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

Second Edition

Submitted for Review

August 5, 2009

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

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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.

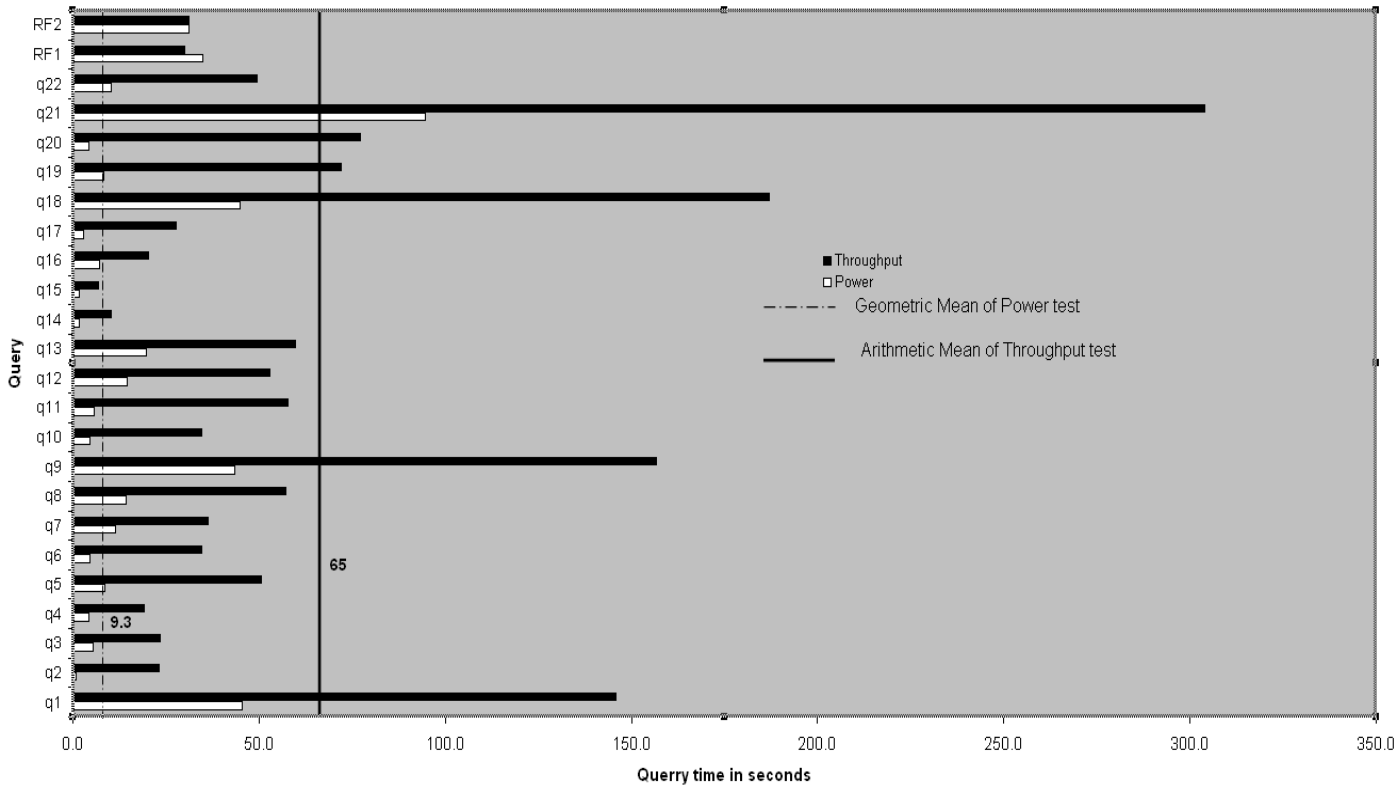
Hardware	Software	Total System Cost
Dell PowerEdge T610 with Dual Intel® Xeon™ X5570 QC 2.93GHz w/ 8M Cache FusionIO ioDrive	**Microsoft Windows Server 2008 Enterprise x64 Edition™ SP1 SQL Server 2008 Enterprise x64 Edition™ SP1**	**$41,998**

TPC-H Power@100GB	TPC-H Throughput@100GB	QphH@100GB	$/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: **August 5, 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: 05-Aug-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	224-4854			$849.00	1	$849.00	$540.00
& 2 Broadcom NICs							
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:**			**$41,998**	**USD**
** All Microsoft maintenance is covered by the maintenance costs of Microsoft SQL Server							
Pricing: NIO = These components are Not Immediately Orderable; 1 = Microsoft, all others are Dell				**QphH@100G**		**28,772.9**	
Pricing may be verified by calling 1-800-BUY-DELL and referencing quote # 489414805							
as a complex quote.							
Audited by Lorna Livingtree, Performance Metrics Inc.				**$ / QphH@100G:**		**$1.46**	**USD**

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

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 (QphH@100GB)	28,772.9
Total System Price Over 3 Years	$41,998
TPC-H Price Performance Metric ($/QphH@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 = SUM (trunc (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 as 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 backuped 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 partion and an NTFS partion for flat file and database backup storage. Volume3 had an additional NTFS partion 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:	**L:**	**D:**		0	**A0-1**			
OS	**DB Logs**	**Backup**		1	**A0-2**			
NTFS	**NTFS**	**NTFS**		2	**A0-3**			
40 GB	**20 GB**	**211 GB**		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

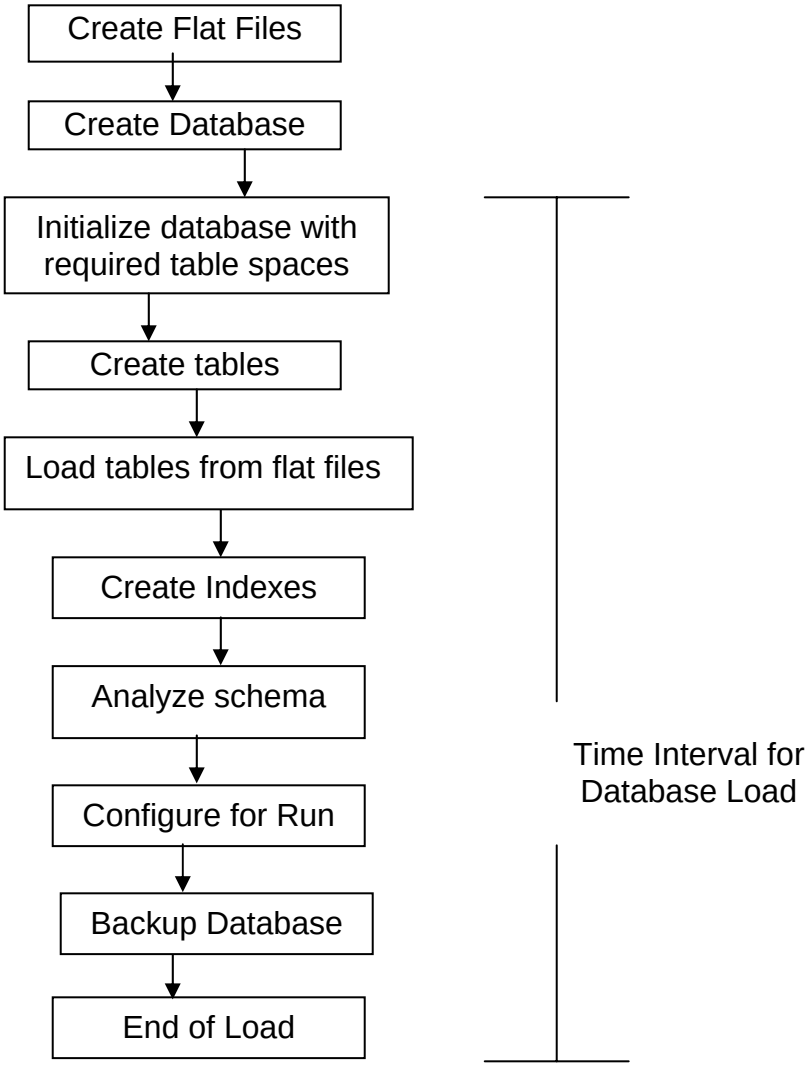
Disk Type	Number of Disks	Space per Disk	Subtotal Disk Space	Total Disk Storage	Data Storage Ratio
80GB	4	74.93GB	6006.6GB	299.72	
73GB 15k	8	67.75GB	542GB	272.96	
				841.72GB	8.4

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,

Lorna Livingtree
Auditor

Appendix A: Tunable Parameters

Server Configuration Parameters

T610 BIOS Configuration:

The Default BIOS setiings were used.

Microsoft Windows 2008 Server Parameters

The default installation of Windows 2008 Enterprise Edition was used with the following changes:

Systems Properties -> Advanced -> Settings -> Performance Options -> Visual Effects -> Adjust for best performance

Administrative Tools -> Local Security Policy -> Local Policies -> User Rights Assignment -> Lock pages in memory -> Add User or Group -> 'Everyone'

Control Panel -> Power Options -> High performance

A TCP/IP address was assigned to the system.

