation\infocard.exe" Normal LocalSystem
0
IKE and AuthIP IPsec Keying Modules IKEEXT Running Auto
Share Process c:\windows\system32\svchost.exe -k netsvcs
Normal LocalSystem 0
PnP-X IP Bus Enumerator IPBusEnum Stopped Disabled
Share Process c:\windows\system32\svchost.exe -k
localsystemnetworkrestricted Normal LocalSystem 0
IP Helper iphlpsvc Running Auto Share Process
c:\windows\system32\svchost.exe -k netsvcs Normal
LocalSystem 0
CNG Key Isolation KeyIso Stopped Manual Share Process
c:\windows\system32\lsass.exe Normal LocalSystem
0
KtmRm for Distributed Transaction Coordinator KtmRm Running
Auto Share Process
c:\windows\system32\svchost.exe -k networkservice Normal
NT AUTHORITY\NetworkService 0
Server LanmanServer Running Auto Share Process
c:\windows\system32\svchost.exe -k netsvcs Normal
LocalSystem 0
Workstation LanmanWorkstation Running Auto Share
Process c:\windows\system32\svchost.exe -k localservice
Normal
NT AUTHORITY\LocalService 0

```

Link-Layer Topology Discovery Mapper	ltdsvc	Stopped	Manual			Remote Access Auto Connection Manager	RasAuto	Stopped	Manual		
Share Process	c:\windows\system32\svchost.exe -k					Share Process	c:\windows\system32\svchost.exe -k netvcs				
localservice	Normal	NT AUTHORITY\LocalService	0			Normal	localSystem	0			
TCP/IP NetBIOS Helper	lmhosts	Running	Auto	Share		Remote Access Connection Manager	RasMan	Stopped	Manual		
Process	c:\windows\system32\svchost.exe -k localservicenetworkrestricted					Share Process	c:\windows\system32\svchost.exe -k netvcs				
	Normal	NT AUTHORITY\LocalService	0			Normal	localSystem	0			
Multimedia Class Scheduler	MMCSS	Stopped	Manual	Share		Routing and Remote Access	RemoteAccess	Stopped	Disabled		
Process	c:\windows\system32\svchost.exe -k netvcs	Normal				Share Process	c:\windows\system32\svchost.exe -k netvcs				
	LocalSystem	0				Normal	localSystem	0			
Windows Firewall	MpsSvc	Running	Auto	Share Process		Remote Registry	RemoteRegistry	Running	Auto	Share	
	c:\windows\system32\svchost.exe -k localservicenonnetwork					Process	c:\windows\system32\svchost.exe -k regsvc	Normal	NT		
	Normal	NT Authority\LocalService	0			AUTHORITY\LocalService	0				
Distributed Transaction Coordinator	MSDTC	Running	Auto			Remote Procedure Call (RPC) Locator	RpcLocator	Stopped			
Own Process	c:\windows\system32\msdtc.exe	Normal				Manual	Own Process	c:\windows\system32\locator.exe			
	NT AUTHORITY\NetworkService	0				Normal	NT AUTHORITY\NetworkService	0			
Microsoft iSCSI Initiator Service	MSiSCSI	Stopped	Manual	Share		Remote Procedure Call (RPC)	RpcSs	Running	Auto	Share	
Process	c:\windows\system32\svchost.exe -k netvcs	Normal				Process	c:\windows\system32\svchost.exe -k rpcss	Normal	NT		
	LocalSystem	0				AUTHORITY\NetworkService	0				
Windows Installer	msiserver	Stopped	Manual	Own Process		Resultant Set of Policy Provider	RSOPProv	Stopped	Manual	Share	
	c:\windows\system32\msiexec /v	Normal				Process	c:\windows\system32\rsopprov.exe	Normal			
	0	LocalSystem				LocalSystem	0				
SQL Server (MSSQLSERVER)	MSSQLSERVER	Stopped	Manual			Special Administration Console Helper	sacsrv	Stopped	Manual		
Own Process	"c:\program files\microsoft sql					Share Process	c:\windows\system32\svchost.exe -k netvcs				
server\mssql10.mssqlserver\mssql\binn\sqlservr.exe" -smssqlserver	Normal					Normal	LocalSystem	0			
	.\administrator	0				Security Accounts Manager	SamSs	Running	Auto	Share	
SQL Active Directory Helper Service	MSSQLServerADHelper100	Stopped	Manual	Own Process		Process	c:\windows\system32\lsass.exe	Normal	LocalSystem		
	files\microsoft sql server\100\shared\sqladhlp.exe"	Normal	NT			0					
	AUTHORITY\NETWORK SERVICE	0				Smart Card	SCardSvr	Stopped	Manual	Share Process	
Network Access Protection Agent	napagent	Stopped	Manual			c:\windows\system32\svchost.exe -k localservice	Normal				
Share Process	c:\windows\system32\svchost.exe -k					NT AUTHORITY\LocalService	0				
networkservice	Normal	NT AUTHORITY\NetworkService	0			Task Scheduler	Schedule	Running	Auto	Share Process	
	0					c:\windows\system32\svchost.exe -k netvcs	Normal				
Netlogon	Netlogon	Stopped	Manual	Share Process		LocalSystem	0				
	c:\windows\system32\lsass.exe	Normal				Smart Card Removal Policy	SCPPolicySvc	Stopped	Manual		
	0	LocalSystem				Share Process	c:\windows\system32\svchost.exe -k netvcs				
Network Connections	Netman	Running	Manual	Share Process		Normal	LocalSystem	0			
	c:\windows\system32\svchost.exe -k localsystemnetworkrestricted					Secondary Logon	seclogon	Running	Auto	Share Process	
	Normal	LocalSystem	0			c:\windows\system32\svchost.exe -k netvcs	Normal				
Network List Service	netprofm	Running	Auto	Share Process		LocalSystem	0				
	c:\windows\system32\svchost.exe -k localservice	Normal				System Event Notification Service	SENS	Running	Auto		
	NT AUTHORITY\LocalService	0				Share Process	c:\windows\system32\svchost.exe -k netvcs				
Net.Tcp Port Sharing Service	NetTcpPortSharing	Stopped	Disabled			Normal	LocalSystem	0			
Share Process	"c:\windows\microsoft.net\framework64\v3.0\windows					Terminal Services Configuration	SessionEnv	Running	Manual		
	communication foundation\smsvchost.exe"	Normal	NT			Share Process	c:\windows\system32\svchost.exe -k netvcs				
	AUTHORITY\LocalService	0				Normal	localSystem	0			
Network Location Awareness	NlaSvc	Running	Auto	Share		Internet Connection Sharing (ICS)	SharedAccess	Stopped			
Process	c:\windows\system32\svchost.exe -k networkservice	Normal				Disabled	Share Process				
	NT AUTHORITY\NetworkService	0				c:\windows\system32\svchost.exe -k netvcs	Normal				
Network Store Interface Service	nsi	Running	Auto	Share		LocalSystem	0				
Process	c:\windows\system32\svchost.exe -k localservice	Normal				Shell Hardware Detection	ShellHWDetection	Running	Auto		
	NT Authority\LocalService	0				Share Process	c:\windows\system32\svchost.exe -k netvcs				
Performance Counter DLL Host	PerfHost	Stopped	Manual	Own		Ignore	LocalSystem	0			
Process	c:\windows\syswow64\perfhost.exe	Normal	NT			Software Licensing	slsvc	Running	Auto	Own Process	
	AUTHORITY\LocalService	0				c:\windows\system32\slsvc.exe	Normal	NT			
Performance Logs & Alerts	pla	Stopped	Manual	Share		AUTHORITY\NetworkService	0				
Process	c:\windows\system32\svchost.exe -k localservicenonnetwork					SL UI Notification Service	SLUINotify	Stopped	Manual		
	Normal	NT AUTHORITY\LocalService	0			Share Process	c:\windows\system32\svchost.exe -k				
Plug and Play	PlugPlay	Running	Auto	Share Process		localservice	Normal	NT AUTHORITY\LocalService	0		
	c:\windows\system32\svchost.exe -k dcomlaunch	Normal				SNMP Trap	SNMPTRAP	Stopped	Manual	Own	
	LocalSystem	0				Process	c:\windows\system32\snmptrap.exe	Normal	NT		
IPsec Policy Agent	PolicyAgent	Running	Auto	Share		AUTHORITY\LocalService	0				
Process	c:\windows\system32\svchost.exe -k					Print Spooler	Spooler	Running	Auto	Own Process	
	networkservicenetworkrestricted	Normal	NT Authority\NetworkService	0		c:\windows\system32\spoolsv.exe	Normal				
	0					LocalSystem	0				
User Profile Service	ProfSvc	Running	Auto	Share Process		SQL Server Browser	SQLBrowser	Stopped	Disabled	Own	
	c:\windows\system32\svchost.exe -k netvcs	Normal				Process	"c:\program files (x86)\microsoft sql				
	LocalSystem	0				server\90\shared\sqlbrowser.exe"	Normal	NT AUTHORITY\LOCAL			
Protected Storage	ProtectedStorage	Stopped	Manual	Share		SERVICE	0				
Process	c:\windows\system32\lsass.exe	Normal	LocalSystem			SQL Server Agent (MSSQLSERVER)	SQLSERVERAGENT	Stopped	Manual	Own Process	
	0					Stopped	Manual	Own Process	"c:\program		
						files\microsoft sql server\mssql10.mssqlserver\mssql\binn\sqlagent.exe" -i			mssqlserver	Normal	.\administrator
						0					

SQL Server VSS Writer	SQLWriterRunning	Auto	Own		c:\windows\system32\svchost.exe -k netsvcs	Normal	localSystem	0
Process	"c:\program files\microsoft sql server\90\shared\sqlwriter.exe"							
SSDP Discovery	SSDPSRV	Stopped	Disabled	Share Process	c:\windows\system32\svchost.exe -k localservice	Normal	NT AUTHORITY\LocalService	0
Secure Socket Tunneling Protocol Service	SstpSvc	Stopped	Manual	Share Process	c:\windows\system32\svchost.exe -k localservice	Normal	NT Authority\LocalService	0
Microsoft Software Shadow Copy Provider	swprv	Stopped	Manual	Own Process	c:\windows\system32\svchost.exe -k swprv	Normal	LocalSystem	0
Superfetch SysMain	Stopped	Disabled	Share Process		c:\windows\system32\svchost.exe -k localsystemnetworkrestricted	Ignore	LocalSystem	0
Telephony TapiSrv	Stopped	Manual	Own Process		c:\windows\system32\svchost.exe -k tapisrv	Normal	NT AUTHORITY\NetworkService	0
TPM Base Services	TBS	Stopped	Auto	Share Process	c:\windows\system32\svchost.exe -k localservice	Normal	NT AUTHORITY\LocalService	0
Terminal Services	TermService	Running	Auto	Share Process	c:\windows\system32\svchost.exe -k networkservice	Normal	NT Authority\NetworkService	0
Themes	Themes	Stopped	Disabled	Share Process	c:\windows\system32\svchost.exe -k netsvcs	Normal	LocalSystem	0
Thread Ordering Server	THREADORDER	Stopped	Manual	Share Process	c:\windows\system32\svchost.exe -k localservice	Normal	NT AUTHORITY\LocalService	0
Distributed Link Tracking Client	TrkWks	Running	Auto	Share Process	c:\windows\system32\svchost.exe -k localsystemnetworkrestricted	Normal	LocalSystem	0
Windows Modules Installer	TrustedInstaller	Stopped	Manual	Own Process	c:\windows\servicing\trustedinstaller.exe	Normal	localSystem	0
Interactive Services Detection	UI0Detect	Stopped	Manual	Own Process	c:\windows\system32\ui0detect.exe	Normal	LocalSystem	0
Terminal Services UserMode Port Redirector	UmRdpService	Running	Manual	Share Process	c:\windows\system32\svchost.exe -k localsystemnetworkrestricted	Normal	localSystem	0
UPnP Device Host	upnphost	Stopped	Disabled	Share Process	c:\windows\system32\svchost.exe -k localservice	Normal	NT AUTHORITY\LocalService	0
Desktop Window Manager Session Manager	UxSms	Running	Auto	Share Process	c:\windows\system32\svchost.exe -k localsystemnetworkrestricted	Normal	localSystem	0
Virtual Disk	vds	Stopped	Manual	Own Process	c:\windows\system32\vds.exe	Normal	LocalSystem	0
Volume Shadow Copy	VSS	Stopped	Manual	Own Process	c:\windows\system32\vssvc.exe	Normal	LocalSystem	0
Windows Time	W32Time	Running	Auto	Share Process	c:\windows\system32\svchost.exe -k localservice	Normal	NT AUTHORITY\LocalService	0
Windows Color System	WcsPlugInService	Stopped	Manual	Share Process	c:\windows\system32\svchost.exe -k wcssvc	Normal	NT AUTHORITY\LocalService	0
Diagnostic Service Host	WdiServiceHost	Stopped	Manual	Share Process	c:\windows\system32\svchost.exe -k wdisvc	Normal	NT AUTHORITY\LocalService	0
Diagnostic System Host	WdiSystemHost	Running	Manual	Share Process	c:\windows\system32\svchost.exe -k localsystemnetworkrestricted	Normal	LocalSystem	0
Windows Event Collector	WeeSvc	Stopped	Manual	Share Process	c:\windows\system32\svchost.exe -k networkservice	Normal	NT AUTHORITY\NetworkService	0
Problem Reports and Solutions Control Panel Support	wercplsupport	Stopped	Manual	Share Process				
Windows Error Reporting Service	WerSvc	Running	Auto	Share Process	c:\windows\system32\svchost.exe -k wercplsupport	Ignore	localSystem	0
WinHTTP Web Proxy Auto-Discovery Service	WinHttpAutoProxySvc	Stopped	Manual	Share Process	c:\windows\system32\svchost.exe -k localservice	Normal	NT AUTHORITY\LocalService	0
Windows Management Instrumentation	Winmgmt	Running	Auto	Share Process	c:\windows\system32\svchost.exe -k netsvcs	Ignore	localSystem	0
Windows Remote Management (WS-Management)	WinRM	Running	Auto	Share Process	c:\windows\system32\svchost.exe -k networkservice	Normal	NT AUTHORITY\NetworkService	0
WMI Performance Adapter	wmiApSrv	Stopped	Manual	Own Process	c:\windows\system32\wbem\wmiaprv.exe	Normal	localSystem	0
Portable Device Enumerator Service	WPDBusEnum	Stopped	Manual	Share Process	c:\windows\system32\svchost.exe -k localsystemnetworkrestricted	Normal	LocalSystem	0
Windows Update	wuauclt	Running	Auto	Share Process	c:\windows\system32\svchost.exe -k netsvcs	Normal	LocalSystem	0
Windows Driver Foundation - User-mode Driver Framework	wudfsvc	Stopped	Manual	Share Process	c:\windows\system32\svchost.exe -k localsystemnetworkrestricted	Normal	LocalSystem	0

[Program Groups]

Group Name	Name	User Name
Start MenuDefault:Start Menu	Default	
Start Menu\Programs Default:Start Menu\Programs	Default	
Start Menu\Programs\Accessories	Default:Start	
Start Menu\Programs\Accessories\Accessibility	Default:Start	
Start Menu\Programs\Accessories\Accessibility	Default	
Start Menu\Programs\Accessories\System Tools	Default:Start	
Start Menu\Programs\Accessories\System Tools	Default	
Start Menu\Programs\Maintenance	Default:Start	
Start Menu\Programs\Maintenance	Default	
Start MenuPublic:Start Menu	Public	
Start Menu\Programs Public:Start Menu\Programs	Public	
Start Menu\Programs\Accessories	Public:Start	
Start Menu\Programs\Accessories\Accessibility	Public:Start	
Start Menu\Programs\Accessories\Accessibility	Public	
Start Menu\Programs\Accessories\System Tools	Public:Start	
Start Menu\Programs\Accessories\System Tools	Public	
Start Menu\Programs\Administrative Tools	Public:Start	
Start Menu\Programs\Administrative Tools	Public	
Start Menu\Programs\Administrative Tools\Terminal Services	Public:Start Menu\Programs\Administrative Tools\Terminal Services	
Start Menu\Programs\Broadcom	Public:Start Menu\Programs\Broadcom	
Start Menu\Programs\Broadcom	Public	
Start Menu\Programs\Extras and Upgrades	Public:Start	
Start Menu\Programs\Extras and Upgrades	Public	
Start Menu\Programs\Fusion-io	Public:Start Menu\Programs\Fusion-io	
Start Menu\Programs\Fusion-io\ioManager	Public:Start	
Start Menu\Programs\Fusion-io\ioManager	Public	
Start Menu\Programs\Maintenance	Public:Start	
Start Menu\Programs\Maintenance	Public	
Start Menu\Programs\Microsoft SQL Server 2008	Public:Start	
Start Menu\Programs\Microsoft SQL Server 2008	Public	
Start Menu\Programs\Microsoft SQL Server 2008\Configuration Tools	Public:Start Menu\Programs\Microsoft SQL Server 2008\Configuration Tools	
Start Menu\Programs\Microsoft SQL Server 2008\Configuration Tools	Public	

Start Menu\Programs\Microsoft SQL Server 2008\Integration Services
 Public:Start Menu\Programs\Microsoft SQL Server
 2008\Integration Services Public
 Start Menu\Programs\Startup Public:Start Menu\Programs\Startup
 Public
 Start Menu\Programs\Windows PowerShell 1.0 Public:Start
 Menu\Programs\Windows PowerShell 1.0 Public
 Start Menu\T610\Administrator:Start Menu T610\Administrator
 Start Menu\Programs T610\Administrator:Start Menu\Programs
 T610\Administrator
 Start Menu\Programs\Accessories T610\Administrator:Start
 Menu\Programs\Accessories T610\Administrator
 Start Menu\Programs\Accessories\Accessibility
 T610\Administrator:Start
 Menu\Programs\Accessories\Accessibility T610\Administrator
 Start Menu\Programs\Accessories\System Tools
 T610\Administrator:Start Menu\Programs\Accessories\System
 Tools T610\Administrator
 Start Menu\Programs\Administrative Tools T610\Administrator:Start
 Menu\Programs\Administrative Tools T610\Administrator
 Start Menu\Programs\Maintenance T610\Administrator:Start
 Menu\Programs\Maintenance T610\Administrator
 Start Menu\Programs\Startup T610\Administrator:Start
 Menu\Programs\Startup T610\Administrator
 Start Menu\Programs\StepMaster T610\Administrator:Start
 Menu\Programs\StepMaster T610\Administrator

[Startup Programs]

Program	Command	User Name	Location
bacstray	c:\program files\broadcom\bacs\bacstray.exe	Public	HKLM\SOFTWARE\Microsoft\Windows\CurrentVersion\Run

[OLE Registration]

Object	Local Server
WordPad Document	"%programfiles%\windows nt\accessories\wordpad.exe"
Package	Not Available

[Windows Error Reporting]

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

Appendix A

Appendix B: Database Build Scripts


```
-- Create Database
-- Microsoft TPC-H Benchmark Kit Ver. 2.7.0-1005
-- Copyright Microsoft, 2006 - 2009
--
```

```
if exists (select name from sysdatabases where name =
'tpch100g')
    drop database tpch100g
```

```
CREATE DATABASE tpch100g
ON PRIMARY
(
    NAME = tpch100g_root,
    FILENAME = 'C:\tpch100g_root.mdf',
    SIZE = 10MB,
    FILEGROWTH = 10MB),
```

```
FILEGROUP DATA_FG
(
    NAME = tpch100g_data1,
    FILENAME =
'D:\mounthead\Fusion1\tpch100g\tpch100g_data1.mdf',
    SIZE = 5500MB,
    FILEGROWTH = 10),
(
    NAME = tpch100g_data5,
    FILENAME =
'D:\mounthead\Fusion1\tpch100g\tpch100g_data5.mdf',
    SIZE = 5500MB,
    FILEGROWTH = 10),
(
    NAME = tpch100g_data9,
    FILENAME =
'D:\mounthead\Fusion1\tpch100g\tpch100g_data9.mdf',
    SIZE = 5500MB,
    FILEGROWTH = 10),
(
    NAME = tpch100g_data13,
    FILENAME =
'D:\mounthead\Fusion1\tpch100g\tpch100g_data13.mdf',
    SIZE = 5500MB,
    FILEGROWTH = 10),
(
    NAME = tpch100g_data17,
    FILENAME =
'D:\mounthead\Fusion1\tpch100g\tpch100g_data17.mdf',
    SIZE = 5500MB,
    FILEGROWTH = 10),
(
    NAME = tpch100g_data21,
    FILENAME =
'D:\mounthead\Fusion1\tpch100g\tpch100g_data21.mdf',
    SIZE = 5500MB,
    FILEGROWTH = 10),
(
    NAME = tpch100g_data25,
    FILENAME =
'D:\mounthead\Fusion1\tpch100g\tpch100g_data25.mdf',
    SIZE = 5500MB,
    FILEGROWTH = 10),
(
    NAME = tpch100g_data29,
    FILENAME =
'D:\mounthead\Fusion1\tpch100g\tpch100g_data29.mdf',
```

```

    SIZE = 5500MB,
    FILEGROWTH = 10),
(
    NAME = tpch100g_data2,
    FILENAME =
'D:\mounthead\Fusion2\tpch100g\tpch100g_data2.mdf',
    SIZE = 5500MB,
    FILEGROWTH = 10),
(
    NAME = tpch100g_data6,
    FILENAME =
'D:\mounthead\Fusion2\tpch100g\tpch100g_data6.mdf',
    SIZE = 5500MB,
    FILEGROWTH = 10),
(
    NAME = tpch100g_data10,
    FILENAME =
'D:\mounthead\Fusion2\tpch100g\tpch100g_data10.mdf',
    SIZE = 5500MB,
    FILEGROWTH = 10),
(
    NAME = tpch100g_data14,
    FILENAME =
'D:\mounthead\Fusion2\tpch100g\tpch100g_data14.mdf',
    SIZE = 5500MB,
    FILEGROWTH = 10),
(
    NAME = tpch100g_data18,
    FILENAME =
'D:\mounthead\Fusion2\tpch100g\tpch100g_data18.mdf',
    SIZE = 5500MB,
    FILEGROWTH = 10),
(
    NAME = tpch100g_data22,
    FILENAME =
'D:\mounthead\Fusion2\tpch100g\tpch100g_data22.mdf',
    SIZE = 5500MB,
    FILEGROWTH = 10),
(
    NAME = tpch100g_data26,
    FILENAME =
'D:\mounthead\Fusion2\tpch100g\tpch100g_data26.mdf',
    SIZE = 5500MB,
    FILEGROWTH = 10),
(
    NAME = tpch100g_data30,
    FILENAME =
'D:\mounthead\Fusion2\tpch100g\tpch100g_data30.mdf',
    SIZE = 5500MB,
    FILEGROWTH = 10),
(
    NAME = tpch100g_data3,
    FILENAME =
'D:\mounthead\Fusion3\tpch100g\tpch100g_data3.mdf',
    SIZE = 5500MB,
    FILEGROWTH = 10),
(
    NAME = tpch100g_data7,
    FILENAME =
'D:\mounthead\Fusion3\tpch100g\tpch100g_data7.mdf',
    SIZE = 5500MB,
    FILEGROWTH = 10),
(
    NAME = tpch100g_data11,
    FILENAME =
'D:\mounthead\Fusion3\tpch100g\tpch100g_data11.mdf',
    SIZE = 5500MB,
    FILEGROWTH = 10),
(
    NAME = tpch100g_data15,
```

```

FILENAME =
'D:\mounthead\Fusion3\tpch100g\tpch100g_data15.mdf',
  SIZE = 5500MB,
  FILEGROWTH = 10),
(
  NAME = tpch100g_data19,
  FILENAME =
'D:\mounthead\Fusion3\tpch100g\tpch100g_data19.mdf',
  SIZE = 5500MB,
  FILEGROWTH = 10),
(
  NAME = tpch100g_data23,
  FILENAME =
'D:\mounthead\Fusion3\tpch100g\tpch100g_data23.mdf',
  SIZE = 5500MB,
  FILEGROWTH = 10),
(
  NAME = tpch100g_data27,
  FILENAME =
'D:\mounthead\Fusion3\tpch100g\tpch100g_data27.mdf',
  SIZE = 5500MB,
  FILEGROWTH = 10),
(
  NAME = tpch100g_data31,
  FILENAME =
'D:\mounthead\Fusion3\tpch100g\tpch100g_data31.mdf',
  SIZE = 5500MB,
  FILEGROWTH = 10),
(
  NAME = tpch100g_data4,
  FILENAME =
'D:\mounthead\Fusion4\tpch100g\tpch100g_data4.mdf',
  SIZE = 5500MB,
  FILEGROWTH = 10),
(
  NAME = tpch100g_data8,
  FILENAME =
'D:\mounthead\Fusion4\tpch100g\tpch100g_data8.mdf',
  SIZE = 5500MB,
  FILEGROWTH = 10),
(
  NAME = tpch100g_data12,
  FILENAME =
'D:\mounthead\Fusion4\tpch100g\tpch100g_data12.mdf',
  SIZE = 5500MB,
  FILEGROWTH = 10),
(
  NAME = tpch100g_data16,
  FILENAME =
'D:\mounthead\Fusion4\tpch100g\tpch100g_data16.mdf',
  SIZE = 5500MB,
  FILEGROWTH = 10),
(
  NAME = tpch100g_data20,
  FILENAME =
'D:\mounthead\Fusion4\tpch100g\tpch100g_data20.mdf',
  SIZE = 5500MB,
  FILEGROWTH = 10),
(
  NAME = tpch100g_data24,
  FILENAME =
'D:\mounthead\Fusion4\tpch100g\tpch100g_data24.mdf',
  SIZE = 5500MB,
  FILEGROWTH = 10),
(
  NAME = tpch100g_data28,
  FILENAME =
'D:\mounthead\Fusion4\tpch100g\tpch100g_data28.mdf',
  SIZE = 5500MB,
  FILEGROWTH = 10),

```