Control Panel -> Windows Firewall -> Turn Windows Firewall on or off -> Off

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	config_value	run_value
access check cache bucket count	0	65536	0	0
access check cache quota	0	2147483647	0	0
Ad Hoc Distributed Queries	0	1	0	0
affinity I/O mask	-2147483648	2147483647	0	0
affinity mask	-2147483648	2147483647	65535	65535
affinity64 I/O mask	-2147483648	2147483647	0	0
affinity64 mask	-2147483648	2147483647	0	0
Agent XPs	0	1	1	1
allow updates	0	1	1	1
awe enabled	0	1	1	1
backup compression default	0	1	0	0
blocked process threshold (s)	0	86400	0	0
c2 audit mode	0	1	0	0
clr enabled	0	1	0	0
common criteria compliance enabled	0	1	0	0
cost threshold for parallelism	0	32767	0	0
cross db ownership chaining	0	1	0	0
cursor threshold	-1	2147483647	-1	-1
Database Mail XPs	0	1	0	0
default full-text language	0	2147483647	1033	1033
default language	0	9999	0	0
default trace enabled	0	1	0	0
disallow results from triggers	0	1	0	0
EKM provider enabled	0	1	0	0
filestream access level	0	2	0	0
fill factor (%)	0	100	0	0
ft crawl bandwidth (max)	0	32767	100	100
ft crawl bandwidth (min)	0	32767	0	0
ft notify bandwidth (max)	0	32767	100	100
ft notify bandwidth (min)	0	32767	0	0
index create memory (KB)	704	2147483647	0	0
in-doubt xact resolution	0	2	0	0
lightweight pooling	0	1	1	1
locks	5000	2147483647	0	0
max degree of parallelism	0	64	0	0
max full-text crawl range	0	256	4	4
max server memory (MB)	16	2147483647	2147483647	2147483647
max text repl size (B)	-1	2147483647	65536	65536
max worker threads	128	32767	3200	3200
media retention	0	365	0	0
min memory per query (KB)	512	2147483647	512	512
min server memory (MB)	0	2147483647	0	0
nested triggers	0	1	1	1

network packet size (B) 512 32767 32767
32767
Ole Automation Procedures 0 1 0 0
open objects 0 2147483647 0 0
optimize for ad hoc workloads 0 1 0 0
PH timeout (s) 1 3600 60 60
precompute rank 0 1 0 0
priority boost 0 1 1 1
query governor cost limit 0 2147483647 0
0
query wait (s) -1 2147483647 -1 -1
recovery interval (min) 0 32767 32767
32767
remote access 0 1 1 1
remote admin connections 0 1 0 0
remote login timeout (s) 0 2147483647 0
0
remote proc trans 0 1 0 0
remote query timeout (s) 0 2147483647 0
0
Replication XPs 0 1 0 0
scan for startup procs 0 1 0 0
server trigger recursion 0 1 1 1
set working set size 0 1 0 0
show advanced options 0 1 1 1
SMO and DMO XPs 0 1 1 1
SQL Mail XPs 0 1 0 0
transform noise words 0 1 0 0
two digit year cutoff 1753 9999 2049
2049
user connections 0 32767 0 0
user options 0 32767 0 0
xp_cmdshell 0 1 0 0

Microsoft SQL Server 2008 Database Options

sp_dboption %DBNAME%, 'trunc. log on chkpt.',true
sp_dboption '%DBNAME%','auto create statistics','OFF'
sp_dboption '%DBNAME%','auto update statistics','OFF'
alter database %DBNAME% set PAGE_VERIFY NONE

Microsoft SQL Server 2008 Node Configuration

No Node configuration changes were made.

Microsoft SQL Server Database Statistics

sp_createstats @fullscan = 'fullscan'

Microsoft StepMaster Parameters

Load Parameters

BCP_ROWS 10000
DBNAME tpch100g
DELETED EXECUTIONS 32
FILES_PER_UPDATE_SET 128
FLAT_FILE_PARALLELISM 8
FLATFILE_DIR_1
D:\mnthead\Fusion1\TPC-H\Flat_File_1
FLATFILE_DIR_1
D:\mnthead\Fusion1\TPC-H\Flat_File_1
FLATFILE_DIR_1
D:\mnthead\Fusion1\TPC-H\Flat_File_1
FLATFILE_DIR_1
D:\mnthead\Fusion1\TPC-H\Flat_File_1
FLATFILE_DIR_1
D:\mnthead\Fusion1\TPC-H\Flat_File_1
FLATFILE_DIR_1
D:\mnthead\Fusion1\TPC-H\Flat_File_1
FLATFILE_DIR_1
D:\mnthead\Fusion1\TPC-H\Flat_File_1
FLATFILE_DIR_1
D:\mnthead\Fusion1\TPC-H\Flat_File_1
INDEX_CREATE_PARALLELISM 16
INSERT_EXECUTIONS 32
KIT_DIR
C:\MSTPCH.2.7.0-1005
MAX_STREAMS 5
MAX_WORKER_THREADS 3200
NUMBER_OF_PROCS 2
QUERY_DIR
%RUN_DIR%\Queries
RF_FLATFILE_DIR
D:\mounthead\Fusion3\TPC-H\RF_Flat_File
RUN_DIR
%KIT_DIR%\run
SCALEFACTOR 100
SERVER T610
SETUP_DIR %KIT_DIR%\Setup
SYSTEM_ARCHITECTURE x64
TABLE_LOAD_PARALLELISM 32
TEMPLATE_DIR
%RUN_DIR%\templates
TOOLS_DIR %KIT_DIR%\tools
TOTAL_LOAD_FILES_PER_TABLE 64
TRACEFLAGS -c -x -E -T 834 -T 2301 -T 2442
UPDATE_SETS 20

VALIDATION_DIR
%SETUP_DIR%\Validation

Run Parameters

BATCH_SIZE 10
BCP_ROWS 10000
DBNAME tpch100g
DELETED EXECUTIONS 32
DELETE_PARALLELISM 32
FILES_PER_UPDATE_SET 128
INSERT_EXECUTIONS 32
INSERT_PARALLELISM 32
KIT_DIR
C:\MSTPCH.2.7.0-1005
MAX_STREAMS 5
QUERY_DIR
%RUN_DIR%\Queries
RF_FLATFILE_DIR
D:\mounthead\Fusion3\TPC-H\RF_Flat_File
RUN_DIR
%KIT_DIR%\run
TABLE_LOAD_PARALLELISM 32
TOOLS_DIR %KIT_DIR%\tools
TPCH_AUTOMATION_PATH
%SETUP_DIR%\CMD_RFs
TPCH_MASTERLOG_NAME
MasterLog.txt
TRACEFLAGS -c -x -E -T 834 -T 2301 -T 2442

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
0x00000D00-0x0000FFFF 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]