```

(
  NAME = tpch100g_data32,
  FILENAME =
'D:\mounthead\Fusion4\tpch100g\tpch100g_data32.mdf',
  SIZE = 5500MB,
  FILEGROWTH = 10),
FILEGROUP LOAD_FG
(
  NAME = tpch100g_load1,
  FILENAME =
'D:\mounthead\Fusion1\tpch100g\tpch100g_load1.mdf',
  SIZE = 5500MB,
  FILEGROWTH = 10)
,
(
  NAME = tpch100g_load5,
  FILENAME =
'D:\mounthead\Fusion1\tpch100g\tpch100g_load5.mdf',
  SIZE = 5500MB,
  FILEGROWTH = 10)
,
(
  NAME = tpch100g_load9,
  FILENAME =
'D:\mounthead\Fusion1\tpch100g\tpch100g_load9.mdf',
  SIZE = 5500MB,
  FILEGROWTH = 10)
,
(
  NAME = tpch100g_load13,
  FILENAME =
'D:\mounthead\Fusion1\tpch100g\tpch100g_load13.mdf',
  SIZE = 5500MB,
  FILEGROWTH = 10)
,
(
  NAME = tpch100g_load17,
  FILENAME =
'D:\mounthead\Fusion1\tpch100g\tpch100g_load17.mdf',
  SIZE = 5500MB,
  FILEGROWTH = 10)
,
(
  NAME = tpch100g_load21,
  FILENAME =
'D:\mounthead\Fusion1\tpch100g\tpch100g_load21.mdf',
  SIZE = 5500MB,
  FILEGROWTH = 10)
,
(
  NAME = tpch100g_load25,
  FILENAME =
'D:\mounthead\Fusion1\tpch100g\tpch100g_load25.mdf',
  SIZE = 5500MB,
  FILEGROWTH = 10)
,
(
  NAME = tpch100g_load29,
  FILENAME =
'D:\mounthead\Fusion1\tpch100g\tpch100g_load29.mdf',
  SIZE = 5500MB,
  FILEGROWTH = 10)
,
(
  NAME = tpch100g_load2,
  FILENAME =
'D:\mounthead\Fusion2\tpch100g\tpch100g_load2.mdf',

```

```

    SIZE          = 5500MB,
    FILEGROWTH    = 10)
,
(    NAME          = tpch100g_load6,
  FILENAME        =
'D:\mnthead\Fusion2\tpch100g\tpch100g_load6.mdf',
  SIZE            = 5500MB,
  FILEGROWTH      = 10)
,
(    NAME          = tpch100g_load10,
  FILENAME        =
'D:\mnthead\Fusion2\tpch100g\tpch100g_load10.mdf',
  SIZE            = 5500MB,
  FILEGROWTH      = 10)
,
(    NAME          = tpch100g_load14,
  FILENAME        =
'D:\mnthead\Fusion2\tpch100g\tpch100g_load14.mdf',
  SIZE            = 5500MB,
  FILEGROWTH      = 10)
,
(    NAME          = tpch100g_load18,
  FILENAME        =
'D:\mnthead\Fusion2\tpch100g\tpch100g_load18.mdf',
  SIZE            = 5500MB,
  FILEGROWTH      = 10)
,
(    NAME          = tpch100g_load22,
  FILENAME        =
'D:\mnthead\Fusion2\tpch100g\tpch100g_load22.mdf',
  SIZE            = 5500MB,
  FILEGROWTH      = 10)
,
(    NAME          = tpch100g_load26,
  FILENAME        =
'D:\mnthead\Fusion2\tpch100g\tpch100g_load26.mdf',
  SIZE            = 5500MB,
  FILEGROWTH      = 10)
,
(    NAME          = tpch100g_load30,
  FILENAME        =
'D:\mnthead\Fusion2\tpch100g\tpch100g_load30.mdf',
  SIZE            = 5500MB,
  FILEGROWTH      = 10)
,
(    NAME          = tpch100g_load3,
  FILENAME        =
'D:\mnthead\Fusion3\tpch100g\tpch100g_load3.mdf',
  SIZE            = 5500MB,
  FILEGROWTH      = 10)
,
(    NAME          = tpch100g_load7,
  FILENAME        =
'D:\mnthead\Fusion3\tpch100g\tpch100g_load7.mdf',
  SIZE            = 5500MB,
  FILEGROWTH      = 10)
,
(    NAME          = tpch100g_load11,

```

```

  FILENAME        =
'D:\mnthead\Fusion3\tpch100g\tpch100g_load11.mdf',
  SIZE            = 5500MB,
  FILEGROWTH      = 10)
,
(    NAME          = tpch100g_load15,
  FILENAME        =
'D:\mnthead\Fusion3\tpch100g\tpch100g_load15.mdf',
  SIZE            = 5500MB,
  FILEGROWTH      = 10)
,
(    NAME          = tpch100g_load19,
  FILENAME        =
'D:\mnthead\Fusion3\tpch100g\tpch100g_load19.mdf',
  SIZE            = 5500MB,
  FILEGROWTH      = 10)
,
(    NAME          = tpch100g_load23,
  FILENAME        =
'D:\mnthead\Fusion3\tpch100g\tpch100g_load23.mdf',
  SIZE            = 5500MB,
  FILEGROWTH      = 10)
,
(    NAME          = tpch100g_load27,
  FILENAME        =
'D:\mnthead\Fusion3\tpch100g\tpch100g_load27.mdf',
  SIZE            = 5500MB,
  FILEGROWTH      = 10)
,
(    NAME          = tpch100g_load31,
  FILENAME        =
'D:\mnthead\Fusion3\tpch100g\tpch100g_load31.mdf',
  SIZE            = 5500MB,
  FILEGROWTH      = 10)
,
(    NAME          = tpch100g_load4,
  FILENAME        =
'D:\mnthead\Fusion4\tpch100g\tpch100g_load4.mdf',
  SIZE            = 5500MB,
  FILEGROWTH      = 10)
,
(    NAME          = tpch100g_load8,
  FILENAME        =
'D:\mnthead\Fusion4\tpch100g\tpch100g_load8.mdf',
  SIZE            = 5500MB,
  FILEGROWTH      = 10)
,
(    NAME          = tpch100g_load12,
  FILENAME        =
'D:\mnthead\Fusion4\tpch100g\tpch100g_load12.mdf',
  SIZE            = 5500MB,
  FILEGROWTH      = 10)
,
(    NAME          = tpch100g_load16,
  FILENAME        =
'D:\mnthead\Fusion4\tpch100g\tpch100g_load16.mdf',
  SIZE            = 5500MB,
  FILEGROWTH      = 10)
,

```

```

( NAME = tpch100g_load20,
  FILENAME =
'D:\mnthead\Fusion4\tpch100g\tpch100g_load20.mdf',
  SIZE = 5500MB,
  FILEGROWTH = 10)
,
( NAME = tpch100g_load24,
  FILENAME =
'D:\mnthead\Fusion4\tpch100g\tpch100g_load24.mdf',
  SIZE = 5500MB,
  FILEGROWTH = 10)
,
( NAME = tpch100g_load28,
  FILENAME =
'D:\mnthead\Fusion4\tpch100g\tpch100g_load28.mdf',
  SIZE = 5500MB,
  FILEGROWTH = 10)
,
( NAME = tpch100g_load32,
  FILENAME =
'D:\mnthead\Fusion4\tpch100g\tpch100g_load32.mdf',
  SIZE = 5500MB,
  FILEGROWTH = 10)
LOG ON
( NAME = tpch100g_Log1,
  FILENAME = 'L:\tpch100g_Log1.mdf',
  SIZE = 20000MB,
  FILEGROWTH = 0MB)

```

```

-- File: CREATETABLES.SQL
-- Microsoft TPC-H Benchmark Kit Ver. 2.7.0-1005
-- Copyright Microsoft, 2006 - 2009
--

```

use tpch100g

```

create table PART
(P_PARTKEY int not null,
 P_NAME varchar(55) not null,
 P_MFGR char(25) not null,
 P_BRAND char(10) not null,
 P_TYPE varchar(25) not null,
 P_SIZE int not null,
 P_CONTAINER char(10) not null,
 P_RETAILPRICE float not
null,
 P_COMMENT varchar(23) not null)
on LOAD_FG

```

```

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

```

on LOAD_FG

```

create table PARTSUPP
(PS_PARTKEY int not null,
 PS_SUPPKEY int not null,
 PS_AVAILQTY int not null,
 PS_SUPPLYCOST float not null,
 PS_COMMENT varchar(199) not null)

```

on LOAD_FG

```

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

```

on LOAD_FG

```

create table ORDERS
(O_ORDERKEY bigint not
null,
 O_CUSTKEY int not null,
 O_ORDERSTATUS char(1) not
null,
 O_TOTALPRICE float not
null,
 O_ORDERDATE date not null,
 O_ORDERPRIORITY char(15) not null,
 O_CLERK char(15) not null,
 O_SHIPPRIORITY int not null,
 O_COMMENT varchar(79) not null)

```

on LOAD_FG

```

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

```

on LOAD_FG

```

create table NATION
  (N_NATIONKEY int not null,
  N_NAME char(25) not null,
  N_REGIONKEY int not null,
  N_COMMENT varchar(152)not null)
on LOAD_FG

```

```

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

```

```

-- File: CREATECLUSTEREDINDEXES.SQL
-- Microsoft TPC-H Benchmark Kit Ver. 2.7.0-1005
-- Copyright Microsoft, 2006 - 2009
--

```

```
use tpch100g
```

```

ALTER TABLE NATION ADD CONSTRAINT
PK_N_NATIONKEY PRIMARY KEY (N_NATIONKEY)
ON DATA_FG

```

```

ALTER TABLE REGION ADD CONSTRAINT
PK_R_REGIONKEY PRIMARY KEY (R_REGIONKEY)
ON DATA_FG

```

```

CREATE INDEX N_REGIONKEY_IDX ON
NATION(N_REGIONKEY)
WITH (fillfactor=100, SORT_IN_TEMPDB=ON,
MAXDOP=%INDEX_CREATE_PARALLELISM%)
ON DATA_FG

```

```

ALTER TABLE PART ADD CONSTRAINT
PK_P_PARTKEY PRIMARY KEY (P_PARTKEY)
WITH
(MAXDOP=%INDEX_CREATE_PARALLELISM%)
ON DATA_FG

```

```

ALTER TABLE SUPPLIER ADD CONSTRAINT
PK_S_SUPPKEY PRIMARY KEY (S_SUPPKEY)
WITH
(MAXDOP=%INDEX_CREATE_PARALLELISM%)
ON DATA_FG

```

```

CREATE INDEX S_NATIONKEY_IDX ON
SUPPLIER(S_NATIONKEY)
WITH (FILLFACTOR=100, SORT_IN_TEMPDB=ON,
MAXDOP=%INDEX_CREATE_PARALLELISM%)
ON DATA_FG

```

```

ALTER TABLE CUSTOMER ADD CONSTRAINT
PK_C_CUSTKEY PRIMARY KEY (C_CUSTKEY)
WITH
(MAXDOP=%INDEX_CREATE_PARALLELISM%)

```

```
ON DATA_FG
```

```

ALTER TABLE PARTSUPP ADD CONSTRAINT
PK_PS_PARTKEY_PS_SUPPKEY PRIMARY KEY
(PS_PARTKEY, PS_SUPPKEY)
WITH
(MAXDOP=%INDEX_CREATE_PARALLELISM%)
ON DATA_FG

```

```

CREATE CLUSTERED INDEX O_ORDERDATE_CLUIDX
ON ORDERS(O_ORDERDATE)
WITH (FILLFACTOR=95, SORT_IN_TEMPDB=ON,
MAXDOP=%INDEX_CREATE_PARALLELISM%)
ON DATA_FG

```

```

ALTER TABLE ORDERS ADD CONSTRAINT
PK_O_ORDERKEY PRIMARY KEY (O_ORDERKEY)
WITH (FILLFACTOR = 95,
MAXDOP=%INDEX_CREATE_PARALLELISM%)
ON DATA_FG

```

```

-- File: CREATEINDEXESSTREAM2.SQL
-- Microsoft TPC-H Benchmark Kit Ver. 2.7.0-1005-
1004
-- Copyright Microsoft, 2006 - 2009
--

```

```
use tpch100g
```

```

CREATE INDEX PS_SUPPKEY_IDX ON
PARTSUPP(PS_SUPPKEY)
WITH( FILLFACTOR=100, SORT_IN_TEMPDB=ON,
MAXDOP=%INDEX_CREATE_PARALLELISM%)
ON DATA_FG

```

```

CREATE CLUSTERED INDEX L_SHIPDATE_CLUIDX
ON LINEITEM(L_SHIPDATE)
WITH ( FILLFACTOR=95, SORT_IN_TEMPDB=ON,
MAXDOP=%INDEX_CREATE_PARALLELISM%)
ON DATA_FG

```

```

CREATE INDEX L_ORDERKEY_IDX ON
LINEITEM(L_ORDERKEY)
WITH ( FILLFACTOR=95, SORT_IN_TEMPDB=ON,
MAXDOP=%INDEX_CREATE_PARALLELISM%)
ON DATA_FG

```

```

CREATE INDEX L_PARTKEY_IDX ON
LINEITEM(L_PARTKEY)
WITH (FILLFACTOR=95, SORT_IN_TEMPDB=ON,
MAXDOP=%INDEX_CREATE_PARALLELISM%)
ON DATA_FG

```

```

--
-- File:  DROPLLOADFG.SQL
--        Microsoft TPC-H Benchmark Kit Ver. 2.7.0-1005
--        Copyright Microsoft, 2006 - 2009
--
USE %DBNAME%
GO
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 FILE
%DBNAME%_load17
GO

```

```

ALTER DATABASE %DBNAME% REMOVE FILE
%DBNAME%_load18
GO
ALTER DATABASE %DBNAME% REMOVE FILE
%DBNAME%_load19
GO
ALTER DATABASE %DBNAME% REMOVE FILE
%DBNAME%_load20
GO
ALTER DATABASE %DBNAME% REMOVE FILE
%DBNAME%_load21
GO
ALTER DATABASE %DBNAME% REMOVE FILE
%DBNAME%_load22
GO
ALTER DATABASE %DBNAME% REMOVE FILE
%DBNAME%_load23
GO
ALTER DATABASE %DBNAME% REMOVE FILE
%DBNAME%_load24
GO
ALTER DATABASE %DBNAME% REMOVE FILE
%DBNAME%_load25
GO
ALTER DATABASE %DBNAME% REMOVE FILE
%DBNAME%_load26
GO
ALTER DATABASE %DBNAME% REMOVE FILE
%DBNAME%_load27
GO
ALTER DATABASE %DBNAME% REMOVE FILE
%DBNAME%_load28
GO
ALTER DATABASE %DBNAME% REMOVE FILE
%DBNAME%_load29
GO
ALTER DATABASE %DBNAME% REMOVE FILE
%DBNAME%_load30
GO
ALTER DATABASE %DBNAME% REMOVE FILE
%DBNAME%_load31
GO
ALTER DATABASE %DBNAME% REMOVE FILE
%DBNAME%_load32
GO
ALTER DATABASE %DBNAME% REMOVE
FILEGROUP LOAD_FG
GO

```

```

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

```

```
if exists (select name from sysdevices where name =
'BackupDev1b')
```

```
    exec sp_dropdevice BackupDev1b
```

```
GO
```

```
if exists (select name from sysdevices where name =
'BackupDev2b')
```

```
    exec sp_dropdevice BackupDev2b
```

```
GO
```

```
if exists (select name from sysdevices where name =
'BackupDev3b')
```

```
    exec sp_dropdevice BackupDev3b
```

```
GO
```

```
if exists (select name from sysdevices where name =
'BackupDev4b')
```

```
    exec sp_dropdevice BackupDev4b
```

```
GO
```

```
sp_addumpdevice 'disk', 'BackupDev1b',
'D:\mntthead\Fusion1\TPCHbackup1b'
```

```
GO
```

```
sp_addumpdevice 'disk', 'BackupDev2b',
'D:\mntthead\Fusion2\TPCHbackup2b'
```

```
GO
```

```
sp_addumpdevice 'disk', 'BackupDev3b',
'D:\mntthead\Fusion3\TPCHbackup3b'
```

```
GO
```

```
sp_addumpdevice 'disk', 'BackupDev4b',
'D:\mntthead\Fusion4\TPCHbackup4b'
```

```
GO
```

```
backup database tpch100g to BackupDev1b, BackupDev2b,
BackupDev3b, BackupDev4b with init, stats=1
```

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

```
restore database tpch100g from BackupDev1b, BackupDev2b,
BackupDev3b, BackupDev4b with replace, stats=1
```

```
--      Microsoft TPC-H Benchmark Kit Ver. 2.7.0-1005
--      Copyright Microsoft, 2006 - 2009
--
-- MoveTemp.sql
```

```
alter database tempdb modify file
```

```
(name='tempdev',filename='D:\mounthead\Fusion1\TempdB.
mdf')
```

```
alter database tempdb modify file
```

```
(name='templog',filename='D:\mounthead\Fusion2\Templog.1
df')
```

```
--      Microsoft TPC-H Benchmark Kit Ver. 2.7.0-1005
--      Copyright Microsoft, 2006 - 2009
--
```

```
alter database tempdb modify file
```

```
(name=tempdev,
filename='D:\mounthead\Fusion1\TempdB.mdf',size=4700mb
)
```

```
alter database tempdb modify file
```

```
(name=templog,
filename='D:\mounthead\Fusion2\Templog.ldf',size=4700mb)
```

```
alter database tempdb add file
```

```
(name=tempdev2,
filename='D:\mounthead\Fusion3\tempdev_2',size=2700mb),
```

```
(name=tempdev3,
filename='D:\mounthead\Fusion4\tempdev_3',size=4700mb),
```

```
(name=tempdev4,
filename='D:\tempdb\tempdev_4',size=39000mb),
```

```
(name=tempdev5,
filename='C:\tempdb\tempdev_5',size=21000mb)
```

Appendix C: ACID Scripts

Appendix C

```

-- ACID_DUR_TRAN.SQL
--
-- TPC-H Version 2.7.0-1005 ACID Transaction
--
-- Implemented trunc(x,2) as ROUND(x,2,1)
--

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,
@o_key,
@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
-- Microsoft TPC-H Benchmark Kit Ver. 2.7.0-1005
-- Copyright Microsoft, 2006 - 2009

```


Appendix C

```
-- 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
2.7.0-1005
--           Copyright Microsoft, 2006 - 2009
--
-- 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 2.7.0-1005 ACID Transaction
--
-- Implemented trunc(x,2) as ROUND(x,2,1)
--

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

        select @quantity  =
L_QUANTITY,
        @extprice    =
L_EXTENDEDPRICE,
```

Appendix C

```

        @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_ACI values( @pkey,
        @skey,
@o_key,
        @l_key,
        @delta,
getdate())
commit transaction T

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

```

```

go
-- File: ACID_VALUES.SQL
-- Microsoft TPC-H Benchmark Kit Version
2.7.0-1005
-- Copyright Microsoft, 2006 - 2009
--
-- 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
-- loop to populate table for ACID
while (@counter <= (@cons_rows + 10) )
begin

```

Appendix C

```

-- 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
                select
                    @rand_part_key = ROUND(((RAND() *
(@multiplier+9))/5),0)

                    @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
        insert into acid_values
        values(@acid_test,
        @rand_o_key,

```

Appendix C

```

@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
           = @counter + 1,
               @found_one
           = 0,
               @cnt
           = 0
               end
           end

-- File:  CLEANUP.SQL
-- Microsoft TPC-H Benchmark Kit Ver. 2.7.0-1005
-- Copyright Microsoft, 2006 - 2009

if exists ( select name from sysobjects where name =
'HISTORY_ACT' )
    drop table HISTORY_ACT
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. 2.7.0-1005
-- Copyright Microsoft, 2006 - 2009

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

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

```

Appendix C

```

@counter "SEQ NUMBER"
exec acid_tran_com @rand_o_key, @o_key int,
                  @rand_l_key, @l_key int,
                  @rand_delta @delta int

go
-- File: DUR_TRAN.SQL
-- Microsoft TPC-H Benchmark Kit Ver. 2.7.0-1005
-- Copyright Microsoft, 2006 - 2009

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 2.7.0-1005 ACID Transaction
--
-- Implemented trunc(x,2) as ROUND(x,2,1)
--

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

```

Appendix C

```

        @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,
        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

-- iso5_parts.sql
--
-- TPC-H Version 2.7.0-1005 ACID Transaction
--
--
if exists ( select name from sysobjects where name =
'iso5_parts' )
        drop procedure iso5_parts
go

create proc iso5_parts
        @ps_partkey1 int,
        @ps_suppkey1 int
as

```

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```

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 2.7.0-1005 ACID Transaction
    --
    -- Implemented trunc(x,2) as ROUND(x,2,1)
    --

    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
                L_LINENUMBER =
            @l_key

            select @ototal = @ototal -
            ROUND((ROUND((@extprice * (1 - @disc)),2,1) * (1 +
            @tax)),2,1),
                @rprice =
            ROUND((@extprice/@quantity),2,1),

```

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```

@cost =
ROUND((@rprice * @delta),2,1),
@cost,
@new_extprice = @extprice +
@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,
@skkey,
@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 2.7.0-1005 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)
print " "
print "TPC-H Query Data"
-- ACID CODE END

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

```


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```
-- 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 2.7.0-1005 ACID Transaction
--
-- Implemented trunc(x,2) as ROUND(x,2,1)
--
```

```
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 " "
-- 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 +
@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,
```

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```

@o_key,
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:"
select convert(char(30), getdate(), 9)
print " "
end
-- ACID CODE END

select @rprice 'RPrice',
@quantity 'Quantity',
@tax 'Tax',
@disc 'Discount',

@skkey,
@l_key,
@delta,

end
go

-- tran_w_rb.sql
--
-- TPC-H Version 2.7.0-1005 ACID Transaction
--
-- Implemented trunc(x,2) as ROUND(x,2,1)
--
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
where O_ORDERKEY = @o_key
print " "
-- ACID CODE END

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

-- ACID CODE BEGIN

```

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```

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 +
@new_extprice,
        @delta
where   L_ORDERKEY = @o_key and
        L_LINENUMBER =
@l_key

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,
                               @rprice 'RPrice',
                               @quantity 'Quantity',
                               @o_key,
                               @l_key,
                               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
print " "
print " "
print "TPC-H ACID Transaction End:"
select convert(char(30), getdate(),9)
print " "
end
--      ACID CODE END

select  @rprice 'RPrice',
        @quantity 'Quantity',
        @o_key,
        @l_key,
        getdate()

```

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```

@tax 'Tax',
@disc 'Discount',
@extprice 'Extended Price',
@ototal 'Total'

exec tran_w_rb @rand_o_key,
              @rand_l_key,
              @rand_delta

GO

-- File:  CON1.SQL
--       Microsoft TPC-H Benchmark Kit Ver. 2.7.0-1005
--       Copyright Microsoft, 2006 - 2009
--
-- Consistency test 1
-- -----
--
-- 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)),
              I.L_ORDERKEY,

cast(sum(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
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 ''
end

go

-- File:  ATOM_C.SQL
--       Microsoft TPC-H Benchmark Kit Ver. 2.7.0-1005
--       Copyright Microsoft, 2006 - 2009
-- 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:  ATOM_RB.SQL
--       Microsoft TPC-H Benchmark Kit Ver. 2.7.0-1005
--       Copyright Microsoft, 2006 - 2009
-- 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"

```

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```
SELECT o_orderkey AS 'O_OrderKey',
       o_totalprice AS 'O_TotalPrice',
       l_orderkey AS 'L_OrderKey',
       lineitem_sum AS '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. 2.7.0-1005
-- Copyright Microsoft, 2006 - 2009
--
-- 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)),
       I.L_ORDERKEY,
       cast(sum(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,
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 AS 'O_OrderKey',
       o_totalprice AS 'O_TotalPrice',
       l_orderkey AS 'L_OrderKey',
       lineitem_sum AS '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 2 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

--
-- 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
```

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```

and          where H_O_KEY = acid_o_key          -- Durability Stream 6
              select *
and          H_L_KEY = acid_l_key              from acid_values
and          H_DELTA = acid_delta              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 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 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 *

```

Appendix C

```

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
      )

-- File: DUR_VERIFY1.SQL
-- Microsoft TPC-H Kit Ver. 2.7.0-1005
-- Copyright Microsoft, 2006 - 2009
--
-- 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 ''

if exists ( select name from sysobjects where name =
'temp_dur1_output' )
drop table temp_dur1_output
GO