Resource	Device	Status
IRQ 81	Microsoft ACPI-Compliant System	OK
IRQ 82	Microsoft ACPI-Compliant System	OK
IRQ 83	Microsoft ACPI-Compliant System	OK
IRQ 84	Microsoft ACPI-Compliant System	OK
IRQ 85	Microsoft ACPI-Compliant System	OK
IRQ 86	Microsoft ACPI-Compliant System	OK
IRQ 87	Microsoft ACPI-Compliant System	OK
IRQ 88	Microsoft ACPI-Compliant System	OK
IRQ 89	Microsoft ACPI-Compliant System	OK
IRQ 90	Microsoft ACPI-Compliant System	OK
IRQ 91	Microsoft ACPI-Compliant System	OK
IRQ 92	Microsoft ACPI-Compliant System	OK
IRQ 93	Microsoft ACPI-Compliant System	OK
IRQ 94	Microsoft ACPI-Compliant System	OK
IRQ 95	Microsoft ACPI-Compliant System	OK
IRQ 96	Microsoft ACPI-Compliant System	OK
IRQ 97	Microsoft ACPI-Compliant System	OK
IRQ 98	Microsoft ACPI-Compliant System	OK
IRQ 99	Microsoft ACPI-Compliant System	OK
IRQ 100	Microsoft ACPI-Compliant System	OK
IRQ 101	Microsoft ACPI-Compliant System	OK
IRQ 102	Microsoft ACPI-Compliant System	OK
IRQ 103	Microsoft ACPI-Compliant System	OK
IRQ 104	Microsoft ACPI-Compliant System	OK
IRQ 105	Microsoft ACPI-Compliant System	OK
IRQ 106	Microsoft ACPI-Compliant System	OK
IRQ 107	Microsoft ACPI-Compliant System	OK
IRQ 108	Microsoft ACPI-Compliant System	OK
IRQ 109	Microsoft ACPI-Compliant System	OK
IRQ 110	Microsoft ACPI-Compliant System	OK
IRQ 111	Microsoft ACPI-Compliant System	OK
IRQ 112	Microsoft ACPI-Compliant System	OK
IRQ 113	Microsoft ACPI-Compliant System	OK
IRQ 114	Microsoft ACPI-Compliant System	OK
IRQ 115	Microsoft ACPI-Compliant System	OK
IRQ 116	Microsoft ACPI-Compliant System	OK
IRQ 117	Microsoft ACPI-Compliant System	OK
IRQ 118	Microsoft ACPI-Compliant System	OK
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IRQ 122	Microsoft ACPI-Compliant System	OK
IRQ 123	Microsoft ACPI-Compliant System	OK
IRQ 124	Microsoft ACPI-Compliant System	OK
IRQ 125	Microsoft ACPI-Compliant System	OK
IRQ 126	Microsoft ACPI-Compliant System	OK
IRQ 127	Microsoft ACPI-Compliant System	OK
IRQ 128	Microsoft ACPI-Compliant System	OK
IRQ 129	Microsoft ACPI-Compliant System	OK
IRQ 130	Microsoft ACPI-Compliant System	OK
IRQ 131	Microsoft ACPI-Compliant System	OK
IRQ 132	Microsoft ACPI-Compliant System	OK
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IRQ 135	Microsoft ACPI-Compliant System	OK
IRQ 136	Microsoft ACPI-Compliant System	OK
IRQ 137	Microsoft ACPI-Compliant System	OK
IRQ 138	Microsoft ACPI-Compliant System	OK
IRQ 139	Microsoft ACPI-Compliant System	OK
IRQ 140	Microsoft ACPI-Compliant System	OK
IRQ 141	Microsoft ACPI-Compliant System	OK
IRQ 142	Microsoft ACPI-Compliant System	OK
IRQ 143	Microsoft ACPI-Compliant System	OK
IRQ 144	Microsoft ACPI-Compliant System	OK
IRQ 145	Microsoft ACPI-Compliant System	OK
IRQ 146	Microsoft ACPI-Compliant System	OK
IRQ 147	Microsoft ACPI-Compliant System	OK
IRQ 148	Microsoft ACPI-Compliant System	OK
IRQ 149	Microsoft ACPI-Compliant System	OK
IRQ 150	Microsoft ACPI-Compliant System	OK
IRQ 151	Microsoft ACPI-Compliant System	OK
IRQ 152	Microsoft ACPI-Compliant System	OK
IRQ 153	Microsoft ACPI-Compliant System	OK
IRQ 154	Microsoft ACPI-Compliant System	OK
IRQ 155	Microsoft ACPI-Compliant System	OK
IRQ 156	Microsoft ACPI-Compliant System	OK
IRQ 157	Microsoft ACPI-Compliant System	OK
IRQ 158	Microsoft ACPI-Compliant System	OK
IRQ 159	Microsoft ACPI-Compliant System	OK
IRQ 160	Microsoft ACPI-Compliant System	OK
IRQ 161	Microsoft ACPI-Compliant System	OK
IRQ 162	Microsoft ACPI-Compliant System	OK
IRQ 163	Microsoft ACPI-Compliant System	OK
IRQ 164	Microsoft ACPI-Compliant System	OK
IRQ 165	Microsoft ACPI-Compliant System	OK
IRQ 166	Microsoft ACPI-Compliant System	OK
IRQ 167	Microsoft ACPI-Compliant System	OK
IRQ 168	Microsoft ACPI-Compliant System	OK
IRQ 169	Microsoft ACPI-Compliant System	OK
IRQ 170	Microsoft ACPI-Compliant System	OK
IRQ 171	Microsoft ACPI-Compliant System	OK
IRQ 172	Microsoft ACPI-Compliant System	OK
IRQ 173	Microsoft ACPI-Compliant System	OK
IRQ 174	Microsoft ACPI-Compliant System	OK

IRQ 175 Microsoft ACPI-Compliant System OK
IRQ 176 Microsoft ACPI-Compliant System OK
IRQ 177 Microsoft ACPI-Compliant System OK
IRQ 178 Microsoft ACPI-Compliant System OK
IRQ 179 Microsoft ACPI-Compliant System OK
IRQ 180 Microsoft ACPI-Compliant System OK
IRQ 181 Microsoft ACPI-Compliant System OK
IRQ 182 Microsoft ACPI-Compliant System OK
IRQ 183 Microsoft ACPI-Compliant System OK
IRQ 184 Microsoft ACPI-Compliant System OK
IRQ 185 Microsoft ACPI-Compliant System OK
IRQ 186 Microsoft ACPI-Compliant System OK
IRQ 187 Microsoft ACPI-Compliant System OK
IRQ 188 Microsoft ACPI-Compliant System OK
IRQ 189 Microsoft ACPI-Compliant System OK
IRQ 190 Microsoft ACPI-Compliant System OK
IRQ 4294967294 Intel(R) 5520/5500/X58 I/O Hub PCI Express Root Port 1 - 3408 OK
IRQ 36 Broadcom BCM5709C NetXtreme II GigE OK
IRQ 48 Broadcom BCM5709C NetXtreme II GigE #2 OK
IRQ 4294967293 Intel(R) 5520/5500/X58 I/O Hub PCI Express Root Port 3 - 340A OK
IRQ 32 Fusion ioDrive OK
IRQ 4294967292 Intel(R) 5520/X58 I/O Hub PCI Express Root Port 4 - 340B OK
IRQ 33 Fusion ioDrive OK
IRQ 4294967291 Intel(R) 5520/X58 I/O Hub PCI Express Root Port 5 - 340C OK
IRQ 34 Fusion ioDrive OK
IRQ 4294967290 Intel(R) 5520/5500/X58 I/O Hub PCI Express Root Port 7 - 340E OK
IRQ 38 Fusion ioDrive OK
IRQ 4294967288 Intel(R) 5520/5500/X58 I/O Hub PCI Express Root Port 9 - 3410 OK
IRQ 4294967289 Intel(R) 5520/5500/X58 I/O Hub PCI Express Root Port 10 - 3411 OK
IRQ 41 DELL PERC 6/i Integrated RAID Controller OK
IRQ 17 Intel(R) ICH9 Family USB Universal Host Controller - 2937 OK
IRQ 18 Intel(R) ICH9 Family USB Universal Host Controller - 2938 OK
IRQ 19 Intel(R) ICH9 Family USB2 Enhanced Host Controller - 293C OK
IRQ 21 Intel(R) ICH9 Family USB Universal Host Controller - 2934 OK
IRQ 21 Intel(R) ICH9 Family USB Universal Host Controller - 2936 OK
IRQ 21 Intel(R) ICH9 Family USB2 Enhanced Host Controller - 293A OK
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
0x80000000-0xFDFFFFFF PCI bus OK
0xFED40000-0xFED44FFF PCI bus OK
0xDA000000-0xDDFFFFFF Intel(R) 5520/5500/X58 I/O Hub PCI Express Root Port 1 - 3408 OK
0xDA000000-0xDDFFFFFF Broadcom BCM5709C NetXtreme II GigE OK
0xDC000000-0xDDFFFFFF Broadcom BCM5709C NetXtreme II GigE #2 OK
0xDF100000-0xDF2FFFFF Intel(R) 5520/5500/X58 I/O Hub PCI Express Root Port 3 - 340A OK
0xDF2F0000-0xDF2FFFFF Fusion ioDrive OK
0xDF300000-0xDF4FFFFF Intel(R) 5520/X58 I/O Hub PCI Express Root Port 4 - 340B OK
0xDF4F0000-0xDF4FFFFF Fusion ioDrive OK
0xDF500000-0xDF6FFFFF Intel(R) 5520/X58 I/O Hub PCI Express Root Port 5 - 340C OK
0xDF6F0000-0xDF6FFFFF Fusion ioDrive OK
0xDF700000-0xDF8FFFFF Intel(R) 5520/5500/X58 I/O Hub PCI Express Root Port 7 - 340E OK
0xDF8F0000-0xDF8FFFFF Fusion ioDrive OK
0xDF900000-0xDF9FFFFF Intel(R) 5520/5500/X58 I/O Hub PCI Express Root Port 10 - 3411 OK
0xDF980000-0xDF9BFFFF DELL PERC 6/i Integrated RAID Controller OK
0xDF9C0000-0xDF9FFFFF DELL PERC 6/i Integrated RAID Controller OK
0xDF0FF800-0xDF0FFBFF Intel(R) ICH9 Family USB2 Enhanced Host Controller - 293C OK
0xDF0FFC00-0xDF0FFFFF Intel(R) ICH9 Family USB2 Enhanced Host Controller - 293A OK
0xDE000000-0xDEFFFFFF Intel(R) 82801 PCI Bridge - 244E OK
0xD9800000-0xD9FFFFFF Intel(R) 82801 PCI Bridge - 244E OK
0xD9800000-0xD9FFFFFF Standard VGA Graphics Adapter OK
0xDE7FC000-0xDE7FFFFF Standard VGA Graphics Adapter OK
0xDE800000-0xDEFFFFFF Standard VGA Graphics Adapter OK
0xE0000000-0xEFFFFFFF 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\msrle32.dll Microsoft Corporation
OK C:\Windows\system32\MSRLE32.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