CREATE TABLE temp_dur1_output
(
  o_orderkey int,
  o_totalprice money,
  l_orderkey int,
  lineitem_sum money
)

INSERT INTO temp_dur1_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_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

```

Appendix C

```
-- File: DUR_VERIFY2.SQL
-- Microsoft TPC-H Kit Ver. 2.7.0-1005
-- Copyright Microsoft, 2006 - 2009
--
-- 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 ''

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_EXTENDEDPRI
(1 - L_DISCOUNT)),2,1) * (1 + L_TAX)),2,1))
SELECT DISTINCT(o.O_ORDERKEY),
CAST(o.O_TOTALPRICE AS decimal(20,3)),
l.L_ORDERKEY,

CAST(SUM(CAST(CAST(CAST(CAST(CAST(L_E
XTENDEDPRI 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_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

:: Wait for ISO test to complete
%TOOLS_DIR%\Utility\semaphore -waitlist ISO1_1 ISO1_2
::

echo *** >
%ACID_DIR%\iso\iso1.ver
echo *** Isolation test 1 results >>
%ACID_DIR%\iso\iso1.ver
echo *** >>
%ACID_DIR%\iso\iso1.ver
type %OUTPUT_DIR%\Execute_Isolation_1_1.out
>> %ACID_DIR%\iso\iso1.ver
type %OUTPUT_DIR%\Execute_Isolation_1_2.out
>> %ACID_DIR%\iso\iso1.ver

:: Wait for ISO test to complete
%TOOLS_DIR%\Utility\semaphore -waitlist ISO2_1 ISO2_2
::

echo *** >
%ACID_DIR%\iso\iso2.ver
echo *** Isolation test 2 results >>
%ACID_DIR%\iso\iso2.ver
echo *** >>
%ACID_DIR%\iso\iso2.ver
type %OUTPUT_DIR%\Execute_Isolation_2_1.out
>> %ACID_DIR%\iso\iso2.ver
type %OUTPUT_DIR%\Execute_Isolation_2_2.out
>> %ACID_DIR%\iso\iso2.ver
```


Appendix C

```

:: Wait for ISO test to complete
%TOOLS_DIR%\Utility\semaphore -waitlist ISO3_1 ISO3_2
::
echo    ***                >
%ACID_DIR%\iso\iso3.ver
echo    *** Isolation test 3 results    >>
%ACID_DIR%\iso\iso3.ver
echo    ***                >>
%ACID_DIR%\iso\iso3.ver
type    %OUTPUT_DIR%\Execute_Isolation_3_1.out
        >> %ACID_DIR%\iso\iso3.ver
type    %OUTPUT_DIR%\Execute_Isolation_3_2.out
        >> %ACID_DIR%\iso\iso3.ver
:: Wait for ISO test to complete
%TOOLS_DIR%\Utility\semaphore -waitlist ISO4_1 ISO4_2
::
echo    ***                >
%ACID_DIR%\iso\iso4.ver
echo    *** Isolation test 4 results    >>
%ACID_DIR%\iso\iso4.ver
echo    ***                >>
%ACID_DIR%\iso\iso4.ver
type    %OUTPUT_DIR%\Execute_Isolation_4_1.out
        >> %ACID_DIR%\iso\iso4.ver
type    %OUTPUT_DIR%\Execute_Isolation_4_2.out
        >> %ACID_DIR%\iso\iso4.ver
:: Wait for ISO test to complete
%TOOLS_DIR%\Utility\semaphore -waitlist ISO5_1 ISO5_2
::
echo    ***                >
%ACID_DIR%\iso\iso5.ver
echo    *** Isolation test 5 results    >>
%ACID_DIR%\iso\iso5.ver
echo    ***                >>
%ACID_DIR%\iso\iso5.ver
type    %OUTPUT_DIR%\Execute_Isolation_5_1.out
        >> %ACID_DIR%\iso\iso5.ver
type    %OUTPUT_DIR%\Execute_Isolation_5_2.out
        >> %ACID_DIR%\iso\iso5.ver
:: Wait for ISO test to complete
%TOOLS_DIR%\Utility\semaphore -waitlist ISO6_1 ISO6_2
ISO6_3
::
echo    ***                >
%ACID_DIR%\iso\iso6.ver
echo    *** Isolation test 6 results    >>
%ACID_DIR%\iso\iso6.ver
echo    ***                >>
%ACID_DIR%\iso\iso6.ver
type    %OUTPUT_DIR%\Execute_Isolation_6_1.out
        >> %ACID_DIR%\iso\iso6.ver
type    %OUTPUT_DIR%\Execute_Isolation_6_2.out
        >> %ACID_DIR%\iso\iso6.ver
type    %OUTPUT_DIR%\Execute_Isolation_6_3.out
        >> %ACID_DIR%\iso\iso6.ver

```

```

type    %OUTPUT_DIR%\Execute_Isolation_6_3.out
>> %ACID_DIR%\iso\iso6.ver-- File:
ISOL1_1.SQL
-- Microsoft TPC-H Benchmark Kit Ver. 2.7.0-1005
-- Copyright Microsoft, 2006 - 2009

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. 2.7.0-1005
-- Copyright Microsoft, 2006 - 2009

-- 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. 2.7.0-1005
-- Copyright Microsoft, 2006 - 2009

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

```

Appendix C

```
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. 2.7.0-1005
-- Copyright Microsoft, 2006 - 2009

-- 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
-- Microsoft TPC-H Benchmark Kit Ver. 2.7.0-1005
-- Copyright Microsoft, 2006 - 2009

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. 2.7.0-1005
-- Copyright Microsoft, 2006 - 2009

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. 2.7.0-1005
-- Copyright Microsoft, 2006 - 2009

-- 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. 2.7.0-1005
-- Copyright Microsoft, 2006 - 2009

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
```

Appendix C

```
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. 2.7.0-1005
-- Copyright Microsoft, 2006 - 2009
```

```
-- 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',
       @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. 2.7.0-1005
-- Copyright Microsoft, 2006 - 2009
```

```
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. 2.7.0-1005
-- Copyright Microsoft, 2006 - 2009
```

```
-- 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

```
-- acid_qry1.sql
```

```
--
```

```
-- TPC-H Version 2.7.0-1005 ACID Transaction
```

```
--
```

```
-- Implemented trunc(x,2) as ROUND(x,2,1)
```

```
--
```

```
-- 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
```

Appendix C

GO

```
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. 2.7.0-1005
-- Copyright Microsoft, 2006 - 2009
```

```
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
```

```
-- acid_qry1.sql
--
-- TPC-H Version 2.7.0-1005 ACID Transaction
--
-- Implemented trunc(x,2) as ROUND(x,2,1)
--
```

```
--      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

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
WHEREP_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
WHEREP_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

```

-- using default substitutions

/* TPC_H Query 1 - Pricing Summary Report */

```

SELECT      L_RETURNFLAG,
            L_LINESTATUS,
            SUM(L_QUANTITY)
            AS SUM_QTY,
            SUM(L_EXTENDEDPRI
            CE)
            AS SUM_BASE_PRICE,
            SUM(L_EXTENDEDPRI
            CE*(1-L_DISCOUNT))
            AS SUM_DISC_PRICE,
            SUM(L_EXTENDEDPRI
            CE*(1-
L_DISCOUNT)*(1+L_TAX)) AS SUM_CHARGE,
            AVG(L_QUANTITY)
            AS AVG_QTY,
            AVG(L_EXTENDEDPRI
            CE)
            AS AVG_PRICE,
            AVG(L_DISCOUNT)
            AS AVG_DISC,
            COUNT_BIG(*)
            AS COUNT_ORDER
FROM LINEITEM
WHEREL_SHIPDATE <= dateadd(dd, -90, cast('1998-12-
01'as date))
GROUP BY L_RETURNFLAG,
L_LINESTATUS
ORDER BY L_RETURNFLAG,
L_LINESTATUS

L_RETURNFLAG L_LINESTATUS SUM_QTY
SUM_BASE_PRICE SUM_DISC_PRICE
SUM_CHARGE AVG_QTY
AVG_PRICE AVG_DISC
COUNT_ORDER
-----
-----
A F 37734107.000000
56586554400.730110 53758257134.870110
55909065222.827606 25.522006 38273.129735
0.049985 1478493
N F 991417.000000 1487504710.380005
1413082168.054102 1469649223.194376 25.516472
38284.467761 0.050093 38854
N O 74476040.000000
111701729697.739910 106118230307.605550
110367043872.497100 25.502227 38249.117989
0.049997 2920374
R F 37719753.000000
56568041380.900078 53741292684.604057
55889619119.831848 25.505794 38250.854626
0.050009 1478870

```

Appendix D

QKuHYh,vZGiwu2FWEJoLDx04	33-429-790-	9739.860000	Supplier#000003384	FRANCE
6131 uriously regular requests hag		138357	Manufacturer#2	o,Z3v4POifevE k9U1b
9937.840000	Supplier#000005969	ROMANIA	6JlucX,I	16-494-913-5925 s after the furiously bold
108438	Manufacturer#1			packages sleep fluffily idly final requests: quickly final
ANDENSOSmk,miq23Xfb5RWt6dvUcvt6Qa	29-520-	9721.950000	Supplier#000008757	UNITED
692-3537 efully express instructions. regular requests against		KINGDOM	156241	Manufacturer#3
the slyly fin		Atg6GnM4dT2		33-821-407-2995 eep
9936.220000	Supplier#000005250	UNITED		furiously sauternes; quickl
KINGDOM	249	Manufacturer#4	9681.330000	Supplier#000008406
B3rqp0xbSEim4Mpy2RH J	33-320-228-2957	78405	Manufacturer#1	,qUuXcftU1
etect about the furiously final accounts. slyly ironic pinto				32-139-873-8571 haggle slyly regular excuses. quic
beans sleep inside the furiously		9643.550000	Supplier#000005148	ROMANIA
9923.770000	Supplier#000002324	GERMANY	107617	Manufacturer#1
29821	Manufacturer#4	y3OD9UywSTOk		kT4ciVFslx9z4s79p Js825
17-779-299-1839 ackages boost blithely. blithely regular				29-252-617-4850 final excuses. final ideas boost quickly
deposits c		9624.820000	Supplier#000001816	FRANCE
9871.220000	Supplier#000006373	GERMANY	34306	Manufacturer#3
43868	Manufacturer#5	J8fcXWstQm		e7vab91vLJPWxxZnewmnDBpDmxYHrb
17-813-485-8637 etect blithely bold asymptotes. fluffily				16-392-237-
ironic platelets wake furiously; blit				6726 e packages are around the special ideas. special, pending
9870.780000	Supplier#000001286	GERMANY	9624.780000	Supplier#000009658
81285	Manufacturer#2		189657	Manufacturer#1
YKA,E2fjiVd7eUrzp2Ef8j1QxGo2DFnosaTEH	17-516-			oE9uBgEfSS4opIcepXyAYM,x
924-4574 regular accounts. furiously unusual courts above				29-748-876-2014
the fi		9612.940000	Supplier#000003228	ROMANIA
9870.780000	Supplier#000001286	GERMANY	120715	Manufacturer#2
181285	Manufacturer#4		KDdpNKN3cWu7ZSrbdp7AfSLxx,qWB	29-325-784-
YKA,E2fjiVd7eUrzp2Ef8j1QxGo2DFnosaTEH	17-516-			8187 warhorses. quickly even deposits sublata daringly ironic
924-4574 regular accounts. furiously unusual courts above				instructions. slyly blithe t
the fi		9612.940000	Supplier#000003228	ROMANIA
9852.520000	Supplier#000008973	RUSSIA	198189	Manufacturer#4
18972	Manufacturer#2		KDdpNKN3cWu7ZSrbdp7AfSLxx,qWB	29-325-784-
t5L67YdBYH6o,Vz24jpdYQ9	32-188-594-7038			8187 warhorses. quickly even deposits sublata daringly ironic
rms wake final foxes. carefully unusual depende				instructions. slyly blithe t
9847.830000	Supplier#000008097	RUSSIA	9571.830000	Supplier#000004305
130557	Manufacturer#2	xMe97bpE69NzdwLoX		179270
32-375-640-3593 the special excuses. silent sentiments serve				Manufacturer#2
carefully final ac				qNHZ7WmCzygwMPRDO9Ps
9847.570000	Supplier#000006345	FRANCE		29-973-481-1831
86344	Manufacturer#1			kly carefully express asymptotes. furiou
VSt3rzk3qG698u6ld8HhOByvrTcSTSvQIDQDag	16-886-			9558.100000
766-7945 ges. slyly regular requests are. ruthless, express				Supplier#000003532
excuses cajole blithely across the unu				UNITED
9847.570000	Supplier#000006345	FRANCE	KINGDOM	88515
173827	Manufacturer#2			Manufacturer#4
VSt3rzk3qG698u6ld8HhOByvrTcSTSvQIDQDag	16-886-			EOeuiOn21OVpTIGuufFDFsbN1p0lhpXHp
766-7945 ges. slyly regular requests are. ruthless, express				33-152-301-
excuses cajole blithely across the unu				2164 foxes. quickly even excuses use. slyly special foxes nag
9836.930000	Supplier#000007342	RUSSIA		bl
4841	Manufacturer#4	JOIK7C1,7xrEZSSOw		9492.790000
32-399-414-5385 blithely carefully bold theodolites. fur				Supplier#000005975
9817.100000	Supplier#000002352	RUSSIA	25974	Manufacturer#5
124815	Manufacturer#2	4LfoHUZjgEbAKw		S6mIiCTx82z7IV
TgdKcgOc4D4uCYw	32-551-831-1437	wake carefully		17-992-579-4839 arefully pending accounts. blithely regular
alongside of the carefully final ex				excuses boost carefully carefully ironic p
9817.100000	Supplier#000002352	RUSSIA	9461.050000	Supplier#000002536
152351	Manufacturer#3	4LfoHUZjgEbAKw		UNITED
TgdKcgOc4D4uCYw	32-551-831-1437	wake carefully	KINGDOM	20033
alongside of the carefully final ex				Manufacturer#1
				8mmGbyzaU 7ZS2wJumTibypncu9pNkDc4FYA
				33-556-
				973-5522 . slyly regular deposits wake slyly. furiously regular
				warthogs are.
				9453.010000
				Supplier#000000802
				ROMANIA
				175767
				Manufacturer#1
				,6HYXb4uaHITmtMBj4Ak57Pd
				29-342-882-6463
				gular frets. permanently special multipliers believe blithely
				alongs
				9408.650000
				Supplier#000007772
				UNITED
				KINGDOM
				117771
				Manufacturer#4

Appendix D

AiC5YAH, gdu0i7 33-152-491-1126 nag
 against the final requests. furiously unusual packages cajole
 blit
 9359.610000 Supplier#000004856 ROMANIA
 62349 Manufacturer#5 HYogcF3Jb yh1
 29-334-870-9731 y ironic theodolites. blithely sile
 9357.450000 Supplier#000006188 UNITED
 KINGDOM 138648 Manufacturer#1
 g801,ssP8wpTk4Hm 33-583-607-1633 ously
 always regular packages. fluffily even accounts beneath the
 furiously final pack
 9352.040000 Supplier#000003439 GERMANY
 170921 Manufacturer#4 qYPDgoiBGhCYxjgC
 17-128-996-4650 according to the carefully bold ideas
 9312.970000 Supplier#000007807 RUSSIA
 90279 Manufacturer#5
 oGYMPCk9XHGB2PBfKRnHA 32-673-872-
 5854 ecial packages among the pending, even requests use
 regula
 9312.970000 Supplier#000007807 RUSSIA
 100276 Manufacturer#5
 oGYMPCk9XHGB2PBfKRnHA 32-673-872-
 5854 ecial packages among the pending, even requests use
 regula
 9280.270000 Supplier#000007194 ROMANIA
 47193 Manufacturer#3 zhRUQkBSrFYxIAXTfInj
 vyGRQjeK 29-318-454-2133 o beans haggle after the
 furiously unusual deposits. carefully silent dolphins cajole
 carefully
 9274.800000 Supplier#000008854 RUSSIA
 76346 Manufacturer#3
 lXhLoOUM7I3mZ1mKnerw OSqdbb4QbGa 32-524-
 148-5221 y. courts do wake slyly. carefully ironic platelets
 haggle above the slyly regular the
 9249.350000 Supplier#000003973 FRANCE
 26466 Manufacturer#1
 d18GiDsL6Wm2IsGXM,RZf1jCsgZAOjNYVThTRP4 16-
 722-866-1658 uests are furiously. regular tithes through the
 regular, final accounts cajole furiously above the q
 9249.350000 Supplier#000003973 FRANCE
 33972 Manufacturer#1
 d18GiDsL6Wm2IsGXM,RZf1jCsgZAOjNYVThTRP4 16-
 722-866-1658 uests are furiously. regular tithes through the
 regular, final accounts cajole furiously above the q
 9208.700000 Supplier#000007769 ROMANIA
 40256 Manufacturer#5 rsimdze 5o9P Ht7xS
 29-964-424-9649 lites was quickly above the furiously ironic
 requests. slyly even foxes against the blithely bold
 9201.470000 Supplier#000009690 UNITED
 KINGDOM 67183 Manufacturer#5 CB
 BnUTlmi5zdeEl7R7 33-121-267-9529 e even,
 even foxes. blithely ironic packages cajole regular packages.
 slyly final ide
 9192.100000 Supplier#000000115 UNITED
 KINGDOM 85098 Manufacturer#3 nJ
 2t0f7Ve,wL1,6WzGBJLNUCKIsV 33-597-248-1220
 es across the carefully express accounts boost caref
 9189.980000 Supplier#000001226 GERMANY
 21225 Manufacturer#4 qsLCqSvLyZfuXIpjz

17-725-903-1381 deposits. blithely bold excuses about the
 slyly bold forges wake
 9128.970000 Supplier#000004311 RUSSIA
 146768 Manufacturer#5
 I8IjnXd7NSJRs594RxsRR0 32-155-440-7120
 refully. blithely unusual asymptotes haggle
 9104.830000 Supplier#000008520 GERMANY
 150974 Manufacturer#4 RqRVDgD0ER J9
 b41vR2,3 17-728-804-1793 ly about the blithely
 ironic depths. slyly final theodolites among the fluffily bold
 ideas print
 9101.000000 Supplier#000005791 ROMANIA
 128254 Manufacturer#5
 zub2zCV,jhHPPQqi,P2INAjE1zI n66cOEoXFG 29-549-
 251-5384 ts. notornis detect blithely above the carefully bold
 requests. blithely even package
 9094.570000 Supplier#000004582 RUSSIA
 39575 Manufacturer#1 WB0XkCSG3r,mnQ
 n,h9VIxj9ARHFvKgMDf 32-587-577-1351 jole. regular
 accounts sleep blithely frets. final pinto beans play furiously
 past the
 8996.870000 Supplier#000004702 FRANCE
 102191 Manufacturer#5 8XVcQK23akp
 16-811-269-8946 ickly final packages along the express plat
 8996.140000 Supplier#000009814 ROMANIA
 139813 Manufacturer#2
 af0O5pg83IPU4IDVmEyIXZVqYZQzSDIYLA mR 29-995-
 571-8781 dependencies boost quickly across the furiously
 pending requests! unusual dolphins play sl
 8968.420000 Supplier#000010000 ROMANIA
 119999 Manufacturer#5 aTGLEusCiL4F
 PDBdv665XBjHpyCOB0i 29-578-432-2146 ly regular
 foxes boost slyly. quickly special waters boost carefully ironi
 8936.820000 Supplier#000007043 UNITED
 KINGDOM 109512 Manufacturer#1
 FVajceZInZdbJE6Z9XsRUxrUEpiwHDrOXi,1Rz 33-784-
 177-8208 efully regular courts. furiousl
 8929.420000 Supplier#000008770 FRANCE
 173735 Manufacturer#4 R7cG26TixrHAP9
 HckhfRi 16-242-746-9248 cajole furiously unusual
 requests. quickly stealthy requests are.
 8920.590000 Supplier#000003967 ROMANIA
 26460 Manufacturer#1 eHoAXe62SY9
 29-194-731-3944 aters. express, pending instructions sleep.
 brave, r
 8920.590000 Supplier#000003967 ROMANIA
 173966 Manufacturer#2 eHoAXe62SY9
 29-194-731-3944 aters. express, pending instructions sleep.
 brave, r
 8913.960000 Supplier#000004603 UNITED
 KINGDOM 137063 Manufacturer#2
 OUzlvMUr7n,utLxmPNeYKsf3T24OXskxB5 33-789-
 255-7342 haggle slyly above the furiously regular pinto
 beans. even
 8877.820000 Supplier#000007967 FRANCE
 167966 Manufacturer#5
 A3pi1BARM4nx6R,qrwFoRPU 16-442-147-9345
 ously foxes. express, ironic requests im

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8862.240000	Supplier#000003323	ROMANIA	32-565-297-8775 ove the even courts. furiously special
73322	Manufacturer#3	W9 IYcsC9FwBqk3ItL	platelets
29-736-951-3710	ly pending ideas sleep about the furiously		8503.700000
unu			Supplier#000006830
8841.590000	Supplier#000005750	ROMANIA	RUSSIA
100729	Manufacturer#5		44325
Erx3lAgu0g62iaHF9x50uMH4EgeN9hEG		29-344-502-	Manufacturer#4
5481	gainst the pinto beans. fluffily unusual dependencies		BC4WFCYRUZyaIghU
affix slyly even deposits.			4S
8781.710000	Supplier#000003121	ROMANIA	32-147-878-5069
13120	Manufacturer#5		pades cajole. furious
wNqTogx238ZYCamFb,50v,bj 4IbNFW9Bvw1xP		29-707-	packages among the carefully express excuses boost furiously
291-5144	s wake quickly ironic ideas		across th
8754.240000	Supplier#000009407	UNITED	8457.090000
KINGDOM	179406	Manufacturer#4	Supplier#000009456
CHRCbkaWcf5B		33-903-970-9604	UNITED
requests. carefully even foxes above the furious			KINGDOM
8691.060000	Supplier#000004429	UNITED	19455
KINGDOM	126892	Manufacturer#2	Manufacturer#1
k,BQms5UhoAF1B2Asi,fLib		33-964-337-5038	7SBhZs8gP1cJtOQf433YBk
efully express deposits kindle after the deposits. final			33-858-440-4349
8655.990000	Supplier#000006330	RUSSIA	cing requests along the furiously unusual deposits promise
193810	Manufacturer#2		among the furiously unus
UozlaENr0ytKe2w6CeIEWFwn iO3S8Rae7Ou		32-561-	8441.400000
198-3705	symptotes use about the express dolphins. requests		Supplier#000003817
use after the express platelets. final, ex			FRANCE
8638.360000	Supplier#000002920	RUSSIA	141302
75398	Manufacturer#1	Je2a8bszf3L	Manufacturer#2
32-122-621-7549	ly quickly ironic requests. even requests		hU3fz3xL78
whithout t			16-339-356-5115
8638.360000	Supplier#000002920	RUSSIA	ely even ideas. ideas wake slyly furiously
170402	Manufacturer#3	Je2a8bszf3L	unusual instructions. pinto beans sleep ag
32-122-621-7549	ly quickly ironic requests. even requests		8432.890000
whithout t			Supplier#000003990
8607.690000	Supplier#000006003	UNITED	RUSSIA
KINGDOM	76002	Manufacturer#2	191470
EH9wADcEiuenM0NR08zDwMidw,52Y2RyILeIA		33-416-807-5206	Manufacturer#1
ar, pending accounts. pending depende			wehBBp1RQbfxAYDASS75MsywmsKHRVdkrvNe6m
8569.520000	Supplier#000005936	RUSSIA	32-839-509-9301
5935	Manufacturer#5		ep furiously. packages should have to haggle
jXaNz6vwnEWJ2ksLZJpjtgt0bY2a3AU		32-644-251-	slyly across the deposits. furiously regu
7916	. regular foxes nag carefully atop the regular, silent		8431.400000
deposits. quickly regular packages			Supplier#000002675
8564.120000	Supplier#000000033	GERMANY	ROMANIA
110032	Manufacturer#1		5174
gfeKpYw3400L0SDywXA6Ya1Qmq1w6YB9f3R		17-138-	Manufacturer#1
897-9374	n sauternes along the regular asymptotes are		HJFStOu9R5NGPOegKhgbzBdyvrG2yh8w
regularly along the			29-474-643-
8553.820000	Supplier#000003979	ROMANIA	1443
143978	Manufacturer#4		ithely express pinto beans. blithely even foxes haggle.
BfmVhCAnCMY3jzpjUMy4CNWs9 HzpdQR7INJU		29-124-646-4897	furiously regular theodol
ic requests wake against the blithely unusual			8407.040000
accounts. fluffily r			Supplier#000005406
8517.230000	Supplier#000009529	RUSSIA	RUSSIA
37025	Manufacturer#5	e44R8o7JAIS9iMcr	162889
32-565-297-8775	ove the even courts. furiously special		Manufacturer#4
platelets			j7 gYF5RW8DC5UrkC
8517.230000	Supplier#000009529	RUSSIA	32-626-152-4621
59528	Manufacturer#2	e44R8o7JAIS9iMcr	r the blithely regular packages. slyly ironic
			theodoli
			8386.080000
			Supplier#000008518
			FRANCE
			36014
			Manufacturer#3
			2jqzqqAVe9crMVGP,n9nTsQXulNLTUYoJjEDcqWV
			16-618-780-7481
			blithely bold pains are carefully platelets.
			8376.520000
			Supplier#000005306
			UNITED
			KINGDOM
			190267
			Manufacturer#5
			9t8Y8
			QqSIsoADPt6NLdk,TP5zyRx41oBUlgoGc9
			33-632-514-
			7931
			ly final accounts sleep special, regular requests.
			furiously regular
			8348.740000
			Supplier#000008851
			FRANCE
			66344
			Manufacturer#4
			nWxi7GwEbjhw1
			16-796-240-2472
			boldly final deposits. regular, even
			instructions detect slyly. fluffily unusual pinto bea
			8338.580000
			Supplier#000007269
			FRANCE
			17268
			Manufacturer#4
			ZwhJSwABUoiB04,3
			16-267-277-4365
			iously final accounts. even pinto beans
			cajole slyly regular
			8328.460000
			Supplier#000001744
			ROMANIA
			69237
			Manufacturer#5
			oLo3fV64q2,FKHa3p,qHnS7Yzv,ps8
			29-330-728-5873
			ep carefully-- even, careful packages are slyly along t
			8307.930000
			Supplier#000003142
			GERMANY
			18139
			Manufacturer#1
			dqblvV8dCNAorGIJ
			17-595-447-6026
			olites wake furiously regular decoys. final
			requests nod
			8231.610000
			Supplier#000009558
			RUSSIA
			192000
			Manufacturer#2
			mcDgen,yT1iJDHDS5fV
			32-762-137-5858
			foxes according to the furi