[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 0xA0000-0xBFFFF
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_SSTPMINIPORT\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_L2TPMINIPORT\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_PPTPMINIPORT\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_PPPOEMINIPORT\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\raspppoe.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 Tcpip [TCP/IP]
Connectionless Service No
Guarantees Delivery Yes
Guarantees Sequencing Yes
Maximum Address Size 16 bytes
Maximum Message Size 0 bytes
Message Oriented No
Minimum Address Size 16 bytes
Pseudo Stream Oriented No
Supports Broadcasting No
Supports Connect Data No
Supports Disconnect Data No
Supports Encryption No
Supports Expedited Data Yes
Supports Graceful Closing Yes
Supports Guaranteed Bandwidth No
Supports Multicasting No

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

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

Supports Multicasting No

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

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

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

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

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

[WinSock]

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

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

[Ports]

[Serial]

Item Value
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 PCIIDE\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 PCIIDE\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

[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
Accept Stop
acpi Microsoft ACPI Driver
c:\windows\system32\drivers\acpi.sys Kernel Driver
Yes Boot Running OK Critical No
Yes
adp94xx adp94xx c:\windows\system32\drivers\adp94xx.sys Kernel
Driver No Disabled Stopped OK Normal No
No
adpahci adpahci c:\windows\system32\drivers\adpahci.sys Kernel
Driver No Disabled Stopped OK Normal No
No
adpu160m adpu160m c:\windows\system32\drivers\adpu160m.sys Kernel
Driver No Disabled Stopped OK Normal No
No
adpu320 adpu320 c:\windows\system32\drivers\adpu320.sys Kernel
Driver No Disabled Stopped OK Normal No
No
afd Ancilliary Function Driver for Winsock
c:\windows\system32\drivers\afd.sys Kernel Driver
Yes System Running OK Normal No
Yes
agp440 Intel AGP Bus Filter c:\windows\system32\drivers\agp440.sys
Kernel Driver No Manual Stopped OK
Normal No No
aic78xx aic78xx c:\windows\system32\drivers\djsvs.sys Kernel
Driver No Disabled Stopped OK Normal No
No
aliide aliide c:\windows\system32\drivers\aliide.sys Kernel
Driver No Disabled Stopped OK Critical No
No
amdide amdide c:\windows\system32\drivers\amdide.sys Kernel
Driver No Disabled Stopped OK Critical No
No
amdk8 AMD K8 Processor Driver
c:\windows\system32\drivers\amdk8.sys Kernel Driver
No Disabled Stopped OK Normal No
No
arc arc c:\windows\system32\drivers\arc.sys Kernel
Driver No Disabled Stopped OK Normal No
No
arcsas arcsas c:\windows\system32\drivers\arcsas.sys Kernel
Driver No Disabled Stopped OK Normal No
No
asyncmac RAS Asynchronous Media Driver
c:\windows\system32\drivers\asyncmac.sys Kernel Driver
No Manual Stopped OK Normal No
No
atapi IDE Channel c:\windows\system32\drivers\atapi.sys
Kernel Driver Yes Boot Running OK
Critical No Yes
b06bdrv Broadcom NetXtreme II VBD
c:\windows\system32\drivers\bxvbda.sys Kernel Driver
Yes Boot Running OK Normal No
Yes
blbdrive blbdrive c:\windows\system32\drivers\blbdrive.sys Kernel
Driver No Disabled Stopped OK Normal No
No
blfp Broadcom Advanced Server Program Driver
c:\windows\system32\drivers\basp.sys Kernel Driver
No Manual Stopped OK Normal No
No
bowser Bowser c:\windows\system32\drivers\bowser.sys File
System Driver Yes Manual Running OK Normal
No Yes
brfiltlo Brother USB Mass-Storage Lower Filter Driver
c:\windows\system32\drivers\brfiltlo.sys Kernel Driver
No Manual Stopped OK Normal No
No
brfiltup Brother USB Mass-Storage Upper Filter Driver
c:\windows\system32\drivers\brfiltup.sys Kernel Driver
No Manual Stopped OK Normal No
No
brserid Brother MFC Serial Port Interface Driver (WDM)
c:\windows\system32\drivers\brserid.sys Kernel Driver
No Disabled Stopped OK Normal No
No
brserwdm Brother WDM Serial driver
c:\windows\system32\drivers\brserwdm.sys Kernel Driver
No Disabled Stopped OK Normal No
No
brusbmdm Brother MFC USB Fax Only Modem
c:\windows\system32\drivers\brusbmdm.sys Kernel Driver
No Disabled Stopped OK Normal No
No
brusbser Brother MFC USB Serial WDM Driver
c:\windows\system32\drivers\brusbser.sys Kernel Driver
No Manual Stopped OK Normal No
No
cdfs CD/DVD File System Reader
c:\windows\system32\drivers\cdfs.sys File System Driver
Yes Disabled Running OK Normal No
Yes
cdrom CD-ROM Driver c:\windows\system32\drivers\cdrom.sys
Kernel Driver Yes System Running OK
Normal No Yes
circlass Consumer IR Devices c:\windows\system32\drivers\circlass.sys
Kernel Driver No Disabled Stopped OK
Normal No No
clfs Common Log (CLFS) c:\windows\system32\clfs.sys Kernel
Driver Yes Boot Running OK Critical No
Yes
cmdide cmdide c:\windows\system32\drivers\cmdide.sys Kernel
Driver No Disabled Stopped OK Critical No
No
compbatt Microsoft Composite Battery Driver
c:\windows\system32\drivers\compbatt.sys Kernel Driver
No Disabled Stopped OK Critical No
No
crcdisk Crcdisk Filter Driver c:\windows\system32\drivers\crcdisk.sys
Kernel Driver Yes Boot Running OK
Normal No Yes
csc Offline Files Driver c:\windows\system32\drivers\csc.sys
Kernel Driver No Disabled Stopped OK
Normal No No
dfsc DFS Namespace Client Driver
c:\windows\system32\drivers\dfsc.sys File System Driver

Yes System Running OK Normal No
Yes
disk Disk Driver c:\windows\system32\drivers\disk.sys
Kernel Driver Yes Boot Running OK
Normal No Yes
dxgkrnl LDDM Graphics Subsystem
c:\windows\system32\drivers\dxgkrnl.sys Kernel Driver
No Manual Stopped OK Ignore No
No
e1g60 Intel(R) PRO/1000 NDIS 6 Adapter Driver
c:\windows\system32\drivers\e1g6032e.sys Kernel Driver
No Manual Stopped OK Normal No
No
elxstor elxstor c:\windows\system32\drivers\elxstor.sys Kernel
Driver No Disabled Stopped OK Normal No
No
errdev Microsoft Hardware Error Device Driver
c:\windows\system32\drivers\errdev.sys Kernel Driver
Yes Manual Running OK Normal No
Yes
exfat exFAT File System Driver
c:\windows\system32\drivers\exfat.sys File System Driver
No Manual Stopped OK Normal No
No
fastfat FAT12/16/32 File System Driver
c:\windows\system32\drivers\fastfat.sys File System Driver
No Manual Stopped OK Normal No
No
fdc Floppy Disk Controller Driver
c:\windows\system32\drivers\fdc.sys Kernel Driver
No Disabled Stopped OK Normal No
No
fileinfo File Information FS MiniFilter
c:\windows\system32\drivers\fileinfo.sys File System Driver
No Manual Stopped OK Normal No
No
filetrace FileTrace c:\windows\system32\drivers\filetrace.sys File
System Driver No Manual Stopped OK Normal
No No
fiodrive Fusion ioDrive Device Driver
c:\windows\system32\drivers\fiodrive.sys Kernel Driver
Yes Boot Running OK Normal No
Yes
flpydisk Floppy Disk Driver c:\windows\system32\drivers\flpydisk.sys
Kernel Driver No Disabled Stopped OK
Normal No No
fltmgr FltMgr c:\windows\system32\drivers\fltmgr.sys File
System Driver Yes Boot Running OK Critical
No Yes
gagp30kx Microsoft Generic AGPv3.0 Filter for K8 Processor Platforms
c:\windows\system32\drivers\gagp30kx.sys Kernel Driver
No Manual Stopped OK Normal No
No
hdaudbus Microsoft UAA Bus Driver for High Definition Audio
c:\windows\system32\drivers\hdaudbus.sys Kernel Driver
No Disabled Stopped OK Normal No
No
hidbth Microsoft Bluetooth HID Miniport
c:\windows\system32\drivers\hidbth.sys Kernel Driver
No Disabled Stopped OK Ignore No
No
hidir Microsoft Infrared HID Driver
c:\windows\system32\drivers\hidir.sys Kernel Driver
No Disabled Stopped OK Ignore No
No
hidusb Microsoft HID Class Driver
c:\windows\system32\drivers\hidusb.sys Kernel Driver
Yes Manual Running OK Ignore No
Yes
hpcisss HpCISSs c:\windows\system32\drivers\hpcisss.sys Kernel
Driver No Disabled Stopped OK Normal No
No
http HTTP c:\windows\system32\drivers\http.sys Kernel
Driver Yes Manual Running OK Normal No
Yes
i2omp i2omp c:\windows\system32\drivers\i2omp.sys Kernel
Driver No Disabled Stopped OK Normal No
No
i8042prt i8042 Keyboard and PS/2 Mouse Port Driver
c:\windows\system32\drivers\i8042prt.sys Kernel Driver
No Disabled Stopped OK Normal No
No
iastorv Intel RAID Controller Vista
c:\windows\system32\drivers\iastorv.sys Kernel Driver
No Disabled Stopped OK Normal No
No
iirsp iirsp c:\windows\system32\drivers\iirsp.sys Kernel
Driver No Disabled Stopped OK Normal No
No
intelide intelide c:\windows\system32\drivers\intelide.sys Kernel
Driver No Disabled Stopped OK Critical No
No
intelppm Intel Processor Driver c:\windows\system32\drivers\intelppm.sys
Kernel Driver Yes Manual Running OK
Normal No Yes
ioatdma Intel(R) QuickData Technology Device
c:\windows\system32\drivers\qd260x64.sys Kernel Driver
No Disabled Stopped OK Normal No
No
ipfilterdriver IP Traffic Filter Driver
c:\windows\system32\drivers\ipfltdrv.sys Kernel Driver
No Manual Stopped OK Normal No
No
ipmidrv IPMIDRV c:\windows\system32\drivers\ipmidrv.sys Kernel
Driver Yes Manual Running OK Normal No
Yes
ipnat IP Network Address Translator
c:\windows\system32\drivers\ipnat.sys Kernel Driver
No Manual Stopped OK Normal No
No
irenum IR Bus Enumerator c:\windows\system32\drivers\irenum.sys
Kernel Driver No Manual Stopped OK
Ignore No No
isapnp PnP ISA/EISA Bus Driver
c:\windows\system32\drivers\isapnp.sys Kernel Driver
No Disabled Stopped OK Critical No
No
iscsiprt iSCsiPort Driver c:\windows\system32\drivers\msiscsi.sys
Kernel Driver Yes Manual Running OK
Normal No Yes
iteatapi ITEATAPI_Service_Install
c:\windows\system32\drivers\iteatapi.sys Kernel Driver
No Disabled Stopped OK Normal No
No
iteraid ITERAID_Service_Install
c:\windows\system32\drivers\iteraid.sys Kernel Driver
No Disabled Stopped OK Normal No
No
kbdclass Keyboard Class Driver
c:\windows\system32\drivers\kbdclass.sys Kernel Driver
Yes System Running OK Normal No
Yes
kbdhid Keyboard HID Driver c:\windows\system32\drivers\kbdhid.sys
Kernel Driver Yes System Running OK
Ignore No Yes
ksecdd KSecDD c:\windows\system32\drivers\ksecdd.sys Kernel
Driver Yes Boot Running OK Critical No
Yes
ksthunk Kernel Streaming Thunks
c:\windows\system32\drivers\ksthunk.sys Kernel Driver
No Manual Stopped OK Normal No
No
l2nd Broadcom NetXtreme II BXND
c:\windows\system32\drivers\bxnd60a.sys Kernel Driver

Yes Manual Running OK Normal No
Yes
lltdio Link-Layer Topology Discovery Mapper I/O Driver
c:\windows\system32\drivers\lltdio.sys Kernel Driver
Yes Auto Running OK Normal No
Yes
lsi_fc LSI_FC c:\windows\system32\drivers\lsi_fc.sys Kernel
Driver No Disabled Stopped OK Normal No
No
lsi_sas LSI_SAS c:\windows\system32\drivers\lsi_sas.sys Kernel
Driver No Disabled Stopped OK Normal No
No
lsi_scsi LSI_SCSI c:\windows\system32\drivers\lsi_scsi.sys Kernel
Driver No Disabled Stopped OK Normal No
No
luafv UAC File Virtualization
c:\windows\system32\drivers\luafv.sys File System Driver
Yes Auto Running OK Normal No
Yes
megasas megasas c:\windows\system32\drivers\megasas.sys Kernel
Driver Yes Boot Running OK Normal No
Yes
megasr MegaSR c:\windows\system32\drivers\megasr.sys Kernel
Driver No Disabled Stopped OK Normal No
No
modem Modem c:\windows\system32\drivers\modem.sys Kernel
Driver No Manual Stopped OK Ignore No
No
monitor Microsoft Monitor Class Function Driver Service
c:\windows\system32\drivers\monitor.sys Kernel Driver
Yes Manual Running OK Normal No
Yes
mouclass Mouse Class Driver c:\windows\system32\drivers\mouclass.sys
Kernel Driver Yes System Running OK
Normal No Yes
mouhid Mouse HID Driver c:\windows\system32\drivers\mouhid.sys
Kernel Driver Yes Manual Running OK
Ignore No Yes
mountmgr Mount Point Manager c:\windows\system32\drivers\mountmgr.sys
Kernel Driver Yes Boot Running OK
Critical No Yes
mpio Microsoft Multi-Path Bus Driver
c:\windows\system32\drivers\mpio.sys Kernel Driver
No Disabled Stopped OK Normal No
No
mpsdrv Windows Firewall Authorization Driver
c:\windows\system32\drivers\mpsdrv.sys Kernel Driver
Yes Manual Running OK Normal No
Yes
mraid35x Mraid35x c:\windows\system32\drivers\mraid35x.sys Kernel
Driver No Disabled Stopped OK Normal No
No
mrxsmb SMB MiniRedirector Wrapper and Engine
c:\windows\system32\drivers\mrxsmb.sys File System Driver
Yes Manual Running OK Normal No
Yes
mrxsmb10 SMB 1.x MiniRedirector
c:\windows\system32\drivers\mrxsmb10.sys File System Driver
Yes Manual Running OK Normal No
Yes
mrxsmb20 SMB 2.0 MiniRedirector
c:\windows\system32\drivers\mrxsmb20.sys File System Driver
Yes Manual Running OK Normal No
Yes
msahci msahci c:\windows\system32\drivers\msahci.sys Kernel
Driver No Disabled Stopped OK Critical No
No
msdsm Microsoft Multi-Path Device Specific Module
c:\windows\system32\drivers\msdsm.sys Kernel Driver
No Disabled Stopped OK Normal No
No
msfs Msfs c:\windows\system32\drivers\msfs.sys File
System Driver Yes System Running OK Normal
No Yes
msisadrv ISA/EISA Class Driver
c:\windows\system32\drivers\msisadrv.sys Kernel Driver
Yes Boot Running OK Critical No
Yes
msrpc MsRPC c:\windows\system32\drivers\msrpc.sys Kernel
Driver No Manual Stopped OK Normal No
No
mssmbios Microsoft System Management BIOS Driver
c:\windows\system32\drivers\mssmbios.sys Kernel Driver
Yes Manual Running OK Normal No
Yes
mup Mup c:\windows\system32\drivers\mup.sys File
System Driver Yes Boot Running OK Normal
No Yes
ndis NDIS System Driver c:\windows\system32\drivers\ndis.sys
Kernel Driver Yes Boot Running OK
Critical No Yes
ndistapi Remote Access NDIS TAPI Driver
c:\windows\system32\drivers\ndistapi.sys Kernel Driver
Yes Manual Running OK Normal No
Yes
ndisuio NDIS Usermode I/O Protocol
c:\windows\system32\drivers\ndisuio.sys Kernel Driver
No Manual Stopped OK Normal No
No
ndiswan Remote Access NDIS WAN Driver
c:\windows\system32\drivers\ndiswan.sys Kernel Driver
Yes Manual Running OK Normal No
Yes
ndproxy NDIS Proxy c:\windows\system32\drivers\ndproxy.sys
Kernel Driver Yes Manual Running OK
Normal No Yes
netbios NetBIOS Interface c:\windows\system32\drivers\netbios.sys
File System Driver Yes System Running OK
Normal No Yes
netbt NETBT c:\windows\system32\drivers\netbt.sys Kernel
Driver Yes System Running OK Normal No
Yes
nfrd960 nfrd960 c:\windows\system32\drivers\nfrd960.sys Kernel
Driver No Disabled Stopped OK Normal No
No
npfs Npfs c:\windows\system32\drivers\npfs.sys File
System Driver Yes System Running OK Normal
No Yes
nsiproxy NSI proxy service c:\windows\system32\drivers\nsiproxy.sys
Kernel Driver Yes System Running OK
Normal No Yes
ntfs Ntfs c:\windows\system32\drivers\ntfs.sys File
System Driver Yes Manual Running OK Normal
No Yes
null Null c:\windows\system32\drivers\null.sys Kernel
Driver Yes System Running OK Normal No
Yes
nvraid NVIDIA nForce RAID Driver
c:\windows\system32\drivers\nvraid.sys Kernel Driver
No Disabled Stopped OK Normal No
No
nvstor nvstor c:\windows\system32\drivers\nvstor.sys Kernel
Driver No Disabled Stopped OK Critical No
No
nv_agp NVIDIA nForce AGP Bus Filter
c:\windows\system32\drivers\nv_agp.sys Kernel Driver
No Manual Stopped OK Normal No
No
ohci1394 NEC FireWarden OHCI Compliant IEEE 1394 Host Controller
c:\windows\system32\drivers\ohci1394.sys Kernel Driver
No Disabled Stopped OK Normal No
No