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8152.610000	Supplier#000002731	ROMANIA	7887.080000	Supplier#000009792	GERMANY
15227	Manufacturer#4	nluXJCuY1tu	164759	Manufacturer#3	
29-805-463-2030 special requests. even, regular warhorses affix among the final gr			Y28ITVeYriT3kIGdV2K8fSZ V2UqT5H1Otz 17-988-938-4296 ckly around the carefully fluffy theodolites. slyly		
8109.090000	Supplier#000009186	FRANCE	ironic pack		
99185	Manufacturer#1		7871.500000	Supplier#000007206	RUSSIA
wgfosrVPexl9pEXWywaqlBMDYYf		16-668-570-	104695	Manufacturer#1	3w
1402 tions haggle slyly about the sil			fNCnrVmvJJE95sgWZzvW 32-432-452-7731		
8102.620000	Supplier#000003347	UNITED	ironic requests. furiously final theodolites cajole. final,		
KINGDOM	18344	Manufacturer#5	express packages sleep. quickly reg		
CtXS2S16i		33-454-274-8532	7852.450000 Supplier#000005864 RUSSIA		
the slyly bold instructions. special foxes haggle silently among the			8363 Manufacturer#4 WCNfBPZeSxh3h,c		
8046.070000	Supplier#000008780	FRANCE	32-454-883-3821 usly unusual pinto beans. brave ideas sleep		
191222	Manufacturer#3	AczzuE0UK9osj ,Lx0Jmh	carefully quickly ironi		
16-473-215-6395 onic platelets cajole after the regular instructions. permanently bold excuses			7850.660000 Supplier#000001518 UNITED		
8042.090000	Supplier#000003245	RUSSIA	KINGDOM 86501 Manufacturer#1		
135705	Manufacturer#4		ONda3YJiHKJOC 33-730-383-3892 ifts		
Dh8Ik93onrbOL4DyTfGw8a9oKUX3d9Y		32-836-132-	haggle fluffily pending pai		
8872 osits. packages cajole slyly. furiously regular deposits cajole slyly. q			7843.520000 Supplier#000006683 FRANCE		
8042.090000	Supplier#000003245	RUSSIA	11680 Manufacturer#4		
150729	Manufacturer#1		2Z0JGkiv01Y00oCFwUGfviIbhzCdy 16-464-517-		
Dh8Ik93onrbOL4DyTfGw8a9oKUX3d9Y		32-836-132-	8943 express, final pinto beans x-ray slyly asymptotes.		
8872 osits. packages cajole slyly. furiously regular deposits cajole slyly. q			unusual, unusual		
7992.400000	Supplier#000006108	FRANCE	(100 row(s) affected)		
118574	Manufacturer#1	8tBydnTDwUqfBfFV4I3	-- using default substitutions		
16-974-998-8937 ironic ideas? fluffily even instructions wake. blithel			/* TPC_H Query 3 - Shipping Priority */		
7980.650000	Supplier#000001288	FRANCE	SELECT TOP 10		
13784	Manufacturer#4	zE,7HgVPrCn	L_ORDERKEY,		
16-646-464-8247 ully bold courts. escapades nag slyly. furiously fluffy theodo			SUM(L_EXTENDEDPRICE*(1-L_DISCOUNT))		
7950.370000	Supplier#000008101	GERMANY	AS REVENUE,		
33094	Manufacturer#5	kkYvL6lujovjJgTNG	O_ORDERDATE,		
IKkaXQDYgx8lLohj		17-627-663-8014	O_SHIPRIORITY		
arefully unusual requests x-ray above the quickly final deposits.			FROM CUSTOMER,		
7937.930000	Supplier#000009012	ROMANIA	ORDERS,		
83995	Manufacturer#2		LINEITEM		
iUiTziH,Ek3i4lwSgunXMgrcTzwdb		29-250-925-9690	WHEREC_MKTSEGMENT = 'BUILDING' AND		
to the blithely ironic deposits nag sly			C_CUSTKEY = O_CUSTKEY AND		
7914.450000	Supplier#000001013	RUSSIA	L_ORDERKEY = O_ORDERKEY AND		
125988	Manufacturer#2		O_ORDERDATE < '1995-03-15' AND		
riRcntps4KEDtYScjpMIWeYF6mNnR		32-194-698-	L_SHIPDATE > '1995-03-15'		
3365 busily bold packages are dolphi			GROUP BY L_ORDERKEY,		
7912.910000	Supplier#000004211	GERMANY	O_ORDERDATE,		
159180	Manufacturer#5		O_SHIPRIORITY		
2wQRVovHrm3,v03IKzfTd,1PYsFXQFFOG		17-266-	ORDER BY REVENUE DESC,		
947-7315 ay furiously regular platelets. cou			O_ORDERDATE		
7912.910000	Supplier#000004211	GERMANY	L_ORDERKEY REVENUE		
184210	Manufacturer#4		O_ORDERDATE O_SHIPRIORITY		
2wQRVovHrm3,v03IKzfTd,1PYsFXQFFOG		17-266-	-----		
947-7315 ay furiously regular platelets. cou			2456423 406181.011100 1995-03-05 0		
7894.560000	Supplier#000007981	GERMANY	3459808 405838.698900 1995-03-04 0		
85472	Manufacturer#4	NSJ96vMROAbeXP	492164 390324.061000 1995-02-19 0		
17-963-404-3760 ic platelets affix after the furiously			1188320 384537.935900 1995-03-09 0		
			2435712 378673.055800 1995-02-26 0		
			4878020 378376.795200 1995-03-12 0		
			5521732 375153.921500 1995-03-13 0		

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```
2628192      373133.309400      1995-02-22 0
993600       371407.459500      1995-03-05 0
2300070      367371.145200      1995-03-13 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, cast
('1993-07-01' as date)) AND
      EXISTS (
SELECT      *
FROM LINEITEM
WHERE L_ORDERKEY
= O_ORDERKEY AND
      L_COMMITDATE < L_RECEIPTDATE
)
GROUP BY   O_ORDERPRIORITY
ORDER BY   O_ORDERPRIORITY
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_EXTENDEDPRI*(1-L_DISCOUNT))
            AS REVENUE
FROM CUSTOMER,
ORDERS,
LINEITEM,
SUPPLIER,
NATION,
REGION
WHERE C_CUSTKEY = O_CUSTKEY AND
      L_ORDERKEY = O_ORDERKEY AND
      L_SUPPKEY = S_SUPPKEY AND
      C_NATIONKEY = S_NATIONKEY AND
      S_NATIONKEY = N_NATIONKEY AND
      N_REGIONKEY = R_REGIONKEY AND
      R_NAME = 'ASIA' AND
      O_ORDERDATE >= '1994-01-01' AND
      O_ORDERDATE < DATEADD(YY, 1, cast
('1994-01-01' as date))
GROUP BY   N_NAME
```

```
ORDER BY   REVENUE DESC
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_EXTENDEDPRI*L_DISCOUNT)
AS REVENUE
FROM LINEITEM
WHERE L_SHIPDATE >= '1994-01-01' AND
      L_SHIPDATE < dateadd (yy, 1, cast('1994-01-01'
as date)) AND
      L_DISCOUNT BETWEEN .06 - 0.01 AND .06 +
0.01 AND
      L_QUANTITY < 24
REVENUE
```

```
-----
123141078.228300
```

(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_EXTENDEDPRI*(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
```

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```

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_EXTENDEDPRI * (1-
L_DISCOUNT) AS VOLUME,
N2.N_NAME
AS NATION
FROM PART,
SUPPLIER,
LINEITEM,
ORDERS,
CUSTOMER,
NATION N1,
NATION N2,

```

```

REGION
WHEREP_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
(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_EXTENDEDPRI*(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

```

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L_ORDERKEY AND N_NATIONKEY AND '%%green%%') GROUP BY ORDER BY NATION	O_ORDERKEY = S_NATIONKEY = P_NAME AS PROFIT NATION, O_YEAR NATION, O_YEAR O_YEAR	DESC SUM_PROFIT	LIKE			
			ETHIOPIA	1994	48516143.917000	
			ETHIOPIA	1993	46551891.562900	
			ETHIOPIA	1992	44934648.642800	
			FRANCE	1998	32226407.839200	
			FRANCE	1997	47121485.860200	
			FRANCE	1996	47263135.496000	
			FRANCE	1995	47275997.570700	
			FRANCE	1994	47067209.331500	
			FRANCE	1993	51163370.106200	
			FRANCE	1992	47846235.331300	
			GERMANY	1998	28624942.659800	
			GERMANY	1997	49309074.877300	
			GERMANY	1996	49918683.168400	
			GERMANY	1995	52650718.724200	
			GERMANY	1994	50346900.422600	
			GERMANY	1993	50991895.805900	
			GERMANY	1992	48274126.099100	
			INDIA	1998	29943144.354400	
			INDIA	1997	50665453.231200	
			INDIA	1996	50283092.291200	
			INDIA	1995	50006774.644600	
			INDIA	1994	48995190.755600	
			INDIA	1993	50286902.852500	
			INDIA	1992	50850329.402300	
			INDONESIA	1998	27672339.996500	
			INDONESIA	1997	50512145.725600	
			INDONESIA	1996	51653060.116600	
			INDONESIA	1995	51508779.594000	
			INDONESIA	1994	52817950.321800	
			INDONESIA	1993	47959994.955100	
			INDONESIA	1992	51776605.032300	
			IRAN	1998	29065736.238100	
			IRAN	1997	50042063.054500	
			IRAN	1996	50926653.188100	
			IRAN	1995	51249667.648500	
			IRAN	1994	50337085.865000	
			IRAN	1993	51730763.490200	
			IRAN	1992	49955856.563400	
			IRAQ	1998	31624551.001700	
			IRAQ	1997	55121749.019500	
			IRAQ	1996	55897663.793700	
			IRAQ	1995	54815472.517000	
			IRAQ	1994	54408516.126600	
			IRAQ	1993	53633167.977000	
			IRAQ	1992	55891939.339600	
			JAPAN	1998	27934179.669500	
			JAPAN	1997	44517162.546300	
			JAPAN	1996	42545606.120400	
			JAPAN	1995	43749356.399600	
			JAPAN	1994	44840243.070000	
			JAPAN	1993	44660015.532800	
			JAPAN	1992	45410249.121600	
			JORDAN	1998	26901488.578100	
			JORDAN	1997	45471878.409900	
			JORDAN	1996	46794325.791800	
			JORDAN	1995	45178828.576000	
			JORDAN	1994	45333636.507600	
			JORDAN	1993	47971496.097900	
			JORDAN	1992	44717239.177400	
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				
CANADA	1996	52560501.390400				
CANADA	1995	52375332.809200				
CANADA	1994	52600364.658700				
CANADA	1993	52644504.073500				
CANADA	1992	53932871.697000				
CHINA	1998	31075466.164900				
CHINA	1997	50551874.449900				
CHINA	1996	51039293.875400				
CHINA	1995	49287534.616900				
CHINA	1994	50851090.067400				
CHINA	1993	54229629.833000				
CHINA	1992	52400529.372000				
EGYPT	1998	29054433.385600				
EGYPT	1997	50627611.452400				
EGYPT	1996	49542212.844600				
EGYPT	1995	48311550.320700				
EGYPT	1994	49790644.736000				
EGYPT	1993	48904292.969200				
EGYPT	1992	49434932.619200				
ETHIOPIA	1998	28040717.267400				
ETHIOPIA	1997	47455009.866400				
ETHIOPIA	1996	46491097.572900				
ETHIOPIA	1995	46804449.300900				

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KENYA	1998	28597614.337000
KENYA	1997	47949733.727400
KENYA	1996	46886924.622900
KENYA	1995	46072338.755200
KENYA	1994	45772061.171100
KENYA	1993	46308728.234500
KENYA	1992	47257780.840600
MOROCCO	1998	26732115.580000
MOROCCO	1997	45637304.249900
MOROCCO	1996	45558221.745100
MOROCCO	1995	47851318.887400
MOROCCO	1994	46272172.944500
MOROCCO	1993	46764326.181800
MOROCCO	1992	48122783.583100
MOZAMBIQUE	1998	30712392.011200
MOZAMBIQUE	1997	50316528.762500
MOZAMBIQUE	1996	51640320.250900
MOZAMBIQUE	1995	50693774.506000
MOZAMBIQUE	1994	49253277.626000
MOZAMBIQUE	1993	49153016.536700
MOZAMBIQUE	1992	48247551.850300
PERU	1998	29326102.319600
PERU	1997	49753780.395100
PERU	1996	50935170.292700
PERU	1995	53309883.407200
PERU	1994	50643531.796800
PERU	1993	51584622.002000
PERU	1992	47523899.054700
ROMANIA	1998	30368667.399900
ROMANIA	1997	50365683.852600
ROMANIA	1996	49598999.014800
ROMANIA	1995	47537642.869700
ROMANIA	1994	51455283.009500
ROMANIA	1993	50407136.892200
ROMANIA	1992	48185385.128600
RUSSIA	1998	28322384.026600
RUSSIA	1997	50106685.182200
RUSSIA	1996	51753342.430200
RUSSIA	1995	49215820.364700
RUSSIA	1994	52205666.440700
RUSSIA	1993	51860230.034000
RUSSIA	1992	53251677.153000
SAUDI ARABIA	1998	31541259.810000
SAUDI ARABIA	1997	52438750.807600
SAUDI ARABIA	1996	52543737.819700
SAUDI ARABIA	1995	52938696.533100
SAUDI ARABIA	1994	51389601.966800
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
            O_ORDERDATE < dateadd(mm, 3,
cast('1993-10-01' as date ))           AND
            L_RETURNFLAG = 'R'
            AND
            C_NATIONKEY = N_NATIONKEY
GROUP BY   C_CUSTKEY,
            C_NAME,
            C_ACCTBAL,
            C_PHONE,
            N_NAME,
            C_ADDRESS,
            C_COMMENT
ORDER BY   REVENUE      DESC
            C_CUSTKEY  C_NAME          REVENUE
            C_ACCTBAL  N_NAME          C_ADDRESS
            C_PHONE    C_COMMENT
-----
-----
-----
57040  Customer#000057040  734235.245500
632.870000          JAPAN          Eioyzjf4pp

```

Appendix D

22-895-641-3466 sits. slyly regular requests sleep alongside of the regular inst
 143347 Customer#000143347 721002.694800
 2557.470000 EGYPT 1aReFYv,Kw4
 14-742-935-3718 ggle carefully enticing requests. final deposits use bold, bold pinto beans. ironic, idle re
 60838 Customer#000060838 679127.307700
 2454.770000 BRAZIL
 64EaJ5vMAHWJIBOXJklpNc2RJiWE 12-913-494-9813 need to boost against the slyly regular account
 101998 Customer#000101998 637029.566700
 3790.890000 UNITED KINGDOM
 01c9CILnNtfOQYmZj 33-593-865-6378 ress
 foxes wake slyly after the bold excuses. ironic platelets are furiously carefully bold theodolites
 125341 Customer#000125341 633508.086000
 4983.510000 GERMANY
 S29ODD6bceU8QSuUEJznkNaK 17-582-695-5962
 arefully even depths. blithely even excuses sleep furiously. foxes use except the dependencies. ca
 25501 Customer#000025501 620269.784900
 7725.040000 ETHIOPIA
 W556MXuoiaYCCZamJI,Rn0B4ACUGdkQ8DZ 15-874-808-6793 he pending instructions wake carefully at the pinto beans. regular, final instructions along the slyly fina
 115831 Customer#000115831 596423.867200
 5098.100000 FRANCE rFeBbEEyk dl
 ne7zV5fDrmiq1oK09wV7pxqCgIc 16-715-386-3788 l somas sleep. furiously final deposits wake blithely regular pinto b
 84223 Customer#000084223 594998.023900
 528.650000 UNITED KINGDOM
 nAVZCs6BaWap rrM27N 2qBnzc5WBauxbA 33-442-824-8191 slyly final deposits haggle regular, pending dependencies. pending escapades wake
 54289 Customer#000054289 585603.391800
 5583.020000 IRAN
 vXCxoCsU0Bad5JQI ,oobkZ 20-834-292-4707 ely
 special foxes are quickly finally ironic p
 39922 Customer#000039922 584878.113400
 7321.110000 GERMANY
 Zgy4s50I2GKN4pLDPBU8m342gIw6R 17-147-757-8036 y final requests. furiously final foxes cajole blithely special platelets. f
 6226 Customer#000006226 576783.760600
 2230.090000 UNITED KINGDOM
 8gPu8,NPGkfyQQ0hcIYUGPIBWc,ybP5g, 33-657-701-3391 ending platelets along the express deposits cajole carefully final
 922 Customer#000000922 576767.533300
 3869.250000 GERMANY
 Az9RFaut7NkPnc5zSD2PwHgVwr4jRzq 17-945-916-9648 luffily fluffy deposits. packages c
 147946 Customer#000147946 576455.132000
 2030.130000 ALGERIA
 iANyZHjqhy7Ajah0pTrYyhJ 10-886-956-3143
 ithely ironic deposits haggle blithely ironic requests. quickly regu
 115640 Customer#000115640 569341.193300
 6436.100000 ARGENTINA Vtgfia9qI

7EpHgecU1X 11-411-543-4901 ost slyly along the patterns; pinto be
 73606 Customer#000073606 568656.857800
 1785.670000 JAPAN
 xuR0Tro5yChDfOCrjkd2ol 22-437-653-6966 he furiously regular ideas. slowly
 110246 Customer#000110246 566842.981500
 7763.350000 VIETNAM 7KzflgX
 MDOq7sOkI 31-943-426-9837 egular deposits serve blithely above the fl
 142549 Customer#000142549 563537.236800
 5085.990000 INDONESIA
 ChqEoK43OysjdHbtKCp6dKqjNyvvi9 19-955-562-2398 sleep pending courts. ironic deposits against the carefully unusual platelets cajole carefully express accounts.
 146149 Customer#000146149 557254.986500
 1791.550000 ROMANIA s87fvzFQpU
 29-744-164-6487 of the slyly silent accounts. quickly final accounts across the
 52528 Customer#000052528 556397.350900
 551.790000 ARGENTINA
 NFztyTOR10UOJ 11-208-192-3205
 deposits hinder. blithely pending asymptotes breach slyly regular re
 23431 Customer#000023431 554269.536000
 3381.860000 ROMANIA
 HgiV0phqhaIa9aydNoIb 29-915-458-2654
 nusual, even instructions: furiously stealthy n

(20 row(s) affected)

-- using default substitutions

/* TPC_H Query 11 - Important Stock Identification */

```

SELECT      PS_PARTKEY,
            SUM(PS_SUPPLYCOST*PS_AVAILQTY)
            AS VALUE
FROM PARTSUPP,
SUPPLIER,
NATION
WHEREPS_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) *
0.000100000
FROM PARTSUPP,
SUPPLIER,
NATION
WHEREPS_SUPPKEY =
S_SUPPKEY AND
S_NATIONKEY =
N_NATIONKEY AND
N_NAME
= 'GERMANY'

```

Appendix D

ORDER BY)
 PS_PARTKEY 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
31034   13498025.250000
87305   13482847.040000
10181   13445148.750000
62323   13411824.300000
26489   13377256.380000
96493   13339057.830000
56548   13329014.970000
55576   13306843.350000
159751  13306614.480000
92406   13287414.500000
182636  13223726.740000
199969  13135288.210000
62865   13001926.940000
7284    12945298.190000
197867  12944510.520000
11562   12931575.510000
75165   12916918.120000
97175   12911283.500000
140840  12896562.230000
65241   12890600.460000
166120  12876927.220000
9035    12863828.700000
144616  12853549.300000
176723  12832309.740000
170884  12792136.580000
29790   12723300.330000
95213   12555483.730000
183873  12550533.050000
171235  12476538.300000
21533   12437821.320000
17290   12432159.500000
156397  12260623.500000
122611  12222812.980000
```

..... Additional Rows Deleted

```
153787  7967535.580000
8932    7967222.190000
20134   7965713.280000
197635  7963507.580000
80408   7963312.170000
37728   7961875.680000
26624   7961772.310000
44736   7961144.100000
29763   7960605.030000
36147   7959463.680000
146040  7957587.660000
115469  7957485.140000
142276  7956790.630000
181280  7954037.350000
115096  7953047.550000
109650  7952258.730000
93862   7951992.240000
158325  7950728.300000
55952   7950387.060000
122397  7947106.270000
28114   7946945.720000
11966   7945197.480000
47814   7944083.000000
85096   7943691.060000
51657   7943593.770000
196680  7943578.890000
13141   7942730.340000
193327  7941036.250000
152612  7940663.710000
139680  7939242.360000
31134   7938318.300000
45636   7937240.850000
56694   7936015.950000
8114    7933921.880000
71518   7932261.690000
72922   7930400.640000
146699  7929167.400000
92387   7928972.670000
186289  7928786.190000
95952   7927972.780000
196514  7927180.700000
4403    7925729.040000
2267    7925649.370000
45924   7925047.680000
11493   7916722.230000
104478  7916253.600000
166794  7913842.000000
161995  7910874.270000
23538   7909752.060000
41093   7909579.920000
112073  7908617.570000
92814   7908262.500000
```


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```

88919 7907992.500000
79753 7907933.880000
108765 7905338.980000
146530 7905336.600000
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,cast
('1994-01-01' as date))
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

/* 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 50005
9 6641
10 6532
11 6014
8 5937
12 5639
13 5024
19 4793
7 4687
17 4587
18 4529
20 4516
15 4505
14 4446
16 4273
21 4190
22 3623
6 3265
23 3225
24 2742
25 2086
5 1948
26 1612
27 1179
4 1007
28 893

```

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```

29      593
3       415
30     376
31     226
32     148
2      134
33     75
34     50
35     37
1      17
36     14
38     5
37     5
40     4
41     2
39     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, cast ('1995-09-01'
as date))
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, cast ('1996-01-
01' as date))
GROUP BY   L_SUPPKEY
GO

```

/* TPC_H Query 15 - Top Supplier */

```

SELECT      S_SUPPKEY,
            S_NAME,
            S_ADDRESS,
            S_PHONE,
            TOTAL_REVENUE
FROM SUPPLIER,
      REVENUE0
WHERE S_SUPPKEY = SUPPLIER_NO AND
      TOTAL_REVENUE = (      SELECT
MAX(TOTAL_REVENUE)
                        FROM REVENUE0
                        )
ORDER BY   S_SUPPKEY

```

DROP VIEW REVENUE0

```

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,

```

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P_BRAND	P_TYPE	P_SIZE	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	
Brand#43	SMALL ANODIZED COPPER	36	24	
Brand#44	STANDARD POLISHED NICKEL	3	24	
Brand#52	ECONOMY PLATED TIN	14	24	
Brand#52	STANDARD BURNISHED NICKEL	3	24	
Brand#53	MEDIUM ANODIZED STEEL	14	24	
Brand#14	PROMO ANODIZED NICKEL	45	23	
Brand#32	ECONOMY PLATED BRASS	9	23	
Brand#52	SMALL ANODIZED COPPER	3	23	
Brand#11	ECONOMY BRUSHED COPPER	45	20	
Brand#11	ECONOMY PLATED BRASS	23	20	
Brand#11	LARGE BRUSHED COPPER	49	20	
Brand#11	LARGE POLISHED COPPER	49	20	
Brand#12	STANDARD ANODIZED TIN	49	20	
Brand#12	STANDARD PLATED BRASS	19	20	
Brand#13	ECONOMY BRUSHED BRASS	9	20	
Brand#13	ECONOMY BURNISHED STEEL	14	20	
Brand#13	LARGE BURNISHED NICKEL	19	20	
Brand#13	MEDIUM BURNISHED COPPER	36	20	
Brand#13	SMALL BRUSHED TIN	45	20	
Brand#13	STANDARD ANODIZED COPPER	3	20	
Brand#13	STANDARD PLATED NICKEL	23	20	
Brand#14	ECONOMY ANODIZED COPPER	14	20	
Brand#14	ECONOMY PLATED TIN	36	20	
Brand#14	ECONOMY POLISHED NICKEL	3	20	
Brand#14	MEDIUM ANODIZED NICKEL	3	20	
Brand#14	SMALL POLISHED TIN	14	20	
Brand#15	MEDIUM ANODIZED COPPER	9	20	
Brand#15	MEDIUM PLATED TIN	23	20	
Brand#15	PROMO PLATED BRASS	14	20	
Brand#15	SMALL ANODIZED COPPER	45	20	
Brand#15	SMALL PLATED COPPER	49	20	
Brand#15	STANDARD PLATED TIN	3	20	
Brand#21	LARGE ANODIZED COPPER	36	20	

Brand#21	LARGE BRUSHED TIN	3	20
Brand#21	MEDIUM ANODIZED COPPER	14	20
Brand#21	PROMO BRUSHED TIN	36	20
Brand#21	PROMO POLISHED NICKEL	45	20
Brand#21	SMALL ANODIZED COPPER	9	20
Brand#21	SMALL POLISHED NICKEL	23	20

..... Additional Rows Deleted

Brand#55	STANDARD BRUSHED COPPER	14	4
Brand#55	STANDARD BRUSHED COPPER	19	4
Brand#55	STANDARD BRUSHED NICKEL	3	4
Brand#55	STANDARD BRUSHED NICKEL	36	4
Brand#55	STANDARD BRUSHED STEEL	9	4
Brand#55	STANDARD BRUSHED STEEL	14	4
Brand#55	STANDARD BRUSHED STEEL	19	4
Brand#55	STANDARD BRUSHED STEEL	49	4
Brand#55	STANDARD BRUSHED TIN	19	4
Brand#55	STANDARD BRUSHED TIN	49	4
Brand#55	STANDARD BURNISHED BRASS	9	4
Brand#55	STANDARD BURNISHED BRASS	19	4
Brand#55	STANDARD BURNISHED BRASS	23	4
Brand#55	STANDARD BURNISHED BRASS	36	4
Brand#55	STANDARD BURNISHED COPPER	3	4
Brand#55	STANDARD BURNISHED NICKEL	9	4
Brand#55	STANDARD BURNISHED NICKEL	49	4
Brand#55	STANDARD BURNISHED STEEL	19	4
Brand#55	STANDARD BURNISHED STEEL	23	4
Brand#55	STANDARD BURNISHED STEEL	36	4
Brand#55	STANDARD BURNISHED STEEL	45	4
Brand#55	STANDARD BURNISHED TIN	9	4
Brand#55	STANDARD BURNISHED TIN	19	4
Brand#55	STANDARD BURNISHED TIN	36	4
Brand#55	STANDARD BURNISHED TIN	49	4
Brand#55	STANDARD PLATED BRASS	9	4
Brand#55	STANDARD PLATED BRASS	45	4
Brand#55	STANDARD PLATED BRASS	49	4
Brand#55	STANDARD PLATED COPPER	9	4
Brand#55	STANDARD PLATED COPPER	45	4
Brand#55	STANDARD PLATED NICKEL	3	4
Brand#55	STANDARD PLATED NICKEL	19	4
Brand#55	STANDARD PLATED NICKEL	45	4
Brand#55	STANDARD PLATED STEEL	14	4
Brand#55	STANDARD PLATED STEEL	23	4
Brand#55	STANDARD PLATED STEEL	49	4
Brand#55	STANDARD PLATED TIN	9	4
Brand#55	STANDARD PLATED TIN	14	4
Brand#55	STANDARD PLATED TIN	36	4
Brand#55	STANDARD POLISHED BRASS	3	4
Brand#55	STANDARD POLISHED BRASS	9	4
Brand#55	STANDARD POLISHED BRASS	23	4
Brand#55	STANDARD POLISHED COPPER	3	4
Brand#55	STANDARD POLISHED COPPER	23	4
Brand#55	STANDARD POLISHED COPPER	45	4
Brand#55	STANDARD POLISHED NICKEL	3	4

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```

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)
FROM
LINEITEM
WHERE
L_PARTKEY = P_PARTKEY
)

```

AVG_YEARLY

348406.054286

(1 row(s) affected)

-- using default substitutions

/* TPC_H Query 18 - Large Volume Customer */

```

SELECT      TOP 100
C_NAME,
C_CUSTKEY,

```

```

O_ORDERKEY,
O_ORDERDATE,
O_TOTALPRICE,
SUM(L_QUANTITY)
FROM CUSTOMER,
ORDERS,
LINEITEM
WHERE O_ORDERKEY IN ( SELECT
L_ORDERKEY
FROM
LINEITEM
GROUP BY
L_ORDERKEY HAVING SUM(L_QUANTITY) >
300
) AND
C_CUSTKEY = O_CUSTKEY AND
O_ORDERKEY = L_ORDERKEY
GROUP BY C_NAME,
C_CUSTKEY,
O_ORDERKEY,
O_ORDERDATE,
O_TOTALPRICE
ORDER BY O_TOTALPRICE DESC,
O_ORDERDATE
C_NAME C_CUSTKEY O_ORDERKEY
O_ORDERDATE O_TOTALPRICE
-----

```

Customer#000128120	128120	4722021	1994-
04-07 544089.090000	323.000000		
Customer#000144617	144617	3043270	1997-
02-12 530604.440000	317.000000		
Customer#000013940	13940	2232932	1997-
04-13 522720.610000	304.000000		
Customer#000066790	66790	2199712	1996-
09-30 515531.820000	327.000000		
Customer#000046435	46435	4745607	1997-
07-03 508047.990000	309.000000		
Customer#000015272	15272	3883783	1993-
07-28 500241.330000	302.000000		
Customer#000146608	146608	3342468	1994-
06-12 499794.580000	303.000000		
Customer#000096103	96103	5984582	1992-
03-16 494398.790000	312.000000		
Customer#000024341	24341	1474818	1992-
11-15 491348.260000	302.000000		
Customer#000137446	137446	5489475	1997-
05-23 487763.250000	311.000000		
Customer#000107590	107590	4267751	1994-
11-04 485141.380000	301.000000		
Customer#000050008	50008	2366755	1996-
12-09 483891.260000	302.000000		
Customer#000015619	15619	3767271	1996-
08-07 480083.960000	318.000000		
Customer#000077260	77260	1436544	1992-
09-12 479499.430000	307.000000		
Customer#000109379	109379	5746311	1996-
10-10 478064.110000	302.000000		

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Customer#000054602	54602	5832321	1997-	Customer#000141098	141098	565574	1995-
02-09 471220.080000	307.000000			09-24 430986.690000	301.000000		
Customer#000105995	105995	2096705	1994-	Customer#000093392	93392	5200102	1997-
07-03 469692.580000	307.000000			01-22 425487.510000	304.000000		
Customer#000148885	148885	2942469	1992-	Customer#000015631	15631	1845057	1994-
05-31 469630.440000	313.000000			05-12 419879.590000	302.000000		
Customer#000114586	114586	551136	1993-	Customer#000112987	112987	4439686	1996-
05-19 469605.590000	308.000000			09-17 418161.490000	305.000000		
Customer#000105260	105260	5296167	1996-	Customer#000012599	12599	4259524	1998-
09-06 469360.570000	303.000000			02-12 415200.610000	304.000000		
Customer#000147197	147197	1263015	1997-	Customer#000105410	105410	4478371	1996-
02-02 467149.670000	320.000000			03-05 412754.510000	302.000000		
Customer#000064483	64483	2745894	1996-	Customer#000149842	149842	5156581	1994-
07-04 466991.350000	304.000000			05-30 411329.350000	302.000000		
Customer#000136573	136573	2761378	1996-	Customer#000010129	10129	5849444	1994-
05-31 461282.730000	301.000000			03-21 409129.850000	309.000000		
Customer#000016384	16384	502886	1994-	Customer#000069904	69904	1742403	1996-
04-12 458378.920000	312.000000			10-19 408513.000000	305.000000		
Customer#000117919	117919	2869152	1996-	Customer#000017746	17746	6882	1997-
06-20 456815.920000	317.000000			04-09 408446.930000	303.000000		
Customer#000012251	12251	735366	1993-	Customer#000013072	13072	1481925	1998-
11-24 455107.260000	309.000000			03-15 399195.470000	301.000000		
Customer#000120098	120098	1971680	1995-	Customer#000082441	82441	857959	1994-
06-14 453451.230000	308.000000			02-07 382579.740000	305.000000		
Customer#000066098	66098	5007490	1992-	Customer#000088703	88703	2995076	1994-
08-07 453436.160000	304.000000			01-30 363812.120000	302.000000		
Customer#000117076	117076	4290656	1997-				
02-05 449545.850000	301.000000						
Customer#000129379	129379	4720454	1997-				
06-07 448665.790000	303.000000						
Customer#000126865	126865	4702759	1994-				
11-07 447606.650000	320.000000						
Customer#000088876	88876	983201	1993-				
12-30 446717.460000	304.000000						
Customer#000036619	36619	4806726	1995-				
01-17 446704.090000	328.000000						
Customer#000141823	141823	2806245	1996-				
12-29 446269.120000	310.000000						
Customer#000053029	53029	2662214	1993-				
08-13 446144.490000	302.000000						
Customer#000018188	18188	3037414	1995-				
01-25 443807.220000	308.000000						
Customer#000066533	66533	29158	1995-				
10-21 443576.500000	305.000000						
Customer#000037729	37729	4134341	1995-				
06-29 441082.970000	309.000000						
Customer#000003566	3566	2329187	1998-				
01-04 439803.360000	304.000000						
Customer#000045538	45538	4527553	1994-				
05-22 436275.310000	305.000000						
Customer#000081581	81581	4739650	1995-				
11-04 435405.900000	305.000000						
Customer#000119989	119989	1544643	1997-				
09-20 434568.250000	320.000000						
Customer#000003680	3680	3861123	1998-				
07-03 433525.970000	301.000000						
Customer#000113131	113131	967334	1995-				
12-15 432957.750000	301.000000						

(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

```

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```

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 */
SELECT      S_NAME,
            S_ADDRESS
FROM SUPPLIER,
            NATION
WHERE S_SUPPKEY IN (
SELECT
PS_SUPPKEY
FROM
PARTSUPP
WHERE
PS_PARTKEY in (
SELECT
P_PARTKEY
FROM PART
WHERE P_NAME like 'forest%'
)
AND
S_NATIONKEY = N_NATIONKEY
AND
N_NAME = 'CANADA'
ORDER BY   S_NAME
           S_ADDRESS
-----
Supplier#000000020    iybAE,RmTymrZVYaFZva2SH,j
Supplier#000000091
YV45D7TkfdQanOOZ7q9QxkyGUapU1oOWU6q3
Supplier#000000197
YC2Acon6kjY3zj3Fbxs2k4Vdf7X0cd2F
Supplier#000000226    83qOdU2EYRdPQAQhEtn GRZEd
Supplier#000000285    Br7e1nnt1yxrw6ImgpJ7YdhFDjuBf
Supplier#000000378    FfbhyCxWvcPrO8ltp9
Supplier#000000402
i9Sw4DoyMhzhKXCH9By,AYSgmD
Supplier#000000530    0qwCMwobKY
OcmLyfRXlagA8ukENJv,
Supplier#000000688    D
fw5ocppmZpYBBIPI718hCihLDZ5KhKX
Supplier#000000710    f19YPvOyb
QoYwjKC,oPycpGfieBAcwKJo
Supplier#000000736
l6i2nMwVuovfKnuVgaSGK2rDy65D1AFLegiL7
Supplier#000000761
zlSLelQUj2XrvTTFnv7WAcYZGvvMTx882d4
Supplier#000000884    bmhEShejaS
Supplier#000000887    urEaTejH5POADP2ARrf
Supplier#000000935    ij98czM
2KzWe7dDT0xB8sq0UfCdvrx
Supplier#000000975    ,AC e,tBpNwKb5xMUzeohxlRn,
hdZJo73gFQF8y
Supplier#000001263    rQWr6nf8ZhB2TAiIDivo5Io
Supplier#000001399    LmrocnlMSyYOWuANx7
Supplier#000001446    lch9HMNU1R7a0LIybsUodVknk6
Supplier#000001454    TOpingu2TVXIjhiL93h,
Supplier#000001500    wDmF5xLxtQch9ctVu,
Supplier#000001602    uKNWleafaM644
Supplier#000001626    UhxNRzUu1dtFmp0
Supplier#000001682    pXTkGxrTQVyH1Rr

```

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Supplier#000001699	Q9C4rfJ26oijVPqqcqVXeRI	Supplier#000003275	9xO4nyJ2QJcX6vGf
Supplier#000001700	7hMICof1Y5zLFg	Supplier#000003288	EDdfNt7E5Uc,xLTupoIgL4yY7ujh,
Supplier#000001726	TeRY7TtTH24sEword7yAaSkjx8	Supplier#000003313	EI2I7we,049SPrvomUm4hZwJoOhZkvLxLJXgVH
Supplier#000001730	Rc8e,1Pybn r6zo0VJIEiD0UD vkh	Supplier#000003314	jnisU8MzqO4iUB3zsPcrysMw3DDUojs4q7LD
Supplier#000001746	qWsendlOekQG1aW4uq06uQaCm51se8lirv7 hBRd	Supplier#000003380	jPv0V,pszouuFT3YsAqIP,kxT3u,gTFiEbRt,x
Supplier#000001752	Fra7outx41THYJaRThdOGiBk	Supplier#000003403	e3X2o ,KCG9tsHji8A
Supplier#000001856	jXcRgzYF0ah05iR8p6w5SbJJLcUGyYiURPvFwUWM	Supplier#000003421	Sh3dt9W5oefFWovnFhrg,
Supplier#000001931	FpJbMU2h6ZR2eBv8I9NIxF	Supplier#000003441	zvFJIZS,oUuShHjpcX
Supplier#000001939	Nrk,JA4bfReUs	Supplier#000003590	sy79CMLxqb,Cbo
Supplier#000001990	DSDJkCgBJzuPg1yuM,CUdLnsRliOxkkHezTCA	Supplier#000003607	lNqFHQYjwSAkf
Supplier#000002020	jB6r1d7MxP6co	Supplier#000003625	qY588W0Yk5iaUy1RXTgNrEKrMAjBYHcKs
Supplier#000002022	dwebGX7Id2pc25YvY33	Supplier#000003656	eEYmmO2gmD
Supplier#000002036	20ytTtVObjKUII2WCB0A	Supplier#000003782	JdfG32XtDgJV,db56
Supplier#000002204	uYmlr46C06udCqanj0KiRsoTQakZsEyssL	Supplier#000003782	iVsPZg7bk06TqNMwi0LKbLURc1zmrg
Supplier#000002243	nSOEV3JeOU79	Supplier#000003918	meRvRCsJoAbfqd0Re4
Supplier#000002245	hz2qWXWVjOyKhqPYMoEwz6zFkrTaDM	Supplier#000003941	Pmb05mQfBMS618O7WKqZJ
Supplier#000002282	ES21K9dxoW1IITzWCj7ekdlNwSWnv1Z 6mQ,BKn	Supplier#000003994	W00LZp3NjK0
Supplier#000002303	nCoWfpB6YOymbgOht7lftklpkHI	Supplier#000004005	V723F1wCy2eA4OgIu8TjBtOVUHp
Supplier#000002373	RzHSxOTQmElCjxIBiVA52Z	Supplier#000004033	ncsAhv9Je,kFXTNjfb2
Supplier#000002419	qydBQd14I515mVXa4fYY	Supplier#000004140	0hL7DJyYjcHL
Supplier#000002481	nLKHUOn2MI9TOA06Znq9GEMcIIMO2	Supplier#000004165	wTJ2dZnQA8P2oi99N6DT47ndHy,XKD2
Supplier#000002571	JZUugz04c iJFLrlGsz9O N,W	Supplier#000004207	tF64pwiOM4IkWjN3mS,e06WuAjLx
Supplier#000002585	1rVHNIReyq	Supplier#000004236	dl,HPTJmGipx YsSq9wmqkuWjst,mCeJ8O6T
Supplier#000002630	CsPoKpw2QuTY4AV1NkWuttneIa4SN	Supplier#000004246	Xha aXQF7u4qU3LsHD
Supplier#000002719	VIPiD17CCo21	Supplier#000004278	bBddbpbXlVp Di9
Supplier#000002719	4nnzQI2CbqREQUuIsXTBVUkaP4mNS3	Supplier#000004343	GK3sbopqrQEKWLMvVBFCG
Supplier#000002721	HVdFAN2JHMQSpKm	Supplier#000004346	S3076LEOwo
Supplier#000002730	lIFxR4fzm31C6,muzJwl84z	Supplier#000004388	VfZ 1lJ,mwp4aS
Supplier#000002775	yDclaDaBD4ihH	Supplier#000004406	Ah0ZaLu6VwufPWUz,7kbXgYZhauEaHqGIg
Supplier#000002853	rTNAOitXka	Supplier#000004430	yvSsKNSTL5HLXBET4luOsPNLxKzAMk
Supplier#000002875	6JgMi	Supplier#000004522	xXtCKwsZDArxIBGDfzX2PgobGZsBg
Supplier#000002934	9Qt6VmwL3Ltt1SRiKww0keLQ,RAZA	Supplier#000004527	p
Supplier#000002941	m,trBENyWSArwg3DhB	Supplier#000004542	pVXCnxgcklWF6A1o3OHY3qW6
Supplier#000002960	Naddba 8YTEKekZyP0	Supplier#000004542	NJSbLJDroYG2y1r3rDiKg
Supplier#000002960	KCPCEsRGGo6vx8TygHh60nAYf9rStQT2T	Supplier#000004574	1HvGwnVueZ5CIndc
Supplier#000002980	Supplier#000002980	Supplier#000004655	67NqBc4 t3PG3F8aO
Supplier#000003062	B9k9yVsyaXvWktOSHezqHiAEp9id0SKzkw	Supplier#000004701	IsqWNq4kGaPowYL
Supplier#000003087	LSQNggY1xnOzz9zBCapy7HwOZQ	Supplier#000004711	6jX4u47URzIMHF
Supplier#000003089	Supplier#000003087 ANwe8QsZ4rgj1HSqVz991eWQ	Supplier#000004987	bEzjp1QdQu ls2ERMxv0km
Supplier#000003095	Supplier#000003089 s5b VCIZqMSZVa r	Supplier#000005000	vn6bu2zXIL1
Supplier#000003201	g7LTdcg29GbTE7r11x	Supplier#000005100	UFx1upJ8MvOvgFjA8
Supplier#000003213	Supplier#000003095 HxON3jJhUi3zjt,r mTD		DeX804 w0H8FrCUvahgy
Supplier#000003241	Supplier#000003201 E87yws6I,t0qNs4QW7UzExKiJnDZwue		ilbuzBX3NK
	Supplier#000003213 pxrRP4irQ1VoyfQ,dTf3		OfvYPs3Io,wEvvLHNaLuCX
	Supplier#000003241 j06SU,LS9O3mwjAMOViANelhb		

Appendix D

Supplier#000005192	JDp4rhXiDw0kf6RH	Supplier#000006949	mLxYUJhsGcLtKe
Supplier#000005195	Woi3b2ZaicPh ZSfu1EfXhE	,GFirNu183AvT	
Supplier#000005283	5fxYXxwXy,TQX,MqDC2hxzyQ	Supplier#000006985	
Supplier#000005300	gXG28YqpxU	PrUUiboQpy,OtgJ01Z4BxJQUyrw9c3I	
Supplier#000005386	Ub6AAfHpWLWP	Supplier#000007072	2tRyX9M1a
Supplier#000005426	9Dz2OVT1q	4Rcm57s779F1ANG9jlpK	
sb4BK71ljQ1XjPBYRPvO		Supplier#000007098	
Supplier#000005484	saFdOR	G3j8g0KC4OcbAu2OVOPHrXQWMCUdjg8wgCHOExu	
qW7AFY,3asPqiiAa11Mo22pCoN0BtPrKo		Supplier#000007135	ls DoKV7V5ulfQy9V
Supplier#000005505	d2sbjG43KwMPX	Supplier#000007160	
Supplier#000005506	On f5ypzoWgB	TqDGBULB3cTqIT6FKDvm9BS4e4v,zwYiQPb	
Supplier#000005516		Supplier#000007169	tEc95D2moN9S84nd55O,dlnW
XsN99Ks9wEvcohU6jRD2MeebQFf76mD8vovuY		Supplier#000007322	wr7dgte5q
Supplier#000005536		MAjiY0uwmi3MyDkSMX1	
Nzo9tGkpgbHT,EZ4D,77MYK14ah1C		Supplier#000007365	51xhROLvQMj05DndtZWt
Supplier#000005605	7Vj6Eil0mThqkM	Supplier#000007398	V8eE6oZ00OFNU,
Supplier#000005631		Supplier#000007402	4UVv58ery1rjmqSR5
14TVrjlzo2SJEBCDgpmWtlvwSqC		Supplier#000007448	yhhpWiJi7EJ6Q5VCaQ
Supplier#000005730	5rkb0PSews	Supplier#000007477	
HvxkL8JaD41UpnSF2cg8H1		9m9j0wfhWzCvVHxkU,PpAxwSH0h	
Supplier#000005736	2dq XTYhtYWSfp	Supplier#000007509	q8,V6LJR0HjJHcOuSG7aLTMg
Supplier#000005737	dmEWcS32C3kx,d,B95 OmYn48	Supplier#000007561	rMcFg2530VC
Supplier#000005797	,o,OebwRbSDmV19gN9fpWPCiqB	Supplier#000007789	
UogvLSR		rQ7cUcPrtudOyO3svNSkimqH6qrfWT2Sz	
Supplier#000005836	tx3SjPD2ZuWGFBRH,	Supplier#000007801	69fi,U1r6enUb
Supplier#000005875		Supplier#000007818	yhhc2CQec Jrvc8zqBi83
IK,sYiGzB94hSyHy9xvSZFbVQNCZe2LXZuGbS		Supplier#000007885	
Supplier#000005974		u3sicchh5ZpyTUpN1cJKNcAoabiWgY	
REhR5jE,lLusQXvf54SwYySgsSSVFhu		Supplier#000007918	r,v9mBQ6LoEYyj1
Supplier#000005989	rjFY,5kgLpBu7c	Supplier#000007926	ErzCF80K9Uy
Supplier#000006059	4m0cv8MwJ9yX2v1wI Z	Supplier#000007957	ELwnio14ssoU1 dRyZIL OK3Vtzb
Supplier#000006065	UiI2Cy3W4Tu5sLk	Supplier#000007965	F7Un5Ij7p5hhj
LuvXLRy6KihlGv		Supplier#000007968	
Supplier#000006070	TalC5m0pDrO6DZbngfmGmqe	DsF9UIZ2Fo6HXN9aErvyglkHoD582HSGZpP	
Supplier#000006109	rY5gbfh3dKHnlylCQUTPGCwnbe	Supplier#000007998	
Supplier#000006121		LnASFBfYRFOo9d6d,asBvVq9Lo2P	
S92ycWwEzYYw4GspCBJN1WMuHhoZ		Supplier#000008168	aOa82a8ZbKcfnDLX
Supplier#000006215		Supplier#000008231	IK7eGw Yj90sTdpsP,vcqWxLB
j2iEbTsl,5PWdqWZ7k1yiISb7qtiiZjDIPEo		Supplier#000008243	2AyePMkDqmqzVzjGTizXthFLO8h
Supplier#000006217	RVN23SYT9jenUeaWGxUd	EiudCMxOmIIG	
Supplier#000006274	S3yTZWqxTKUq g QQgcW9	Supplier#000008275	B1bNDfWg,gpXKQILN
AqhCkNZsW51hHuwU		Supplier#000008323	75I18sZmASwm
Supplier#000006435	xIge69XszYbnO4Eon7cHHO8y	POeheRMdj9tmpyeQ,BfCXN5BIAb	
Supplier#000006463	7 wkdj2EO49iotley2kmIM	Supplier#000008366	
ADpLSszGV3RNWj		h778cEj14BuW9OEKlvPTWq4iwASR6EBBXN7zeS8	
Supplier#000006493	ojV	Supplier#000008423	
f,sNaB6Hm7r,fknDVTL63raJgAjZK		RQhKnkAhR0DAr3Ix4Q1weMMn00hNe Kq	
Supplier#000006521	b9 2zjHzxR	Supplier#000008480	4sSDA4ACReklNjEm5T6b
Supplier#000006607	3F 2e2gqD5u5B	Supplier#000008532	
Supplier#000006706		Uc29q4,5xVdDOF87UZrxhr4xWS0ihEUXuh	
Ak4ga,ePu1QZ6C3qkrqjosaX0gxvqS9vkbe		Supplier#000008595	MH0iB73GQ3z UW3O DbCbqmc
Supplier#000006761		Supplier#000008610	
n4jhxGMqB5prD1HhpLvwrWStOLlla		SgVgP90vP452sUNTgzL9zKwXHXAzV6tV	
Supplier#000006808	HGd2Xo	Supplier#000008705	aE,trRNdpX,4yinTD9O3DebDIp
9nEcHJhZvXjXxWKlpApT		Supplier#000008742	HmPIQEzKCPEcTUL14,kKq
Supplier#000006858		Supplier#000008841	I 85Lu1sekb2xrSlzm0
fnlINT885vBBhsWwTGiZ0o22thwGY16h GHJj21		Supplier#000008895	
Supplier#000006872	XIDPiA7PLXCWK6SeEclD	2cH4okfaLSZTTg8sKRbbJQxkmeFu2Eesj	