parport Parallel port driver c:\windows\system32\drivers\parport.sys
Kernel Driver No Disabled Stopped OK
Normal No No
partmgr Partition Manager c:\windows\system32\drivers\partmgr.sys
Kernel Driver Yes Boot Running OK
Critical No Yes
pci PCI Bus Driver c:\windows\system32\drivers\pci.sys
Kernel Driver Yes Boot Running OK
Critical No Yes
pciide pciide c:\windows\system32\drivers\pciide.sys Kernel
Driver Yes Boot Running OK Critical No
Yes
pcmcia pcmcia c:\windows\system32\drivers\pcmcia.sys Kernel
Driver No Disabled Stopped OK Normal No
No
peauth PEAUTH c:\windows\system32\drivers\peauth.sys Kernel
Driver Yes Auto Running OK Normal No
Yes
pptpminiport WAN Miniport (PPTP)
c:\windows\system32\drivers\raspptp.sys Kernel Driver
Yes Manual Running OK Normal No
Yes
processor Processor Driver c:\windows\system32\drivers\processr.sys
Kernel Driver No Disabled Stopped OK
Normal No No
psched QoS Packet Scheduler c:\windows\system32\drivers\pacer.sys
Kernel Driver Yes System Running OK
Normal No Yes
ql2300 QLogic Fibre Channel Miniport Driver
c:\windows\system32\drivers\ql2300.sys Kernel Driver
No Disabled Stopped OK Normal No
No
ql40xx QLogic iSCSI Miniport Driver
c:\windows\system32\drivers\ql40xx.sys Kernel Driver
No Disabled Stopped OK Normal No
No
rasacd Remote Access Auto Connection Driver
c:\windows\system32\drivers\rasacd.sys Kernel Driver
Yes System Running OK Normal No
Yes
rasl2tp WAN Miniport (L2TP)
c:\windows\system32\drivers\rasl2tp.sys Kernel Driver
Yes Manual Running OK Normal No
Yes
raspppoe Remote Access PPPOE Driver
c:\windows\system32\drivers\raspppoe.sys Kernel Driver
Yes Manual Running OK Normal No
Yes
rassstp WAN Miniport (SSTP)
c:\windows\system32\drivers\rassstp.sys Kernel Driver
Yes Manual Running OK Normal No
Yes
rdbss Redirected Buffering Sub Sysytem
c:\windows\system32\drivers\rdbss.sys File System Driver
Yes System Running OK Normal No
Yes
rdpcdd RDPCDD c:\windows\system32\drivers\rdpcdd.sys Kernel
Driver Yes System Running OK Ignore No
Yes
rdpdr Terminal Server Device Redirector Driver
c:\windows\system32\drivers\rdpdr.sys Kernel Driver
Yes Manual Running OK Normal No
Yes
rdpencdd RDP Encoder Mirror Driver
c:\windows\system32\drivers\rdpencdd.sys Kernel Driver
Yes System Running OK Ignore No
Yes
rdpwd RDP Winstation Driver
c:\windows\system32\drivers\rdpwd.sys Kernel Driver
Yes Manual Running OK Ignore No
Yes
rsfx0102 RsFx0102 Driver c:\windows\system32\drivers\rsfx0102.sys
File System Driver No Disabled Stopped OK
Normal No No
rspndr Link-Layer Topology Discovery Responder
c:\windows\system32\drivers\rspndr.sys Kernel Driver
Yes Auto Running OK Normal No
Yes
s3cap Microsoft Emulated S3 Device Cap Driver
c:\windows\system32\drivers\s3cap.sys Kernel Driver
No Disabled Stopped OK Normal No
No
sacdrv sacdrv c:\windows\system32\drivers\sacdrv.sys Kernel
Driver No Boot Stopped OK Ignore No
No
sbp2port SBP-2 Transport/Protocol Bus Driver
c:\windows\system32\drivers\sbp2port.sys Kernel Driver
No Disabled Stopped OK Normal No
No
secdrv Security Driver c:\windows\system32\drivers\secdrv.sys
Kernel Driver Yes Auto Running OK
Normal No Yes
serenum Serenum Filter Driver c:\windows\system32\drivers\serenum.sys
Kernel Driver Yes Manual Running OK
Normal No Yes
serial Serial port driver c:\windows\system32\drivers\serial.sys
Kernel Driver Yes System Running OK
Ignore No Yes
sermouse Serial Mouse Driver c:\windows\system32\drivers\sermouse.sys
Kernel Driver No Disabled Stopped OK
Normal No No
sffdisk SFF Storage Class Driver
c:\windows\system32\drivers\sffdisk.sys Kernel Driver
No Disabled Stopped OK Normal No
No
sffp_mmc SFF Storage Protocol Driver for MMC
c:\windows\system32\drivers\sffp_mmc.sys Kernel Driver
No Manual Stopped OK Normal No
No
sffp_sd SFF Storage Protocol Driver for SDBus
c:\windows\system32\drivers\sffp_sd.sys Kernel Driver
No Manual Stopped OK Normal No
No
sfloppy High-Capacity Floppy Disk Drive
c:\windows\system32\drivers\sfloppy.sys Kernel Driver
No Disabled Stopped OK Normal No
No
sisraid2 SiSRaid2 c:\windows\system32\drivers\sisraid2.sys Kernel
Driver No Disabled Stopped OK Normal No
No
sisraid4 SiSRaid4 c:\windows\system32\drivers\sisraid4.sys Kernel
Driver No Disabled Stopped OK Normal No
No
smb Message-oriented TCP/IP and TCP/IPv6 Protocol (SMB session)
c:\windows\system32\drivers\smb.sys Kernel Driver
Yes System Running OK Normal No
Yes
spldr Security Processor Loader Driver
c:\windows\system32\drivers\spldr.sys Kernel Driver
Yes Boot Running OK Critical No
Yes
srv srv c:\windows\system32\drivers\srv.sys File
System Driver Yes Manual Running OK Normal
No Yes
srv2 srv2 c:\windows\system32\drivers\srv2.sys File
System Driver Yes Manual Running OK Normal
No Yes
srvnet srvnet c:\windows\system32\drivers\srvnet.sys File
System Driver Yes Manual Running OK Normal
No Yes
storflt Disk VMBUS Acceleration Filter Driver
c:\windows\system32\drivers\storflt.sys Kernel Driver
Yes Boot Running OK Normal No
Yes

storvsc storvsc c:\windows\system32\drivers\storvsc.sys Kernel Driver No Disabled Stopped OK Normal No No

storvsp Microsoft Virtual Disk Server Driver c:\windows\system32\drivers\storvsp.sys Kernel Driver No Disabled Stopped OK Normal No No

swenum Software Bus Driver c:\windows\system32\drivers\swenum.sys Kernel Driver Yes Manual Running OK Normal No Yes

symc8xx Symc8xx c:\windows\system32\drivers\symc8xx.sys Kernel Driver No Disabled Stopped OK Normal No No

sym_hi Sym_hi c:\windows\system32\drivers\sym_hi.sys Kernel Driver No Disabled Stopped OK Normal No No

sym_u3 Sym_u3 c:\windows\system32\drivers\sym_u3.sys Kernel Driver No Disabled Stopped OK Normal No No

tcpip TCP/IP Protocol Driver c:\windows\system32\drivers\tcpip.sys Kernel Driver Yes Boot Running OK Normal No Yes

tcpip6 Microsoft IPv6 Protocol Driver c:\windows\system32\drivers\tcpip.sys Kernel Driver No Manual Stopped OK Normal No No

tcpipreg TCP/IP Registry Compatibility c:\windows\system32\drivers\tcpipreg.sys Kernel Driver Yes Auto Running OK Normal No Yes

tdpipe TDPIPE c:\windows\system32\drivers\tdpipe.sys Kernel Driver No Manual Stopped OK Normal No No

tdtcp TDTCP c:\windows\system32\drivers\tdtcp.sys Kernel Driver Yes Manual Running OK Normal No Yes

tdx NetIO Legacy TDI Support Driver c:\windows\system32\drivers\tdx.sys Kernel Driver Yes System Running OK Normal No Yes

termdd Terminal Device Driver c:\windows\system32\drivers\termdd.sys Kernel Driver Yes System Running OK Normal No Yes

tssecsrv Terminal Services Security Filter Driver c:\windows\system32\drivers\tssecsrv.sys Kernel Driver Yes Manual Running OK Ignore No Yes