Appendix D

```

Supplier#000008967      2kwEHyMG                                WHERE
7FwozNImAUE6mH0hYtqYculJM                                L3.L_ORDERKEY      =
Supplier#000008972      w2vF6 D5YZO3visPXsqVfLADTK                L1.L_ORDERKEY      AND
Supplier#000009032      qK,trB6Sdy4Dz1BRUFNy                                L3.L_SUPPKEY
Supplier#000009147      rOAuryHxpZ9eOvx                                <> L1.L_SUPPKEY      AND
Supplier#000009252      F7cZaPUHwh1                                L3.L_RECEIPTDATE   > L3.L_COMMITDATE
ZKyj3xmAVWC1XdP ue1p5m,i                                )                   AND
Supplier#000009278      RqYTzgxj93CLX 0mcYfCENOfD                S_NATIONKEY = N_NATIONKEY AND
Supplier#000009327      uoqMdf7e7Gj9dbQ53                                N_NAME              = 'SAUDI ARABIA'
Supplier#000009430      igRqmneFt
Supplier#000009567      r4Wfx4c3xsEAjcGj71HHZByornl              GROUP BY           S_NAME
D9vrztXlv4                                ORDER BY           NUMWAIT            DESC,
Supplier#000009601      51m637bO,Rw5DnHWFUvLacRx9                S_NAME
Supplier#000009709      rRnCbHYgDgl9PZYnyWKVYSUW0vKg              S_NAME              NUMWAIT
-----
Supplier#000009753      wLhVEcRmd7PkJF4FBnGK7Z                    Supplier#000002829   20
Supplier#000009796      z,y4Idmr15DOvPUqYG                          Supplier#000005808   18
Supplier#000009799      4wNjXGa4OKWl                                Supplier#000000262   17
Supplier#000009811      E3iuyq7UnZxU7oPZie2Gu6                     Supplier#000000496   17
Supplier#000009812      APFRMy3lCbgFga53n5t9DxzFPQPgnjrGt32        Supplier#000002160   17
Supplier#000009862      rJzweWeN58                                    Supplier#000002301   17
Supplier#000009868      ROjGgx5gvtkmmUUoeyy7v                       Supplier#000002540   17
Supplier#000009869      ucLqxzrpBTRMewGSM29t0rNTM30g1Tu3Xgg3mKag   Supplier#000003063   17
Supplier#000009899      7XdpaHrZr1t,UQFZE                             Supplier#000005178   17
Supplier#000009974      7wJ,J5DKcxSU4Kp1cQLpbcAvB5AsvKT            Supplier#000008331   17
7wJ,J5DKcxSU4Kp1cQLpbcAvB5AsvKT            Supplier#000008331   17
Supplier#000009899      7XdpaHrZr1t,UQFZE                             Supplier#000008331   17
Supplier#000009974      7wJ,J5DKcxSU4Kp1cQLpbcAvB5AsvKT            Supplier#000002005   16
Supplier#000009974      7wJ,J5DKcxSU4Kp1cQLpbcAvB5AsvKT            Supplier#000002095   16
Supplier#000009974      7wJ,J5DKcxSU4Kp1cQLpbcAvB5AsvKT            Supplier#000005799   16
Supplier#000009974      7wJ,J5DKcxSU4Kp1cQLpbcAvB5AsvKT            Supplier#000005842   16
Supplier#000009974      7wJ,J5DKcxSU4Kp1cQLpbcAvB5AsvKT            Supplier#000005842   16
Supplier#000009974      7wJ,J5DKcxSU4Kp1cQLpbcAvB5AsvKT            Supplier#000006450   16
Supplier#000009974      7wJ,J5DKcxSU4Kp1cQLpbcAvB5AsvKT            Supplier#000006939   16
Supplier#000009974      7wJ,J5DKcxSU4Kp1cQLpbcAvB5AsvKT            Supplier#000009200   16
Supplier#000009974      7wJ,J5DKcxSU4Kp1cQLpbcAvB5AsvKT            Supplier#000009727   16
Supplier#000009974      7wJ,J5DKcxSU4Kp1cQLpbcAvB5AsvKT            Supplier#000000486   15
Supplier#000009974      7wJ,J5DKcxSU4Kp1cQLpbcAvB5AsvKT            Supplier#000000565   15
Supplier#000009974      7wJ,J5DKcxSU4Kp1cQLpbcAvB5AsvKT            Supplier#000001046   15
Supplier#000009974      7wJ,J5DKcxSU4Kp1cQLpbcAvB5AsvKT            Supplier#000001047   15
Supplier#000009974      7wJ,J5DKcxSU4Kp1cQLpbcAvB5AsvKT            Supplier#000001161   15
Supplier#000009974      7wJ,J5DKcxSU4Kp1cQLpbcAvB5AsvKT            Supplier#000001336   15
Supplier#000009974      7wJ,J5DKcxSU4Kp1cQLpbcAvB5AsvKT            Supplier#000001435   15
Supplier#000009974      7wJ,J5DKcxSU4Kp1cQLpbcAvB5AsvKT            Supplier#000003075   15
Supplier#000009974      7wJ,J5DKcxSU4Kp1cQLpbcAvB5AsvKT            Supplier#000003335   15
Supplier#000009974      7wJ,J5DKcxSU4Kp1cQLpbcAvB5AsvKT            Supplier#000005649   15
Supplier#000009974      7wJ,J5DKcxSU4Kp1cQLpbcAvB5AsvKT            Supplier#000006027   15
Supplier#000009974      7wJ,J5DKcxSU4Kp1cQLpbcAvB5AsvKT            Supplier#000006795   15
Supplier#000009974      7wJ,J5DKcxSU4Kp1cQLpbcAvB5AsvKT            Supplier#000006800   15
Supplier#000009974      7wJ,J5DKcxSU4Kp1cQLpbcAvB5AsvKT            Supplier#000006824   15
Supplier#000009974      7wJ,J5DKcxSU4Kp1cQLpbcAvB5AsvKT            Supplier#000007131   15
Supplier#000009974      7wJ,J5DKcxSU4Kp1cQLpbcAvB5AsvKT            Supplier#000007382   15
Supplier#000009974      7wJ,J5DKcxSU4Kp1cQLpbcAvB5AsvKT            Supplier#000008913   15
Supplier#000009974      7wJ,J5DKcxSU4Kp1cQLpbcAvB5AsvKT            Supplier#000009787   15
Supplier#000009974      7wJ,J5DKcxSU4Kp1cQLpbcAvB5AsvKT            Supplier#000000633   14
Supplier#000009974      7wJ,J5DKcxSU4Kp1cQLpbcAvB5AsvKT            Supplier#000001960   14
Supplier#000009974      7wJ,J5DKcxSU4Kp1cQLpbcAvB5AsvKT            Supplier#000002323   14
Supplier#000009974      7wJ,J5DKcxSU4Kp1cQLpbcAvB5AsvKT            Supplier#000002490   14
Supplier#000009974      7wJ,J5DKcxSU4Kp1cQLpbcAvB5AsvKT            Supplier#000002993   14
Supplier#000009974      7wJ,J5DKcxSU4Kp1cQLpbcAvB5AsvKT            Supplier#000003101   14
Supplier#000009974      7wJ,J5DKcxSU4Kp1cQLpbcAvB5AsvKT            Supplier#000004489   14
Supplier#000009974      7wJ,J5DKcxSU4Kp1cQLpbcAvB5AsvKT            Supplier#000005435   14

```

(204 row(s) affected)

-- using default substitutions

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

```

SELECT      TOP 100
            S_NAME,
            COUNT(*) AS NUMWAIT
FROM        SUPPLIER,
            LINEITEM L1,
            ORDERS,
            NATION
WHERE       S_SUPPKEY      = L1.L_SUPPKEY
AND
            O_ORDERKEY     = L1.L_ORDERKEY
AND
            O_ORDERSTATUS = 'F'
AND
            L1.L_RECEIPTDATE > L1.L_COMMITDATE
AND
            EXISTS (
                SELECT      *
                FROM        LINEITEM L2
                WHERE       L2.L_ORDERKEY
                = L1.L_ORDERKEY AND
                L2.L_SUPPKEY <>
                L1.L_SUPPKEY
            ) AND
            NOT EXISTS (
                SELECT      *
                FROM        LINEITEM L3

```

Appendix D

Supplier#000005583 14
 Supplier#000005774 14
 Supplier#000007579 14
 Supplier#000008180 14
 Supplier#000008695 14
 Supplier#000009224 14
 Supplier#000000357 13
 Supplier#000000436 13
 Supplier#000000610 13
 Supplier#000000788 13
 Supplier#000000889 13
 Supplier#000001062 13
 Supplier#000001498 13
 Supplier#000002056 13
 Supplier#000002312 13
 Supplier#000002344 13
 Supplier#000002596 13
 Supplier#000002615 13
 Supplier#000002978 13
 Supplier#000003048 13
 Supplier#000003234 13
 Supplier#000003727 13
 Supplier#000003806 13
 Supplier#000004472 13
 Supplier#000005236 13
 Supplier#000005906 13
 Supplier#000006241 13
 Supplier#000006326 13
 Supplier#000006384 13
 Supplier#000006394 13
 Supplier#000006624 13
 Supplier#000006629 13
 Supplier#000006682 13
 Supplier#000006737 13
 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

-- 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
NOT EXISTS (
SELECT      *
FROM
ORDERS
WHERE
O_CUSTKEY = C_CUSTKEY
)
) AS CUSTSALE
GROUP BY   CNTRYCODE
ORDER BY   CNTRYCODE
CNTRYCODE 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)

(100 row(s) affected)

Appendix E

Appendix E: Seed and Input Parameters

Appendix E

Seed

506121711

Stream0

1 98
 2 12 TIN ASIA
 3 AUTOMOBILE 1995-03-18
 4 1995-10-01
 5 ASIA 1994-01-01
 6 1994-01-01 0.07 25
 7 MOZAMBIQUE RUSSIA
 8 RUSSIAEUROPE PROMO BURNISHED
NICKEL
 9 smoke
 10 1993-10-01
 11 IRAQ 0.0000100000
 12 MAIL RAIL 1997-01-01
 13 pending deposits
 14 1997-01-01
 15 1997-01-01
 16 Brand#24 MEDIUM POLISHED 24
 12 28 25 11 4 15
 18
 17 Brand#43 MED BAG
 18 313
 19 Brand#32 Brand#21 Brand#13
 3 13 30
 20 cyan 1994-01-01 CANADA
 21 FRANCE
 22 13 12 24 17 18 33
 25

Stream1

21 IRAQ
 3 FURNITURE 1995-03-16
 18 313
 5 EUROPE 1995-01-01
 11 SAUDI ARABIA0.0000010000
 7 INDIA PERU
 6 1995-01-01 0.04 24
 20 sienna 1995-01-01 RUSSIA
 17 Brand#33 WRAP BOX
 12 REG AIR RAIL 1994-01-01
 16 Brand#53 MEDIUM BRUSHED 42
 1 35 22 3 10 31
 13
 15 1994-08-01
 13 special requests
 10 1993-11-01
 2 41 COPPER ASIA
 8 INDIA ASIA ECONOMY ANODIZED STEEL
 14 1994-11-01

19 Brand#55 Brand#35 Brand#21
 3 17 26
 9 peru
 22 32 27 14 13 26 34
 30
 1 107
 4 1995-06-01

Stream2

6 1996-01-01 0.02 24
 17 Brand#35 WRAP JAR
 14 1995-02-01
 16 Brand#33 PROMO BURNISHED 45
 18 4 25 9 13 19
 39
 19 Brand#52 Brand#13 Brand#11
 8 18 23
 10 1994-08-01
 9 olive
 2 29 BRASS AFRICA
 15 1997-03-01
 8 ALGERIA AFRICA LARGE
POLISHED STEEL
 5 MIDDLE EAST 1996-01-01
 22 23 31 22 10 13 33
 15
 12 SHIP REG AIR 1995-01-01
 7 ALGERIA MOROCCO
 13 special requests
 18 315
 1 115
 4 1993-03-01
 20 dim 1993-01-01 JAPAN
 3 AUTOMOBILE 1995-03-01
 11 INDIA 0.0000010000
 21 CANADA

Stream3

8 PERU AMERICA LARGE BURNISHED
STEEL
 5 AFRICA 1996-01-01
 4 1995-10-01
 6 1996-01-01 0.07 25
 17 Brand#32 WRAP CAN
 7 PERU JORDAN
 1 62
 18 313
 22 12 19 31 16 30 28
 26
 14 1995-06-01
 9 midnight
 10 1993-06-01
 15 1994-12-01
 11 VIETNAM 0.0000010000

Appendix E

20 papaya 1997-01-01 BRAZIL
 2 17 NICKEL ASIA
 21 SAUDI ARABIA
 19 Brand#54 Brand#51 Brand#15
 3 19 30
 13 special requests
 16 Brand#23 SMALL PLATED 49
 34 24 5 4 44 9
 3
 12 MAIL REG AIR 1995-01-01
 3 FURNITURE 1995-03-18

Stream4

5 AMERICA 1996-01-01
 21 JAPAN
 14 1995-09-01
 19 Brand#11 Brand#34 Brand#14
 8 20 26
 15 1997-06-01
 17 Brand#34 SM BOX
 12 TRUCK AIR 1995-01-01
 6 1996-01-01 0.05 24
 4 1993-06-01
 9 lime
 8 INDONESIA ASIA MEDIUM BRUSHED
 STEEL
 16 Brand#53 LARGE BRUSHED 49
 9 26 34 45 25 4
 21
 11 INDONESIA 0.0000010000
 2 5 TIN AFRICA
 10 1994-03-01
 18 314
 1 70
 13 special accounts
 7 INDONESIA JAPAN
 22 11 26 34 27 17 23
 22
 3 MACHINERY 1995-03-03
 20 blue 1995-01-01 MOZAMBIQUE

Stream5

21 ETHIOPIA
 15 1995-03-01
 4 1996-01-01
 6 1996-01-01 0.02 24
 7 ARGENTINA IRAN
 16 Brand#33 STANDARD ANODIZED
 3 8 37 14 49 18
 16 26
 19 Brand#13 Brand#22 Brand#53
 4 10 22
 18 312
 14 1995-12-01

22 10 33 24 17 20 15
 22
 11 RUSSIA0.0000010000
 13 special accounts
 3 BUILDING 1995-03-20
 1 78
 2 43 COPPER EUROPE
 5 ASIA 1996-01-01
 8 ARGENTINA AMERICA MEDIUM
 PLATED STEEL
 20 linen 1994-01-01 FRANCE
 12 RAIL AIR 1995-01-01
 17 Brand#31 SM JAR
 10 1994-12-01
 9 khaki

Appendix F

Appendix F: Benchmark Scripts

print.c

```
/*
 * $Id: print.c,v 1.3 2005/10/28 02:56:22 jms Exp $
 *
 * Revision History
 * =====
 * $Log: print.c,v $
 * Revision 1.3 2005/10/28 02:56:22 jms
 * add platform-specific printf formats to allow for
 * DSS_HUGE data type
 *
 * 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 >> 8) & 0xFF, len & 0xFF,
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_START(fp);
    PR_HUGE(fp, &c->custkey);
    if (scale <= 3000)
        PR_VSTR(fp, c->name, C_NAME_LEN);
    else
        PR_VSTR(fp, c->name, C_NAME_LEN + 3);
    PR_VSTR(fp, c->address,
        (columnar)?(long)(ceil(C_ADDR_LEN *
V_STR_HGH)):c->alen);
    PR_HUGE(fp, &c->nation_code);
    PR_STR(fp, c->phone, PHONE_LEN);
    PR_MONEY(fp, &c->acctbal);
    PR_STR(fp, c->mktsegment, C_MSEG_LEN);
    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_HUGE(fp_o, &o->okey);
PR_HUGE(fp_o, &o->custkey);
PR_CHR(fp_o, &o->orderstatus);
PR_MONEY(fp_o, &o->totalprice);
PR_STR(fp_o, o->odate, DATE_LEN);
PR_STR(fp_o, o->opriority, O_OPRIO_LEN);
PR_STR(fp_o, o->clerk, O_CLRK_LEN);
PR_INT(fp_o, o->spriority);
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_HUGE(fp_l, &o->l[i].okey);
        PR_HUGE(fp_l, &o->l[i].partkey);
        PR_HUGE(fp_l, &o->l[i].suppkey);
        PR_HUGE(fp_l, &o->l[i].lcnt);
        PR_HUGE(fp_l, &o->l[i].quantity);
        PR_MONEY(fp_l, &o->l[i].eprice);
        PR_MONEY(fp_l, &o->l[i].discount);
        PR_MONEY(fp_l, &o->l[i].tax);
        PR_CHR(fp_l, &o->l[i].rflag[0]);
        PR_CHR(fp_l, &o->l[i].lstatus[0]);
        PR_STR(fp_l, o->l[i].sdate, DATE_LEN);
        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].shipinstruct, L_INST_LEN);
        PR_STR(fp_l, o->l[i].shipmode, L_SMODE_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->name,
        (columnar)?(long)P_NAME_LEN:part->nlen);
    PR_STR(p_fp, part->mfgr, P_MFG_LEN);
    PR_STR(p_fp, part->brand, P_BRND_LEN);
    PR_VSTR(p_fp, part->type,
        (columnar)?(long)P_TYPE_LEN:part->tlen);
    PR_HUGE(p_fp, &part->size);
    PR_STR(p_fp, part->container, P_CNTR_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].suppkey);
    PR_HUGE(ps_fp, &part->s[i].qty);
    PR_MONEY(ps_fp, &part->s[i].scost);
    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_STR(fp, supp->name, S_NAME_LEN);
    PR_VSTR(fp, supp->address,
        (columnar)?(long)(ceil(S_ADDR_LEN *
V_STR_HGH)):supp->alen);
    PR_HUGE(fp, &supp->nation_code);
    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
                    last_num = num;
                    rows_this_segment=1;
                    }
                    PR_STRT(dfp);
                    PR_HUGE(dfp, &new);
                    PR_END(dfp);
                    }
                    start = new;
                    last = new;
                    }
                    if (gen_rng)
                    {
                        PR_STRT(dfp);
                        PR_HUGE(dfp, &start);
                        PR_HUGE(dfp, &last);
                        PR_END(dfp);
                    }

                    return(0);
                }

/*
 * 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. 2.7.0-1005
--        Copyright Microsoft, 2006 - 2009
--
IF exists (SELECT name FROM sysobjects WHERE name =
'RF1')
  DROP PROCEDURE RF1
GO
--
-- Create a stored RefreshInsert procedure which will catch
the deadlock
-- victim abort and restart the insert transaction.
--
CREATE PROCEDURE RF1
  @current_execution INTEGER, @insert_sets INTEGER,
  @parallel_executions INTEGER, @total_executions
INTEGER
AS
BEGIN
```

```
DECLARE @startdate DATE
DECLARE @enddate DATE
DECLARE @edate DATE
DECLARE @rangeStart INTEGER
DECLARE @rangeSize INTEGER
DECLARE @range INTEGER
```

```
DECLARE @success INTEGER
DECLARE @index INTEGER
DECLARE @div INTEGER
DECLARE @mod INTEGER
DECLARE @skip INTEGER
DECLARE @i INTEGER
DECLARE @rangeSum INTEGER
DECLARE @totRangeSize INTEGER
DECLARE @stmt NCHAR(1000)
DECLARE @orderSql NCHAR(1000)
DECLARE @liSql NCHAR(1000)
```

```
DECLARE @ErrorMessage NVARCHAR(4000)
DECLARE @ErrorNumber INT
DECLARE @ErrorSeverity INT
DECLARE @ErrorState INT
DECLARE @ErrorLine INT
DECLARE @ErrorProcedure NVARCHAR(200)
```

```
SET @skip = @total_executions/@parallel_executions
SET @div = (@current_execution - 1)/@parallel_executions
SET @mod = (@current_execution - 1) - @div *
@parallel_executions
SET @index = @mod*@skip + @div + 1
```

```
--
-- Get the range for this execution
--
SET @stmt = N'SELECT @sdate = dateadd(day,-
1,min(O_ORDERDATE)), @edate = max(O_ORDERDATE)
FROM NEWORDERS'
EXEC sp_executesql @stmt,N'@sdate DATE output, @edate
DATE output',@startdate output, @enddate output
```

```
--SELECT 'CurrExec:'+cast(@current_execution as
varchar(200)) +','+cast(scheduler_id as varchar(200)) as
[sched] from sys.dm_exec_requests where
session_id=@@spid
```

```
IF (@total_executions > @parallel_executions)
  BEGIN
    SET @div = (@index-1)/@skip
    SET @mod = (@index-1) - @div * @skip
    --SET @rangeSize = datediff(day, @startdate,
@enddate)/@parallel_executions + 1
    SET @rangeSize = ((@div+1) * datediff(day,
@startdate, @enddate))/@parallel_executions - (@div *
datediff(day, @startdate, @enddate))/@parallel_executions
```

```

--SET @rangeStart = @div * @rangeSize
SET @rangeStart = (@div * datediff(day,
@startdate, @enddate))/@parallel_executions
SET @rangeStart = @rangeStart + (@rangeSize *
@mod)/@skip

SET @totRangeSize = ((@mod + 1) *
@rangeSize)/@skip - (@mod * @rangeSize)/@skip
SET @rangeSize = @totRangeSize

IF (@rangeSize < 0)
    SET @rangeSize = 0
IF (@insert_sets <= 0)
    SET @insert_sets = 1
END
ELSE
BEGIN
SET @rangeSize = (@current_execution *
datediff(day, @startdate, @enddate))/@total_executions -
((@current_execution-1) * datediff(day, @startdate,
@enddate))/@total_executions
SET @rangeStart = ((@current_execution-1) *
datediff(day, @startdate, @enddate))/@total_executions
END

SET @startdate = dateadd(day, @rangeStart, @startdate)
IF (@index < @total_executions)
    SET @enddate = dateadd(day, @rangeSize,
@startdate)

SET @range = datediff(day, @startdate, @enddate) /
@insert_sets

--
-- This handles the case when the max-min/insert_sets is less
that 1
--
IF @range = 0
    SET @range = 1

--
-- Generate the two insert statements
--
SET @edate = dateadd(day, @range, @startdate)
SET @orderSql = N'INSERT INTO ORDERS
(O_ORDERKEY, O_CUSTKEY, O_ORDERSTATUS,
O_TOTALPRICE,
O_ORDERDATE, O_ORDERPRIORITY, O_CLERK,
O_SHIPPRIORITY, O_COMMENT)
(SELECT O_ORDERKEY,
O_CUSTKEY, O_ORDERSTATUS, O_TOTALPRICE,
O_ORDERDATE, O_ORDERPRIORITY, O_CLERK,
O_SHIPPRIORITY, O_COMMENT
FROM NEWORDERS
WHERE O_ORDERDATE >
@startdate AND O_ORDERDATE <= @edate)
option (loop join,MaxDop 1)'

```

```

SET @liSql = N'INSERT INTO LINEITEM
(L_ORDERKEY,L_PARTKEY,L_SUPPKEY,L_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,MaxDop 1)'

--
-- Loop through the order keys inserting sets into the
-- ORDERS and LINEITEM tables
--
WHILE @startdate < @enddate
BEGIN
--
-- Insert into ORDERS and LINEITEM tables
--
INSERT_TRANS:
SET @success = 1
BEGIN TRANSACTION

BEGIN TRY
EXEC sp_executesql @orderSql,
N'@startdate DATE, @edate DATE', @startdate, @edate
EXEC sp_executesql @liSql, N'@startdate
DATE, @edate DATE', @startdate, @edate
END TRY
BEGIN CATCH
SET @success = 0
IF (error_number() = 1205) --
deadlock victim
BEGIN
PRINT 'Insert deadlock - restarting
RF1'
IF (@@trancount>0)
ROLLBACK
TRANSACTION
END
ELSE
BEGIN -- not a
deadlock