tunnel Microsoft IPv6 Tunnel Miniport Adapter Driver c:\windows\system32\drivers\tunnel.sys Kernel Driver Yes Manual Running OK Normal No Yes

uagp35 Microsoft AGPv3.5 Filter c:\windows\system32\drivers\uagp35.sys Kernel Driver No Manual Stopped OK Normal No No

udfs udfs c:\windows\system32\drivers\udfs.sys File System Driver No Disabled Stopped OK Normal No No

uliagpkx Uli AGP Bus Filter c:\windows\system32\drivers\uliagpkx.sys Kernel Driver No Manual Stopped OK Normal No No

uliahci uliahci c:\windows\system32\drivers\uliahci.sys Kernel Driver No Disabled Stopped OK Normal No No

ulsata UlSata c:\windows\system32\drivers\ulsata.sys Kernel Driver No Disabled Stopped OK Normal No No

ulsata2 ulsata2 c:\windows\system32\drivers\ulsata2.sys Kernel Driver No Disabled Stopped OK Normal No No

umbus UMBus Enumerator Driver c:\windows\system32\drivers\umbus.sys Kernel Driver Yes Manual Running OK Normal No Yes

umpass Microsoft UMPass Driver c:\windows\system32\drivers\umpass.sys Kernel Driver No Disabled Stopped OK Normal No No

usbccgp Microsoft USB Generic Parent Driver c:\windows\system32\drivers\usbccgp.sys Kernel Driver Yes Manual Running OK Normal No Yes

usbcir eHome Infrared Receiver (USBCIR) c:\windows\system32\drivers\usbcir.sys Kernel Driver No Disabled Stopped OK Normal No No

usbehci Microsoft USB 2.0 Enhanced Host Controller Miniport Driver c:\windows\system32\drivers\usbehci.sys Kernel Driver Yes Manual Running OK Normal No Yes

usbhub Microsoft USB Standard Hub Driver c:\windows\system32\drivers\usbhub.sys Kernel Driver Yes Manual Running OK Normal No Yes

usbohci Microsoft USB Open Host Controller Miniport Driver c:\windows\system32\drivers\usbohci.sys Kernel Driver 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

volmgr Volume Manager Driver c:\windows\system32\drivers\volmgr.sys Kernel Driver Yes Boot Running OK Critical No Yes

volmgrx Dynamic Volume Manager c:\windows\system32\drivers\volmgrx.sys Kernel Driver Yes Boot Running OK Critical No Yes

volsnap Storage volumes c:\windows\system32\drivers\volsnap.sys Kernel Driver Yes Boot Running OK Critical No Yes

vsmraid vsmraid c:\windows\system32\drivers\vsmraid.sys Kernel Driver No Disabled Stopped OK Normal No No

wacompen Wacom Serial Pen HID Driver c:\windows\system32\drivers\wacompen.sys Kernel Driver

No Disabled Stopped OK Normal No
No
wanarp Remote Access IP ARP Driver
c:\windows\system32\drivers\wanarp.sys Kernel Driver
No Manual Stopped OK Normal No
No
wanarpv6 Remote Access IPv6 ARP Driver
c:\windows\system32\drivers\wanarp.sys Kernel Driver
Yes System Running OK Normal No
Yes
wd Microsoft Watchdog Timer Driver
c:\windows\system32\drivers\wd.sys Kernel Driver
No Disabled Stopped OK Normal No
No
wdf01000 Kernel Mode Driver Frameworks service
c:\windows\system32\drivers\wdf01000.sys Kernel Driver
Yes Boot Running OK Normal No
Yes
wmiacpi Microsoft Windows Management Interface for ACPI
c:\windows\system32\drivers\wmiacpi.sys Kernel Driver
No Disabled Stopped OK Normal No
No
ws2ifsl Winsock IFS driver c:\windows\system32\drivers\ws2ifsl.sys
Kernel Driver No Disabled Stopped OK
Normal No No

[Signed Drivers]

Device Name Signed Device Class Driver Version
Driver Date Manufacturer INF Name Driver
Name Device ID
Generic volume Yes VOLUME 6.0.6001.18000 6/21/2006
Microsoft volume.inf Not Available
STORAGE\VOLUME\1&19F7E59C&0&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
OFFSET100000LENGTH12BB800000
Volume Manager Yes SYSTEM 6.0.6001.18000 6/21/2006
(Standard system devices) machine.inf Not
Available ROOT\VOLMGR\0000
UMBus Enumerator Yes SYSTEM 6.0.6001.18000 6/21/2006
Microsoft umbus.inf Not Available
UMB\UMB\1&841921D&0&TSBUS
UMBus Root Bus Enumerator Yes SYSTEM 6.0.6001.18000
6/21/2006 Microsoft umbus.inf Not Available
ROOT\UMBUS\0000
Microsoft System Management BIOS Driver Yes SYSTEM
6.0.6001.18000 6/21/2006 (Standard system devices)
machine.inf Not Available
ROOT\SYSTEM\0002
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
ROOT\LEGACY_WANARPV6\0000
Storage volumes Not Available LEGACYDRIVER Not
Available Not Available Not Available Not Available
Not Available ROOT\LEGACY_VOLSNAP\0000
Dynamic Volume Manager Not Available LEGACYDRIVER
Not Available Not Available Not Available
Not Available Not Available
ROOT\LEGACY_VOLMGRX\0000
VgaSave Not Available LEGACYDRIVER Not Available
Not Available Not Available Not Available
Not Available ROOT\LEGACY_VGASAVE\0000
Terminal Services Security Filter Driver Not Available
LEGACYDRIVER Not Available Not Available
Not Available Not Available Not Available
ROOT\LEGACY_TSSECSRV\0000
NetIO Legacy TDI Support Driver Not Available
LEGACYDRIVER Not Available Not Available
Not Available Not Available Not Available
ROOT\LEGACY_TDX\0000
TDTCP Not Available LEGACYDRIVER Not Available
Not Available Not Available Not Available
Not Available ROOT\LEGACY_TDTCP\0000
TCP/IP Registry Compatibility Not Available LEGACYDRIVER
Not Available Not Available Not Available
Not Available Not Available
ROOT\LEGACY_TCPIPREG\0000
TCP/IP Protocol Driver Not Available LEGACYDRIVER
Not Available Not Available Not Available
Not Available Not Available
ROOT\LEGACY_TCPIP\0000