```

```

        PRINT ERROR_MESSAGE()
        SELECT      @ErrorNumber =
ERROR_NUMBER(),
                  @ErrorSeverity =
ERROR_SEVERITY(),
                  @ErrorState =
ERROR_STATE(),
                  @ErrorLine =
ERROR_LINE(),
                  @ErrorProcedure =
ISNULL(ERROR_PROCEDURE(), '-');
        SELECT @ErrorMessage =
N'Error %%d, Level %%d, State %%d, Procedure %%s, Line
%%d, '+
        'Message: '+ ERROR_MESSAGE();
        IF (@@trancount>0)
            ROLLBACK
TRANSACTION
        RAISERROR
        (
            @ErrorMessage,
            @ErrorSeverity,
            1,
            @ErrorNumber, --
parameter: original error number.
            @ErrorSeverity, -- parameter:
original error severity.
            @ErrorState, -- parameter:
original error state.
            @ErrorProcedure, --
parameter: original error procedure name.
            @ErrorLine -- parameter:
original error line number.
        );
    END
END CATCH

    IF (@success = 0) --
deadlock - redo the inserts
        GOTO INSERT_TRANS

    COMMIT TRANSACTION

    SET @startdate = @edate
    SET @edate = dateadd(day, @range, @edate)

    IF (@edate > @enddate)
        SET @edate = @enddate

    END
END
GO

```

Install_RF2_Stored_Procedure.sql

```

-- File:  CREATERF2PROC.SQL
--      Microsoft TPC-H Benchmark Kit Ver. 2.7.0-1005
--      Copyright Microsoft, 2006 - 2009
--
IF exists (SELECT name FROM sysobjects WHERE name =
'RF2')
    DROP PROCEDURE RF2
GO
--
-- Create a stored Refresh Delete procedure which will catch
the deadlock
-- victim abort and restart the delete transaction.
--
CREATE PROCEDURE RF2
    @current_execution INTEGER, @delete_sets INTEGER,
    @parallel_executions INTEGER, @total_executions
INTEGER
AS
BEGIN
    DECLARE @startdate DATE
    DECLARE @enddate DATE
    DECLARE @edate DATE
    DECLARE @rangeStart INTEGER
    DECLARE @rangeSize INTEGER
    DECLARE @range INTEGER

    declare @success INTEGER
    declare @index INTEGER
    declare @div INTEGER
    declare @mod INTEGER
    declare @skip INTEGER
    declare @i INTEGER
    declare @rangeSum INTEGER
    declare @totRangeSize INTEGER
    declare @sql NCHAR(1000)
    declare @orderSql NCHAR(1000)
    declare @liSql NCHAR(1000)

    DECLARE @ErrorMessage NVARCHAR(4000)
    DECLARE @ErrorNumber INT
    DECLARE @ErrorSeverity INT
    DECLARE @ErrorState INT
    DECLARE @ErrorLine INT
    DECLARE @ErrorProcedure NVARCHAR(200)

    SET @skip = @total_executions/@parallel_executions
    SET @div = floor((@current_execution-
1)/@parallel_executions)
    SET @mod = (@current_execution - 1) - @div *
@parallel_executions
    SET @index = @mod*@skip + @div + 1

    SET @sql = N'SELECT @sdate = dateadd(day,-
1,min(O_ORDERDATE)), @edate = max(O_ORDERDATE)
FROM MOD_OLDORDERS'

```

```
EXEC sp_executesql @sql,N'@sdate DATE output, @edate
DATE output',@startdate output, @enddate output
```

```
--SELECT 'CurrExec:'+cast(@current_execution as
varchar(200)) +','+cast(scheduler_id as varchar(200)) as
[sched] from sys.dm_exec_requests where
session_id=@@spid
```

```
IF (@total_executions > @parallel_executions)
    BEGIN
        SET @div = (@index-1)/@skip
        SET @mod = (@index-1) - @div * @skip

        --SET @rangeSize = datediff(day, @startdate,
        @enddate)/@parallel_executions + 1
        SET @rangeSize = ((@div+1) * datediff(day,
        @startdate, @enddate))/@parallel_executions - (@div *
        datediff(day, @startdate, @enddate))/@parallel_executions

        --SET @rangeStart = @div * @rangeSize
        SET @rangeStart = (@div * datediff(day,
        @startdate, @enddate))/@parallel_executions
        SET @rangeStart = @rangeStart + (@rangeSize *
        @mod)/@skip
```

```
        SET @totRangeSize = ((@mod + 1) *
        @rangeSize)/@skip - (@mod * @rangeSize)/@skip
        SET @rangeSize = @totRangeSize
```

```
        IF (@rangeSize < 0)
            SET @rangeSize = 0
        IF (@delete_sets <= 0)
            SET @delete_sets = 1
        END
```

```
ELSE
    BEGIN
        SET @rangeSize = (@current_execution *
        datediff(day, @startdate, @enddate))/@total_executions -
        ((@current_execution-1) * datediff(day, @startdate,
        @enddate))/@total_executions
        SET @rangeStart = ((@current_execution-1) *
        datediff(day, @startdate, @enddate))/@total_executions
        END
```

```
SET @startdate = dateadd(day, @rangeStart, @startdate)
IF (@index < @total_executions)
    SET @enddate = dateadd(day, @rangeSize,
    @startdate)
```

```
SET @range = datediff(day, @startdate, @enddate) /
@delete_sets
```

```
--
-- This handles the case when the max-min/delete_sets is less
that 1
```

```
--
IF @range = 0
    SET @range = 1
```

```
--
-- Loop through the order keys deleting sets from orders
-- and lineitem tables
```

```
--
SET @edate = dateadd(day, @range, @startdate)
SET @liSql = N'DELETE FROM LINEITEM WHERE
L_ORDERKEY in
        (SELECT O_ORDERKEY FROM
        MOD_OLDORDERS
        WHERE O_ORDERDATE >
        @startdate AND O_ORDERDATE <= @edate)
        option (loop join,MaxDop 1)'
SET @orderSql = N'DELETE FROM ORDERS WHERE
O_ORDERKEY in
        (SELECT O_ORDERKEY FROM
        MOD_OLDORDERS
        WHERE O_ORDERDATE >
        @startdate AND O_ORDERDATE <= @edate)
        option (loop join,MaxDop 1)'
```

```
WHILE @startdate < @enddate
    BEGIN
        DELETE_TRANS:
        SET @success = 1
        BEGIN TRANSACTION

        BEGIN TRY
            EXEC sp_executesql @liSql, N'@startdate
            DATE, @edate DATE', @startdate, @edate
            EXEC sp_executesql @orderSql,
            N'@startdate DATE, @edate DATE', @startdate, @edate
            END TRY
            BEGIN CATCH
                SET @success = 0
                IF (error_number() = 1205) --
                deadlock victim
                    BEGIN
                        PRINT 'Delete deadlock -
                        restarting RF2'
                        IF (@@trancount>0)
                            ROLLBACK
                    END
                TRANSACTION
            ELSE
                BEGIN -- not a
                deadlock
                PRINT ERROR_MESSAGE()
                SELECT @ErrorNumber =
                ERROR_NUMBER(),
                @ErrorSeverity =
                ERROR_SEVERITY(),
                @ErrorState =
                ERROR_STATE(),
                @ErrorLine =
                ERROR_LINE(),
                @ErrorProcedure =
                ISNULL(ERROR_PROCEDURE(), '-');
```



```

SELECT @ErrorMessage =
N'Error %d, Level %d, State %d, Procedure %s, Line
%d, '+

```

```

'Message: '+ ERROR_MESSAGE();
IF (@@trancount>0)
    ROLLBACK

```

```
TRANSACTION
```

```
RAISERROR
```

```

(
    @ErrorMessage,
    @ErrorSeverity,
    1,
    @ErrorNumber, --

```

```
parameter: original error number.
```

```
    @ErrorSeverity, -- parameter:
```

```
original error severity.
```

```
    @ErrorState, -- parameter:
```

```
original error state.
```

```
    @ErrorProcedure, --
```

```
parameter: original error procedure name.
```

```
    @ErrorLine -- parameter:
```

```
original error line number.
```

```
);
```

```
END
```

```
END CATCH
```

```
IF (@success = 0) --
```

```
deadlock - redo the inserts
```

```
GOTO DELETE_TRANS
```

```
COMMIT TRANSACTION
```

```
SET @startdate = @edate
```

```
SET @edate = dateadd(day, @range, @edate)
```

```
IF (@edate > @enddate)
```

```
SET @edate = @enddate
```

```
END
```

```
END
```

```
GO
```

```
ErrHandling.bas
```

```
Attribute VB_Name = "ErrHandling"
```

```
' FILE: ErrHandling.bas
```

```
' Reporting Program for Microsoft TPC-H Kit Ver.
```

```
2.7.0-1004
```

```
' Copyright Microsoft, 2008
```

```
' All Rights Reserved
```

```
,
```

```
' PURPOSE: Error handling module for TPCHMetrics
```

```
report generation program
```

```
' Contact: Reshma Tharamal (reshmat@microsoft.com)
```

```
,
```

```
' UPDATED: November 2007
```

```
' Contact: Jamie Reding (jamiere@microsoft.com)
```

```
' UPDATE: The processing of the RFs was modified in
StepMaster and the
```

```
' metrics calculation reflects the change.
```

```
,
```

```
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.
2.7.0-1004
' Copyright Microsoft, 2008
' All Rights Reserved
'
' PURPOSE: This is the main module that contains the
report generation
' functions for TPCHMetrics
' Contact: Reshma Tharamal (reshmat@microsoft.com)
'
' UPDATED: November 2007
' Contact: Jamie Reding (jamiere@microsoft.com)
' UPDATE: The processing of the RFs was modified in
StepMaster and the
' metrics calculation reflects the change.
'
Option Explicit

' DAO workspace, database and recordset objects
Private mwrkJet As dao.Workspace
Private mDB As dao.Database
Private mDB2 As dao.Database
Private mrecDtls As dao.Recordset
Private mrecSF 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 = 21
'Private miActualStreamIdMax As Integer

' 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

```

```

Private blnRun1, blnRun2 As Boolean

Public cTHStartTime As Currency
Public cTHEndTime As Currency
Public strTHStartTime, strTHEndTime As String

' 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 = 0
' Default number of delete segments per update set
Private Const miDefDelSegmentsPerUpdateSet As Integer = 0

#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
Private intRunID As Integer

```

```
#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 StepExecutionDtls
```

```
    StartTime As Currency
    EndTime As Currency
    StartTimeNextStep As Currency
' ElapsedTime As Double
' ElapsedTpch As Double
    ElapsedTime As Single
    ElapsedTpch As Single
    sStartTm As String
    sEndTm As String
    sStartNextTm As String
End Type
```

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

```
' 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
```

```
Dim strStepTimeStamp, strZeroPad As String
```

```
Dim intCounter, intMonth, intDay, intYear As Integer
```

```
Dim intHour, intMinute As Integer
```

```
Dim fltSeconds, fltStartSeconds, fltEndSeconds,
```

```
fltElapsedSeconds, fltElapsedTPCH As Single
```

```
Dim intFindSlash1, intFindSlash2, intFindSpace,
```

```
intFindColon1, intFindColon2, intFindPeriod As Integer
```

```
Dim intFindDash1, intFindDash2, intZeroCounter As
```

```
Integer
```

```
Dim strRFTimestamp As String
```

```
' Calculate the timing interval for each query in each stream
```

```
For iStreamId = miStreamIdLo To miStreamIdHi
```

```
For iQueryId = miQueryIdMin To miQueryIdMax Step
1
```

```
For iQueryId = miQueryIdMin To (miQueryIdMax - 2)
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 we need to reformat the julian times
```

```
'reformat the start time
```

```
arExecutionDtls(iStreamId, iQueryId).StartTime =
Convert2JulianDash(arExecutionDtls(iStreamId,
iQueryId).sStartTm)
```

```
'reformat the end time
```

```
arExecutionDtls(iStreamId, iQueryId).EndTime =
Convert2JulianDash(arExecutionDtls(iStreamId,
iQueryId).sEndTm)
```

```
'now rebuild the End time string in the proper format
```

```

'reformat the start of the next step
arExecutionDtls(iStreamId,
iQueryId).StartTimeNextStep =
Convert2JulianDash(arExecutionDtls(iStreamId,
iQueryId).sStartNextTm)
Next iQueryId

'calculate the elapsed time for the RF1s
For intCounter = 23 To 24
'convert to a julian
intFindSlash1 = InStr(1, arExecutionDtls(iStreamId,
intCounter).sStartTm, "/")
intFindSlash2 = InStr((intFindSlash1 + 1),
arExecutionDtls(iStreamId, intCounter).sStartTm, "/")
intFindSpace = InStr((intFindSlash2 + 1),
arExecutionDtls(iStreamId, intCounter).sStartTm, " ")
intMonth = CInt(Mid(arExecutionDtls(iStreamId,
intCounter).sStartTm, 1, (intFindSlash1 - 1)))
intDay = CInt(Mid(arExecutionDtls(iStreamId,
intCounter).sStartTm, (intFindSlash1 + 1), (intFindSlash2 -
(intFindSlash1 + 1))))
intYear = CInt(Mid(arExecutionDtls(iStreamId,
intCounter).sStartTm, (intFindSlash2 + 1), (intFindSpace -
(intFindSlash2 + 1))))
intFindSpace = InStrRev(arExecutionDtls(iStreamId,
intCounter).sStartTm, " ")
intFindColon1 = InStr(1, arExecutionDtls(iStreamId,
intCounter).sStartTm, ":")
intFindColon2 = InStr((intFindColon1 + 1),
arExecutionDtls(iStreamId, intCounter).sStartTm, ":")
intFindPeriod = InStr(1, arExecutionDtls(iStreamId,
intCounter).sStartTm, ".")
intHour = CInt(Mid(arExecutionDtls(iStreamId,
intCounter).sStartTm, (intFindSpace + 1), (intFindColon1 -
(intFindSpace + 1))))
intMinute = CInt(Mid(arExecutionDtls(iStreamId,
intCounter).sStartTm, (intFindColon1 + 1), (intFindColon2 -
(intFindColon1 + 1))))
fltSeconds = CSng(Mid(arExecutionDtls(iStreamId,
intCounter).sStartTm, (intFindColon2 + 1)))
'get the Julian date
arExecutionDtls(iStreamId, intCounter).StartTime =
Date2Julian(intMonth, intDay, intYear, intHour, intMinute,
fltSeconds)
'now rebuild the End time string in the proper format
If intHour < 12 Then
strRFTimeStamp = "0" & CStr(intHour)
Else
strRFTimeStamp = CStr(intHour)
End If
If intMinute < 10 Then
strRFTimeStamp = strRFTimeStamp & ":" & "0" &
CStr(intMinute)
Else
strRFTimeStamp = strRFTimeStamp & ":" &
CStr(intMinute)
End If
If fltSeconds < 10# Then

```

```

strRFTimeStamp = strRFTimeStamp & ":" & "0" &
CStr(fltSeconds)
Else
strRFTimeStamp = strRFTimeStamp & ":" &
CStr(fltSeconds)
End If
strZeroPad = ""
If Len(strRFTimeStamp) < 12 Then
If Len(strRFTimeStamp) = 8 Then
strRFTimeStamp = strRFTimeStamp & "."
End If
For intZeroCounter = 1 To (12 -
Len(strRFTimeStamp))
strZeroPad = strZeroPad & "0"
Next
strRFTimeStamp = strRFTimeStamp & strZeroPad
End If
strRFTimeStamp = CStr(intYear) & "-" &
CStr(intMonth) & "-" & CStr(intDay) & " " &
strRFTimeStamp
arExecutionDtls(iStreamId, intCounter).sStartTm =
strRFTimeStamp
'now convert the time to seconds
fltStartSeconds = CSng(intHour * 60 * 60) +
CSng(intMinute * 60) + fltSeconds
intFindSlash1 = InStr(1, arExecutionDtls(iStreamId,
intCounter).sEndTm, "/")
intFindSlash2 = InStr((intFindSlash1 + 1),
arExecutionDtls(iStreamId, intCounter).sEndTm, "/")
intFindSpace = InStr((intFindSlash2 + 1),
arExecutionDtls(iStreamId, intCounter).sEndTm, " ")
intMonth = CInt(Mid(arExecutionDtls(iStreamId,
intCounter).sEndTm, 1, (intFindSlash1 - 1)))
intDay = CInt(Mid(arExecutionDtls(iStreamId,
intCounter).sEndTm, (intFindSlash1 + 1), (intFindSlash2 -
(intFindSlash1 + 1))))
intYear = CInt(Mid(arExecutionDtls(iStreamId,
intCounter).sEndTm, (intFindSlash2 + 1), (intFindSpace -
(intFindSlash2 + 1))))
intFindSpace = InStrRev(arExecutionDtls(iStreamId,
intCounter).sEndTm, " ")
intFindColon1 = InStr(1, arExecutionDtls(iStreamId,
intCounter).sEndTm, ":")
intFindColon2 = InStr((intFindColon1 + 1),
arExecutionDtls(iStreamId, intCounter).sEndTm, ":")
intFindPeriod = InStr(1, arExecutionDtls(iStreamId,
intCounter).sEndTm, ".")
intHour = CInt(Mid(arExecutionDtls(iStreamId,
intCounter).sEndTm, (intFindSpace + 1), (intFindColon1 -
(intFindSpace + 1))))
intMinute = CInt(Mid(arExecutionDtls(iStreamId,
intCounter).sEndTm, (intFindColon1 + 1), (intFindColon2 -
(intFindColon1 + 1))))
fltSeconds = CSng(Mid(arExecutionDtls(iStreamId,
intCounter).sEndTm, (intFindColon2 + 1)))
'get the Julian date
arExecutionDtls(iStreamId, intCounter).EndTime =
Date2Julian(intMonth, intDay, intYear, intHour, intMinute,
fltSeconds)

```

```

'now rebuild the End time string in the proper format
If intHour < 12 Then
    strRFTimeStamp = "0" & CStr(intHour)
Else
    strRFTimeStamp = CStr(intHour)
End If
If intMinute < 10 Then
    strRFTimeStamp = strRFTimeStamp & ":" & "0" &
CStr(intMinute)
Else
    strRFTimeStamp = strRFTimeStamp & ":" &
CStr(intMinute)
End If
If fltSeconds < 10# Then
    strRFTimeStamp = strRFTimeStamp & ":" & "0" &
CStr(fltSeconds)
Else
    strRFTimeStamp = strRFTimeStamp & ":" &
CStr(fltSeconds)
End If
strZeroPad = ""
If Len(strRFTimeStamp) < 12 Then
    If Len(strRFTimeStamp) = 8 Then
        strRFTimeStamp = strRFTimeStamp & "."
    End If
    For intZeroCounter = 1 To (12 -
Len(strRFTimeStamp))
        strZeroPad = strZeroPad & "0"
    Next
    strRFTimeStamp = strRFTimeStamp & strZeroPad
End If
strRFTimeStamp = CStr(intYear) & "-" &
CStr(intMonth) & "-" & CStr(intDay) & " " &
strRFTimeStamp
arExecutionDtls(iStreamId, intCounter).sEndTm =
strRFTimeStamp
'since the "start next step" for the RFs is just the end
time, preload the value
arExecutionDtls(iStreamId, intCounter).sStartNextTm
= strRFTimeStamp
arExecutionDtls(iStreamId,
intCounter).StartTimeNextStep = arExecutionDtls(iStreamId,
intCounter).EndTime
'now convert the time to seconds
fltEndSeconds = CSng(intHour * 60 * 60) +
CSng(intMinute * 60) + fltSeconds
'now calculate the elapsed seconds
fltElapsedSeconds = fltEndSeconds - fltStartSeconds
If fltElapsedSeconds < mfMinElapsed Then
    arExecutionDtls(iStreamId,
intCounter).ElapsedTime = mfMinElapsedRound
Else
    fltElapsedSeconds = Round(fltElapsedSeconds,
miNumDecimalPlaces)
    arExecutionDtls(iStreamId,
intCounter).ElapsedTime = fltElapsedSeconds
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
fltElapsedTPCH = (fltEndSeconds - fltStartSeconds)
arExecutionDtls(iStreamId, intCounter).ElapsedTpch
= fltElapsedTPCH

' 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,
intCounter).ElapsedTpch) < mfMinElapsed Then
    arExecutionDtls(iStreamId,
intCounter).ElapsedTpch = mfMinElapsedRound
Else
    fltElapsedTPCH = Round(fltElapsedTPCH,
miNumDecimalPlaces)
    arExecutionDtls(iStreamId,
intCounter).ElapsedTpch = fltElapsedTPCH
End If
Next intCounter
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
        sStartTm = arExecutionDtls(iStreamId,
iQueryId).sStartTm
        End If

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

```

```

Next iQueryId

Next iStreamId

'since the RFs are processed outside of StepMaster, we
need to look back in the stp file
'to get the actual start time. The drift is usually 10
seconds or so
Call QueryThroughputTimes

strTHStartTime = JulianToString(cTHStartTime)
strTHEndTime = JulianToString(cTHEndTime)

'fElapsedThroughput = CalcElapsedSecs(sStartTm,
sEndTm)
fElapsedThroughput = CalcElapsedSecs(strTHStartTime,
strTHEndTime)
'fElapsedThroughput = Round((cTHEndTime -
cTHStartTime) * 10, miNumDecimalPlaces)
'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 mDB2 Is Nothing Then
    mDB2.Close
    Set mDB2 = 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)
    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 IInstId 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

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

```

```

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

    sLabel = msLblThroughputRF12Mgr
    sIt = 0
    '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(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

    ParentInstId = mrecDtls.Fields("instance_id").Value
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 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 + 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 QueryAndSetSFSStreams(ByVal sDbFile As
String)

' Queries step execution records from the database

Dim strSQL As String
Dim fltScaleFactor As Single

```

On Error GoTo QueryAndSetSFStreamsErr

Screen.MousePointer = vbHourglass

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

' Open database for exclusive access
Set mDB2 = mwrkJet.OpenDatabase(sDbFile,
Options:=True)

strSQL = "SELECT parameter_name, " & _
"    parameter_value " & _
"FROM run_parameters " & _
"WHERE run_id = " &
CStr(frmTPCHMetrics.cboRunId.Text) & " " & _
"ORDER BY parameter_name ASC"

Set mrecSF = mDB2.OpenRecordset(strSQL,
dbOpenSnapshot)

If mrecSF.RecordCount = 0 Then
Screen.MousePointer = vbDefault
MsgBox "There are no records in the database for the run
identifier." & _
" Unable to generate reports."
Else
'set the default values for Number of Streams
(cboStreams)
While Not mrecSF.EOF
If mrecSF.Fields("parameter_name").Value =
"BCP_ROWS" Then
MsgBox "The run ID selected is not a Power or
Throughput Run." & _
"Please select another."
mrecDtIs.Close
CloseDbAndWsp
Screen.MousePointer = vbDefault
frmTPCHMetrics.cboSF.ListIndex = 0
frmTPCHMetrics.cboStreams.ListIndex = 0
Exit Sub
End If
If mrecSF.Fields("parameter_name").Value =
"MAX_STREAMS" Then
frmTPCHMetrics.cboStreams.ListIndex =
CInt(mrecSF.Fields("parameter_value").Value) - 1
End If
If mrecSF.Fields("parameter_name").Value =
"DBNAME" Then
'extract the scale factor from the database name
(tpchxxxxg)
fltScaleFactor =
CSng(Mid(mrecSF.Fields("parameter_value"), 5,
(Len(mrecSF.Fields("parameter_value")) - 5)))
Select Case fltScaleFactor
Case 0.1
frmTPCHMetrics.cboSF.ListIndex = 0
Case 1

```

```

frmTPCHMetrics.cboSF.ListIndex = 1
Case 10
frmTPCHMetrics.cboSF.ListIndex = 2
Case 30
frmTPCHMetrics.cboSF.ListIndex = 3
Case 100
frmTPCHMetrics.cboSF.ListIndex = 4
Case 300
frmTPCHMetrics.cboSF.ListIndex = 5
Case 1000
frmTPCHMetrics.cboSF.ListIndex = 6
Case 3000
frmTPCHMetrics.cboSF.ListIndex = 7
Case 10000
frmTPCHMetrics.cboSF.ListIndex = 8
Case Else
frmTPCHMetrics.cboSF.ListIndex = 0
End Select
End If
mrecSF.MoveNext
Wend
End If

mrecSF.Close
CloseDbAndWsp

Screen.MousePointer = vbDefault

Exit Sub

QueryAndSetSFStreamsErr:

Screen.MousePointer = vbDefault
DisplayErrors

CloseDbAndWsp

End Sub

Private Sub QueryThroughputTimes()
' Queries step execution records from the database for the
start and end of the throughput run

Dim strSQL As String
Dim strLabel As String

strLabel = "Execute Throughput Run"

On Error GoTo QueryThroughputTimesErr

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.start_time, a.end_time, " & _
        " b.step_label " & _
        "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) & " AND " & _
        " b.step_label = 'Execute Throughput Run'"

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
    cTHStartTime = mrecDtls.Fields("start_time").Value
    cTHEndTime = mrecDtls.Fields("end_time").Value
End If

mrecDtls.Close
CloseDbAndWsp

Screen.MousePointer = vbDefault

Exit Sub

QueryThroughputTimesErr:

Screen.MousePointer = vbDefault
DisplayErrors

CloseDbAndWsp

End Sub

Public Sub GenerateSelected()
    ' Called when the user clicks on Generate on the
    TPCHEMetrics 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) = _
        (frmTPCHEMetrics.chkRun(eRunType.Power).Value =
vbChecked)
    mbRunType(eRunType.Throughput) = _
        (frmTPCHEMetrics.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 workspace definition file
    msDbFile = Trim(frmTPCHEMetrics.txtDbFile)
    If msDbFile = gsEmptyString Then
        MsgBox "Please enter the workspace definition file (.stp)
containing the run history."
        Exit Sub
    End If

    ' Initialize the MasterLog file
    msOutput = Trim(frmTPCHEMetrics.txtMasterLogFile)
    If msOutput = gsEmptyString Then
        MsgBox "Please enter the MasterLog file name."
        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(frmTPCHEMetrics.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
    End If

    ' Initialize the report file and ensure that it doesn't already
    exist
    msOutput = Trim(frmTPCHEMetrics.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 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(frmTPCHMetrics.cboSF.Text)

#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 TPCHMetric 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
    GetEndStepIfThroughput = 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, msFmtNumberWOZeros)
    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 TPC_H_KIT Then
Select Case iQuery
Case miQueryIdRF1
LabelEndThroughput = msLb1ThroughputRF1

Case miQueryIdRF2
LabelEndThroughput = IIf(iStream = miStreamIdHi, _
msLb1ThroughputRF2,
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 TPC_H_KIT Then
Dim iQIndex As Integer
#End If

```

```

Select Case iQuery
Case miQueryIdRF1
IteratorThroughput = msFirstRFIterator

Case miQueryIdRF2
IteratorThroughput = msFirstRFIterator

Case Else
#If TPC_H_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 lParentInstId 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
' Determine the start time for the step using the step
label
sLabel = LabelStartPower(iQueryId)

sSql = "step_label = " &
MakeStringFieldValid(sLabel)

If iQueryId = miQueryIdRF1 Then
Call ReadMasterLog("True", iStreamId, iQueryId,
"Start", 1)
Else
If iQueryId = miQueryIdRF2 Then
Call ReadMasterLog("True", iStreamId,
iQueryId, "Start", 2)
Else
mrecDtls.FindFirst sSql
If mrecDtls.NoMatch = True Then
MsgBox "Step " & "" & sLabel & "" & " not
found. " & _
"The PowerRun was not completely
executed!"

Exit Sub
End If
End If
End For
End Sub

```

```

End If

arExecutionDtls(iStreamId, iQueryId).StartTime
= mrecDtls.Fields("start_time").Value
End If
End If

If iQueryId = miQueryIdRF1 Then
Call ReadMasterLog("True", iStreamId, iQueryId,
"End", 1)
Else
If iQueryId = miQueryIdRF2 Then
Call ReadMasterLog("True", iStreamId,
iQueryId, "End", 2)
Else
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
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
        If (iQueryId <> miQueryIdRF1 And iQueryId <>
miQueryIdRF2) Then
            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)
        End If
        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 iQueryId = miQueryIdRF1 Then
                    Call ReadMasterLog("False", iStreamId,
iQueryId, "Start", 1)
                Else
                    If iQueryId = miQueryIdRF2 Then
                        Call ReadMasterLog("False", iStreamId,
iQueryId, "Start", 2)
                    Else
                        sIt = IteratorThroughput(iStreamId, iQueryId)
                        sSql = sSql & " and iterator_value = " &
MakeStringFieldValid(sIt)
                        mrecDtls.FindFirst sSql
                        If mrecDtls.NoMatch = True Then
                            MsgBox "Step " & "" & sLabel & "" & "
not found. " & _
                                "The PowerRun was not completely
executed!"
                        End If
                    End If
                End If
            Next iQueryId
        Next iStreamId
    End If
    Exit Sub

```

```

        End If
        arExecutionDtls(iStreamId,
iQueryId).StartTime = mrecDtls.Fields("start_time").Value
        End If
    End If

    ' Determine the start time for the step using the step
label
    sLabel = LabelStartThroughput(iStreamId,
iQueryId)
    sSql = "step_label = " &
MakeStringFieldValid(sLabel)

    If iQueryId = miQueryIdRF1 Then
        Call ReadMasterLog("False", iStreamId,
iQueryId, "End", 1)
    Else
        If iQueryId = miQueryIdRF2 Then
            Call ReadMasterLog("False", iStreamId,
iQueryId, "End", 2)
        Else
            sIt = IteratorThroughput(iStreamId, iQueryId)
            sSql = sSql & " and iterator_value = " &
MakeStringFieldValid(sIt)
            mrecDtls.FindFirst sSql
            If mrecDtls.NoMatch = True Then
                MsgBox "Step " & "" & sLabel & "" & "
not found. " & _
                    "The PowerRun was not completely
executed!"
            End If
        End If
    End If

    arExecutionDtls(iStreamId,
iQueryId).EndTime = mrecDtls.Fields("end_time").Value
    End If
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 TPCHE_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

        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
        If (iQueryId <> miQueryIdRF1 And iQueryId <>
miQueryIdRF2) Then
            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)
        End If
        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
Dim intCounter As Integer
intCounter = 1

```

```

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
If intCounter = 1 Then
intRunID = mrecDtls.Fields("run_id").Value
intCounter = 99
End If
While Not mrecDtls.EOF
' Add run identifier to the combo box
IRunId = mrecDtls.Fields("run_id").Value
cboLoad.AddItem CStr(IRunId)

mrecDtls.MoveNext
Wend
If cboLoad.ListCount > 0 Then
cboLoad.ListIndex = 0
End If
End If

mrecDtls.Close

Call QueryAndSetSFStreams(sDbFile)

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, "RF Log file:" & vbTab &
frmTPCHMetrics.txtMasterLogFile.Text
Print #hOutputFile, "Run identifier:" & vbTab &
CStr(miRunId)
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
    If iQIndex = 1 Then
        sPrint = vbTab & "Q" & Format$(iQIndex,
msFmtNumberWOZeroes) & vbTab
    Else
        sPrint = "Q" & Format$(iQIndex,
msFmtNumberWOZeroes) & vbTab
    End If
    Print #hOutputFile, sPrint;
Next iQIndex

For iQIndex = miQueryIdRF1 To miQueryIdRF2

```

```

        sPrint = "RF" & Format$(iQIndex - miQueryIdRF1 + 1,
msFmtNumberWOZeroes) & 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(arExecutionDtIs(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(arExecutionDtIs(iSIndex,
iQIndex).ElapsedTime) & vbTab
        Print #hOutputFile, sPrint;
Next iQIndex

Print #hOutputFile,

Next iSIndex

Print #hOutputFile,
Print #hOutputFile, vbTab & Space(6) & "Query" &
Space(15) & "Start" & Space(19) & "End" & _
    Space(19) & "Start" & vbTab & vbTab &
vbTab & "Step" & _
    vbTab & Space(6) & "Official"
Print #hOutputFile, vbTab & Space(7); "ID" & vbTab &
vbTab & Space(2) & "Time" & _
    vbTab & vbTab & vbTab & Space(2) &
"Time" & _
    vbTab & vbTab & Space(6) & "Next Step" & _
    vbTab & vbTab & vbTab & "Delta" & _

```

```

        vbTab & Space(4) & "Query Elapsed" & _
        Space(4) & "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
        If Left(sPrint, 6) = "Stream" Then
            sPrint = vbTab & CStr(iQIndex) & vbTab & _
                arExecutionDtls(iSIndex, iQIndex).sStartTm
& vbTab & _
                arExecutionDtls(iSIndex, iQIndex).sEndTm
& vbTab & _
                arExecutionDtls(iSIndex,
iQIndex).sStartNextTm & vbTab & vbTab & _
                CStr(arExecutionDtls(iSIndex,
iQIndex).ElapsedTime) & vbTab & vbTab & _
                CStr(arExecutionDtls(iSIndex,
iQIndex).ElapsedTpch) & vbTab & vbTab & _
                Round(CStr(arExecutionDtls(iSIndex,
iQIndex).ElapsedTpch - arExecutionDtls(iSIndex,
iQIndex).ElapsedTime), miNumDecimalPlaces)
            Else
                sPrint = vbTab & vbTab & CStr(iQIndex) & vbTab
& _
                arExecutionDtls(iSIndex, iQIndex).sStartTm &
vbTab & _
                arExecutionDtls(iSIndex, iQIndex).sEndTm &
vbTab & _
                arExecutionDtls(iSIndex,
iQIndex).sStartNextTm & vbTab & vbTab & _
                CStr(arExecutionDtls(iSIndex,
iQIndex).ElapsedTime) & vbTab & vbTab & _
                CStr(arExecutionDtls(iSIndex,
iQIndex).ElapsedTpch) & vbTab & vbTab & _
                Round(CStr(arExecutionDtls(iSIndex,
iQIndex).ElapsedTpch - arExecutionDtls(iSIndex,
iQIndex).ElapsedTime), miNumDecimalPlaces)
            End If
            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

Public Function ReadMasterLog(strPower As String,
intStreamID As Integer, intQueryID As Integer, strSequence
As String, intRF As Integer)
    Dim RF1Run1PowerLabelStart, RF1Run1PowerLabelEnd
As String
    Dim RF1Run2PowerLabelStart, RF1Run2PowerLabelEnd
As String
    Dim RF2Run1PowerLabelStart, RF2Run1PowerLabelEnd
As String
    Dim RF2Run2PowerLabelStart, RF2Run2PowerLabelEnd
As String
    Dim RFThroughputStreamLabelStart,
RFThroughputStreamLabelEnd As String
    Dim RF1ThroughputStreamLabelStart,
RF1ThroughputStreamLabelEnd As String
    Dim RF2ThroughputStreamLabelStart,
RF2ThroughputStreamLabelEnd As String
    Dim strLine, strStartTime, strEndTime As String
    Dim intNumStreams, intCounter, intStreamNum,
intMinStreamNum, intMaxStreamNum As Integer
    Dim intPreSpaceLoc, intNextSpaceLoc, intPostSpaceLoc
As Integer
    Dim dteTempTime As Date
    Dim strElapsedTime, strTemp As String

    RF1Run1PowerLabelStart = "Start: Executing
RF1_Exec_STREAM_0"
    RF1Run1PowerLabelEnd = "End: Executing
RF1_Exec_STREAM_0"
    RF2Run1PowerLabelStart = "Start: Executing
RF2_Exec_STREAM_0"
    RF2Run1PowerLabelEnd = "End: Executing
RF2_Exec_STREAM_0"
    RF1ThroughputStreamLabelStart = "Start: Executing
RF1_Exec_STREAM_"
    RF1ThroughputStreamLabelEnd = "End: Executing
RF1_Exec_STREAM_"
    RF2ThroughputStreamLabelStart = "Start: Executing
RF2_Exec_STREAM_"

```



```

RF2ThroughputStreamLabelEnd = "End: Executing
RF2_Exec_STREAM_"

If strPower = "True" Then
  Open frmTPCHMetrics.txtMasterLogFile.Text For Input
  As #1
  Do While Not EOF(1)
    Line Input #1, strLine
    If (intRF = 1 And strSequence = "Start") Then
      If InStr(strLine, RF1Run1PowerLabelStart) Then
        blnRun1 = True
        blnRun2 = False
        'find the start time for the RF
        'first find the second space in the line
        intPreSpaceLoc = InStr(1, strLine, "Start")
        intNextSpaceLoc = InStrRev(strLine, " ",
(intPreSpaceLoc - 2))
        strStartTime = Mid(strLine, (intNextSpaceLoc +
1), ((intPreSpaceLoc - 1) - (intNextSpaceLoc + 1)))
        intPreSpaceLoc = InStr(1, strLine, " ")
        intNextSpaceLoc = InStr((intPreSpaceLoc + 1),
strLine, " ")
        strStartTime = Mid(strLine, (intPreSpaceLoc +
1), (intNextSpaceLoc - intPreSpaceLoc)) & " " & strStartTime
        arExecutionDtls(intStreamID,
intQueryID).sStartTm = strStartTime
        Close #1
        Exit Function
      End If
    End If
    If (intRF = 1 And strSequence = "End") Then
      If InStr(strLine, RF1Run1PowerLabelEnd) Then
        'find the start time for the RF
        'first find the second space in the line
        intPreSpaceLoc = InStr(1, strLine, "End")
        intNextSpaceLoc = InStrRev(strLine, " ",
(intPreSpaceLoc - 2))
        strEndTime = Mid(strLine, (intNextSpaceLoc + 1),
((intPreSpaceLoc - 1) - (intNextSpaceLoc + 1)))
        intPreSpaceLoc = InStr(1, strLine, " ")
        intNextSpaceLoc = InStr((intPreSpaceLoc + 1),
strLine, " ")
        strEndTime = Mid(strLine, (intPreSpaceLoc + 1),
(intNextSpaceLoc - intPreSpaceLoc)) & " " & strEndTime
        arExecutionDtls(intStreamID, intQueryID).sEndTm
= strEndTime
        Close #1
        Exit Function
      End If
    End If
    If (intRF = 2 And strSequence = "Start") Then
      If InStr(strLine, RF2Run1PowerLabelStart) Then
        blnRun1 = True
        blnRun2 = False
        'find the start time for the RF
        'first find the second space in the line
        intPreSpaceLoc = InStr(1, strLine, "Start")
        intNextSpaceLoc = InStrRev(strLine, " ",
(intPreSpaceLoc - 2))

```

```

        strStartTime = Mid(strLine, (intNextSpaceLoc + 1),
((intPreSpaceLoc - 1) - (intNextSpaceLoc + 1)))
        intPreSpaceLoc = InStr(1, strLine, " ")
        intNextSpaceLoc = InStr((intPreSpaceLoc + 1),
strLine, " ")
        strStartTime = Mid(strLine, (intPreSpaceLoc + 1),
(intNextSpaceLoc - intPreSpaceLoc)) & " " & strStartTime
        arExecutionDtls(intStreamID,
intQueryID).sStartTm = strStartTime
        Close #1
        Exit Function
      End If
    End If
    If (intRF = 2 And strSequence = "End") Then
      If InStr(strLine, RF2Run1PowerLabelEnd) Then
        'find the start time for the RF
        'first find the second space in the line
        intPreSpaceLoc = InStr(1, strLine, "End")
        intNextSpaceLoc = InStrRev(strLine, " ",
(intPreSpaceLoc - 2))
        strEndTime = Mid(strLine, (intNextSpaceLoc + 1),
((intPreSpaceLoc - 1) - (intNextSpaceLoc + 1)))
        intPreSpaceLoc = InStr(1, strLine, " ")
        intNextSpaceLoc = InStr((intPreSpaceLoc + 1),
strLine, " ")
        strEndTime = Mid(strLine, (intPreSpaceLoc + 1),
(intNextSpaceLoc - intPreSpaceLoc)) & " " & strEndTime
        arExecutionDtls(intStreamID, intQueryID).sEndTm
= strEndTime
        Close #1
        Exit Function
      End If
    End If
    Loop
    Close #1
  Else
    intNumStreams = frmTPCHMetrics.cboStreams.Text
    intStreamNum = intStreamID
    If intRF = 1 Then
      RFThroughputStreamLabelStart =
RF1ThroughputStreamLabelStart & intStreamNum
      RFThroughputStreamLabelEnd =
RF1ThroughputStreamLabelEnd & intStreamNum
    Else
      RFThroughputStreamLabelStart =
RF2ThroughputStreamLabelStart & intStreamNum
      RFThroughputStreamLabelEnd =
RF2ThroughputStreamLabelEnd & intStreamNum
    End If
    Open frmTPCHMetrics.txtMasterLogFile.Text For Input
    As #1
    Do While Not EOF(1)
      Line Input #1, strLine
      If (strSequence = "Start") Then
        If InStr(strLine, RFThroughputStreamLabelStart)
Then
          'find the start time for the RF
          'first find the second space in the line
          intPreSpaceLoc = InStr(1, strLine, "Start")

```

```

        intNextSpaceLoc = InStrRev(strLine, " ",
(intPreSpaceLoc - 2))
        strStartTime = Mid(strLine, (intNextSpaceLoc +
1), ((intPreSpaceLoc - 1) - (intNextSpaceLoc + 1)))
        intPreSpaceLoc = InStr(1, strLine, " ")
        intNextSpaceLoc = InStr((intPreSpaceLoc + 1),
strLine, " ")
        strStartTime = Mid(strLine, (intPreSpaceLoc +
1), (intNextSpaceLoc - intPreSpaceLoc)) & " " & strStartTime
        arExecutionDtls(intStreamID,
intQueryID).sStartTm = strStartTime
        Close #1
        Exit Function
    End If
Else
    If InStr(strLine, RFThroughputStreamLabelEnd)
Then
        'find the start time for the RF
        'first find the second space in the line
        intPreSpaceLoc = InStr(1, strLine, "End")
        intNextSpaceLoc = InStrRev(strLine, " ",
(intPreSpaceLoc - 2))
        strEndTime = Mid(strLine, (intNextSpaceLoc +
1), ((intPreSpaceLoc - 1) - (intNextSpaceLoc + 1)))
        intPreSpaceLoc = InStr(1, strLine, " ")
        intNextSpaceLoc = InStr((intPreSpaceLoc + 1),
strLine, " ")
        strEndTime = Mid(strLine, (intPreSpaceLoc + 1),
(intNextSpaceLoc - intPreSpaceLoc)) & " " & strEndTime
        arExecutionDtls(intStreamID,
intQueryID).sEndTm = strEndTime
        Close #1
        Exit Function
    End If
End If
Loop
Close #1
End If
End Function

```

```

Public Function Date2Julian(ByVal intMM As Integer, ByVal
intDD As Integer, ByVal intYY As Integer, ByVal intHH As
Integer, ByVal intMI As Integer, ByVal fltSS As Single) As
Double

```

```

    Dim a As Single
    Dim y As Single
    Dim m As Single
    Dim JDN As Double
    Dim JD As Double

```

```

    a = Int((14 - intMM) / 12)
    y = intYY + 4800 - a
    m = intMM + (12 * a) - 3
    JDN = intDD + Int(((153 * m) + 2) / 5) + (365 * y) + Int(y /
4) - 32083
    JD = JDN + ((intHH - 12) / 24) + (intMI / 1440) + (fltSS /
86400)

```

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```

    Date2Julian = JD

```

```

End Function

```

```

Public Function CalcElapsedSecs(ByVal strStartTime As
String, ByVal strEndTime As String) As Double

```

```

    Dim intCounter, intMonth, intDay, intYear As Integer
    Dim intHour, intMinute As Integer
    Dim fltSeconds, fltStartSeconds, fltEndSeconds,
fltElapsedSeconds, fltElapsedTPCH As Double
    Dim intFindSlash1, intFindSlash2, intFindSpace,
intFindColon1, intFindColon2, intFindPeriod As Integer
    Dim intFindDash1, intFindDash2 As Integer
    Dim strRFTimestamp As String

```

```

    intFindSpace = InStrRev(strStartTime, " ")
    intFindColon1 = InStr(1, strStartTime, ":")
    intFindColon2 = InStr((intFindColon1 + 1), strStartTime,
":")
    intFindPeriod = InStr(1, strStartTime, ".")
    intHour = CInt(Mid(strStartTime, (intFindSpace + 1),
(intFindColon1 - (intFindSpace + 1))))
    intMinute = CInt(Mid(strStartTime, (intFindColon1 + 1),
(intFindColon2 - (intFindColon1 + 1))))
    fltSeconds = CDBl(Mid(strStartTime, (intFindColon2 + 1)))
    fltStartSeconds = CDBl((intHour * 60 * 60) +
CDBl((intMinute * 60) + fltSeconds))
    intFindSpace = InStrRev(strEndTime, " ")
    intFindColon1 = InStr(1, strEndTime, ":")
    intFindColon2 = InStr((intFindColon1 + 1), strEndTime,
":")
    intFindPeriod = InStr(1, strEndTime, ".")
    intHour = CInt(Mid(strEndTime, (intFindSpace + 1),
(intFindColon1 - (intFindSpace + 1))))
    intMinute = CInt(Mid(strEndTime, (intFindColon1 + 1),
(intFindColon2 - (intFindColon1 + 1))))
    fltSeconds = CDBl(Mid(strEndTime, (intFindColon2 + 1)))
    fltEndSeconds = CDBl((intHour * 60 * 60) +
CDBl((intMinute * 60) + fltSeconds))
    'calculate the elapsed seconds
    fltElapsedSeconds = Round((fltEndSeconds -
fltStartSeconds) * 10, miNumDecimalPlaces)
    fltElapsedSeconds = Round((fltEndSeconds -
fltStartSeconds), 1)
    CalcElapsedSecs = fltElapsedSeconds

```

```

End Function

```

```

Public Function Convert2JulianDash(ByVal strTimeStamp As
String) As Double

```

```

    Dim intFindDash1, intFindDash2, intFindSpace As Integer
    Dim intFindColon1, intFindColon2, intFindPeriod As
Integer
    Dim intYear, intMonth, intDay As Integer
    Dim intHour, intMinute As Integer
    Dim fltSeconds As Double

```

```

intFindDash1 = InStr(1, strTimeStamp, "-")
intFindDash2 = InStr((intFindDash1 + 1), strTimeStamp, "-")
intFindSpace = InStr((intFindDash2 + 1), strTimeStamp, " ")
intYear = CInt(Mid(strTimeStamp, 1, (intFindDash1 - 1)))
intMonth = CInt(Mid(strTimeStamp, (intFindDash1 + 1), (intFindDash2 - (intFindDash1 + 1))))
intDay = CInt(Mid(strTimeStamp, (intFindDash2 + 1), (intFindSpace - (intFindDash2 + 1))))
intFindSpace = InStrRev(strTimeStamp, " ")
intFindColon1 = InStr(1, strTimeStamp, ":")
intFindColon2 = InStr((intFindColon1 + 1), strTimeStamp, ":")
intFindPeriod = InStr(1, strTimeStamp, ".")
intHour = CInt(Mid(strTimeStamp, (intFindSpace + 1), (intFindColon1 - (intFindSpace + 1))))
intMinute = CInt(Mid(strTimeStamp, (intFindColon1 + 1), (intFindColon2 - (intFindColon1 + 1))))
fltSeconds = CSng(Mid(strTimeStamp, (intFindColon2 + 1)))

'get the Julian date
Convert2JulianDash = Date2Julian(intMonth, intDay, intYear, intHour, intMinute, fltSeconds)
End Function

```

Utility.bas

```

Attribute VB_Name = "Utility"
' FILE: Utility.bas
' Reporting Program for Microsoft TPC-H Kit Ver. 2.7.0-1004
' Copyright Microsoft, 2008
' All Rights Reserved
'
' PURPOSE: Utility functions for TPCHMetrics report generation program
' Contact: Reshma Tharamal (reshmat@microsoft.com)
'
' UPDATED: November 2007
' Contact: Jamie Reding (jamiere@microsoft.com)
' UPDATE: The processing of the RFs was modified in StepMaster and the metrics calculation reflects the change.

```

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
lpstrFileName As String
nMaxFileName 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
        .lStructSize = Len(opfile)
        .Flags = lngFlags
        .lpstrInitialDir = strInitDir
        .lpstrTitle = strDialogTitle
        .lpstrFilter = MakeWindowsFilter(strFilter)
        sFile = strOldFile & String$(MAX_PATH -
Len(strOldFile), 0)
        .lpstrFile = sFile
        .nMaxFile = MAX_PATH
    End With

    If GetOpenFileName(opfile) Then
        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 ShowFileOpenDialog to set these properties
and
    ' display the File Open dialog to the user

On Error GoTo BrowseStpFileErr

BrowseStpFile = ShowFileOpenDialog( _
    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 BrowseLogFile(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 ShowFileOpenDialog to set these properties
and
    ' display the File Open dialog to the user

On Error GoTo BrowseLogFileErr

BrowseLogFile = ShowFileOpenDialog( _
    ms_FILE_OUTPUT_FILTER &
ms_FILE_ALL_FILTER, _
    ms_DLG_TITLE_OPEN, _
    ml_FILE_OUTPUT_FLAGS, _
    strDefaultFile)

Exit Function

BrowseLogFileErr:
    DisplayErrors

```

```

BrowseLogFile = 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 ShowFileOpenDialog 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
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

```

Appendix G: Price Quotations

May 18, 2009

Dell
 Gene Purdy
 1 Dell Way
 Round Rock, TX 78664

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
810-07580	SQL Server 2008 Enterprise x64 Edition Server License with 25 CALs Discount Schedule: Open Program - No Level Unit Price reflects a 39% discount from the retail unit price of \$13,969.	\$8,487	1	\$8,487
359-01912	SQL Server 2008 Client License Client Access License Discount Schedule: Open Program - No Level Unit Price reflects a 4% discount from the retail unit price of \$163.	\$156	25	\$3,900
P72-03195	Windows Server 2008 Enterprise Edition (x64) Server License with 25 CALs Discount Schedule: Open Program - No Level Unit Price reflects a 41% discount from the retail unit price of \$3,999.	\$2,357	1	\$2,357
127-00012	Visual Studio Standard 2005 Full License No Discount Applied	\$250	1	\$250
N/A	Microsoft Problem Resolution Services Professional Support (1 Incident)	\$245	1	\$245

A list of Microsoft's resellers can be found at <http://www.microsoft.com/products/info/render.aspx?view=22&type=mp&content=22/licensing>

All products listed above are currently orderable and available.

Defect support is included in the purchase price. Additional support is available from Microsoft PSS on an incident by incident basis at \$245 per call.

This quote is valid for the next 90 days.

Reference ID: PHgepu09050180000003124.