Disk VMBUS Acceleration Filter Driver Not Available
LEGACYDRIVER Not Available Not Available
Not Available Not Available Not Available
ROOT\LEGACY_STORFLT\0000
Security Processor Loader Driver Not Available LEGACYDRIVER
Not Available Not Available Not Available
Not Available Not Available
ROOT\LEGACY_SPLDR\0000
Message-oriented TCP/IP and TCP/IPv6 Protocol (SMB session) Not
Available LEGACYDRIVER Not Available Not Available
Not Available Not Available Not Available
ROOT\LEGACY_SMB\0000
Security Driver Not Available LEGACYDRIVER Not
Available Not Available Not Available Not Available
Not Available ROOT\LEGACY_SECDRV\0000
Link-Layer Topology Discovery Responder Not Available
LEGACYDRIVER Not Available Not Available
Not Available Not Available Not Available
ROOT\LEGACY_RSPNDR\0000
RDP Winstation Driver Not Available LEGACYDRIVER
Not Available Not Available Not Available
Not Available Not Available
ROOT\LEGACY_RDPWD\0000
RDP Encoder Mirror Driver Not Available LEGACYDRIVER
Not Available Not Available Not Available
Not Available Not Available
ROOT\LEGACY_RDPENCDD\0000
RDPCDD Not Available LEGACYDRIVER Not Available
Not Available Not Available Not Available
Not Available ROOT\LEGACY_RDPCDD\0000
Remote Access Auto Connection Driver Not Available
LEGACYDRIVER Not Available Not Available
Not Available Not Available Not Available
ROOT\LEGACY_RASACD\0000
QoS Packet Scheduler Not Available LEGACYDRIVER Not
Available Not Available Not Available Not Available
Not Available ROOT\LEGACY_PSCHED\0000
PEAUTH Not Available LEGACYDRIVER Not Available
Not Available Not Available Not Available
Not Available ROOT\LEGACY_PEAUTH\0000
Null Not Available LEGACYDRIVER Not Available
Not Available Not Available Not Available
Not Available ROOT\LEGACY_NULL\0000
NSI proxy service Not Available LEGACYDRIVER Not
Available Not Available Not Available Not Available
Not Available ROOT\LEGACY_NSIPROXY\0000
NETBT Not Available LEGACYDRIVER Not Available
Not Available Not Available Not Available
Not Available ROOT\LEGACY_NETBT\0000
NDProxy Not Available LEGACYDRIVER Not Available
Not Available Not Available Not Available
Not Available ROOT\LEGACY_NDPROXY\0000
NDIS System Driver Not Available LEGACYDRIVER Not
Available Not Available Not Available Not Available
Not Available ROOT\LEGACY_NDIS\0000
ISA/EISA Class Driver Not Available LEGACYDRIVER
Not Available Not Available Not Available
Not Available Not Available
ROOT\LEGACY_MSISADRV\0000
Windows Firewall Authorization Driver Not Available
LEGACYDRIVER Not Available Not Available
Not Available Not Available Not Available
ROOT\LEGACY_MPSDRV\0000
Mount Point Manager Not Available LEGACYDRIVER Not
Available Not Available Not Available Not Available
Not Available ROOT\LEGACY_MOUNTMGR\0000
Link-Layer Topology Discovery Mapper I/O Driver Not Available
LEGACYDRIVER Not Available Not Available
Not Available Not Available Not Available
ROOT\LEGACY_LLTDIO\0000
KSecDD Not Available LEGACYDRIVER Not Available
Not Available Not Available Not Available
Not Available ROOT\LEGACY_KSECDD\0000
HTTP Not Available LEGACYDRIVER Not Available
Not Available Not Available Not Available
Not Available ROOT\LEGACY_HTTP\0000
Crcdisk Filter Driver Not Available LEGACYDRIVER Not
Available Not Available Not Available Not Available
Not Available ROOT\LEGACY_CRCDISK\0000
Common Log (CLFS) Not Available LEGACYDRIVER Not
Available Not Available Not Available Not Available
Not Available ROOT\LEGACY_CLFS\0000
Ancilliary Function Driver for Winsock Not Available
LEGACYDRIVER Not Available Not Available
Not Available Not Available Not Available
ROOT\LEGACY_AFD\0000
Microsoft iSCSI Initiator Yes SCSIADAPTER
6.0.6001.18000 6/21/2006 Microsoft iscsi.inf Not
Available ROOT\ISCSIPRT\0000
ACPI Fixed Feature Button Yes SYSTEM 6.0.6001.18000
6/21/2006 (Standard system devices) machine.inf
Not Available ACPI\FIXEDBUTTON\2&DABA3FF&1
Motherboard resources Yes SYSTEM 6.0.6001.18000
6/21/2006 (Standard system devices) machine.inf
Not Available ACPI\PNP0C02\VTD
High precision event timer Yes SYSTEM 6.0.6001.18000
6/21/2006 (Standard system devices) machine.inf
Not Available ACPI\PNP0103\0
Motherboard resources Yes SYSTEM 6.0.6001.18000
6/21/2006 (Standard system devices) machine.inf
Not Available ACPI\PNP0C02\0
IDE Channel Yes HDC 6.0.6001.18000 6/21/2006
(Standard IDE ATA/ATAPI controllers) mshdc.inf Not
Available PCIIDE\IDECHANNEL\4&B5CC01F&0&1
CD-ROM Drive Yes CDROM 6.0.6001.18000 6/21/2006
(Standard CD-ROM drives) cdrom.inf Not Available
IDE\CDROMHL-DT-ST_DVD-
ROM_DH10N_____0D08____\5&334745AD&0&0.0.0
IDE Channel Yes HDC 6.0.6001.18000 6/21/2006
(Standard IDE ATA/ATAPI controllers) mshdc.inf Not
Available PCIIDE\IDECHANNEL\4&B5CC01F&0&0
Intel(R) ICH9 Family 2 port Serial ATA Storage Controller 1 - 2921
No HDC 8.6.1.1001 1/30/2008 Intel oem12.inf
Not Available
PCI\VEN_8086&DEV_2921&SUBSYS_02371028&REV_02\3&
33FD14CA&0&FA
System board Yes SYSTEM 6.0.6001.18000 6/21/2006
(Standard system devices) machine.inf Not
Available ACPI\PNP0C01\1
Microsoft Generic IPMI Compliant Device Yes SYSTEM
6.0.6001.18000 6/21/2006 Microsoft ipmidrv.inf
Not Available ACPI\IPI0001\5
System board Yes SYSTEM 6.0.6001.18000 6/21/2006
(Standard system devices) machine.inf Not
Available ACPI\PNP0C01\0
Communications Port Yes PORTS 6.0.6001.18000 6/21/2006
(Standard port types) msports.inf Not Available
ACPI\PNP0501\2
Communications Port Yes PORTS 6.0.6001.18000 6/21/2006
(Standard port types) msports.inf Not Available
ACPI\PNP0501\1
System timer Yes SYSTEM 6.0.6001.18000 6/21/2006
(Standard system devices) machine.inf Not
Available ACPI\PNP0100\4&13C667F4&0
System CMOS/real time clock Yes SYSTEM 6.0.6001.18000
6/21/2006 (Standard system devices) machine.inf
Not Available ACPI\PNP0B00\4&13C667F4&0
System board Yes SYSTEM 6.0.6001.18000 6/21/2006
(Standard system devices) machine.inf Not
Available ACPI\PNP0C01\2
Programmable interrupt controller Yes SYSTEM
6.0.6001.18000 6/21/2006 (Standard system devices)
machine.inf Not Available
ACPI\PNP0000\4&13C667F4&0

Numeric data processor Yes SYSTEM 6.0.6001.18000 6/21/2006 (Standard system devices) machine.inf Not Available ACPI\PNP0C04\4&13C667F4&0
Direct memory access controller Yes SYSTEM 6.0.6001.18000 6/21/2006 (Standard system devices) machine.inf Not Available ACPI\PNP0200\4&13C667F4&0
Intel(R) ICH9 LPC Interface Controller - 2918 No SYSTEM 9.1.1.1013 1/21/2009 Intel oem11.inf Not Available PCI\VEN_8086&DEV_2918&SUBSYS_02371028&REV_02\3&33FD14CA&0&F8
Generic Non-PnP Monitor Yes MONITOR 6.0.6001.18000 6/21/2006 (Standard monitor types) monitor.inf Not Available DISPLAY\DEFAULT_MONITOR\5&39C4506A&0&12345678&08&03
Standard VGA Graphics Adapter Yes DISPLAY 6.0.6001.18000 6/21/2006 (Standard display types) display.inf Not Available PCI\VEN_102B&DEV_0532&SUBSYS_02371028&REV_0A\4&BBCD9ED&0&18F0
Intel(R) 82801 PCI Bridge - 244E Yes SYSTEM 6.0.6001.18000 6/21/2006 Intel machine.inf Not Available PCI\VEN_8086&DEV_244E&SUBSYS_02371028&REV_92\3&33FD14CA&0&F0
USB Root Hub Yes USB 6.0.6001.18000 6/21/2006 (Standard USB Host Controller) usbport.inf Not Available USB\ROOT_HUB20\4&C9F4614&0
Intel(R) ICH9 Family USB2 Enhanced Host Controller - 293A Yes USB 6.0.6001.18000 6/21/2006 Intel usbport.inf Not Available PCI\VEN_8086&DEV_293A&SUBSYS_02371028&REV_02\3&33FD14CA&0&EF
USB Root Hub Yes USB 6.0.6001.18000 6/21/2006 (Standard USB Host Controller) usbport.inf Not Available USB\ROOT_HUB\4&1B71667F&0
Intel(R) ICH9 Family USB Universal Host Controller - 2939 Yes USB 6.0.6001.18000 6/21/2006 Intel usbport.inf Not Available PCI\VEN_8086&DEV_2939&SUBSYS_02371028&REV_02\3&33FD14CA&0&EB
HID-compliant mouse Yes MOUSE 6.0.6001.18000 6/21/2006 Microsoft msmouse.inf Not Available HID\VID_09AE&PID_0002&MI_01\7&FDD9F08&0&0000
USB Human Interface Device Yes HIDCLASS 6.0.6001.18000 6/21/2006 (Standard system devices) input.inf Not Available USB\VID_09AE&PID_0002&MI_01\6&8FA055B&0&0001
HID Keyboard Device Yes KEYBOARD 6.0.6001.18000 6/21/2006 (Standard keyboards) keyboard.inf Not Available HID\VID_09AE&PID_0002&MI_00\7&38484CD1&0&0000
USB Human Interface Device Yes HIDCLASS 6.0.6001.18000 6/21/2006 (Standard system devices) input.inf Not Available USB\VID_09AE&PID_0002&MI_00\6&8FA055B&0&0000
USB Composite Device Yes USB 6.0.6001.18000 6/21/2006 (Standard USB Host Controller) usb.inf Not Available USB\VID_09AE&PID_0002\USB_COMPOSITE_DEVICE
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\VID_0624&PID_0248\20080519
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_HUB20\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/I\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 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 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 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\DISKFUSIONIO_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 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\DISKFUSIONIO_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 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\DISKFUSIONIO_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 PCIE\DISKFUSIONIO_IODRIVE_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\FEAA53B601
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\FEAA53B400
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&08
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&00
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%\Syste
m32\Wbem;%SYSTEMROOT%\System32\WindowsPowerShell\v1.0\;C:\Pro
gram 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
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
Start Time Until Time Elapsed Time Pages Printed
Job ID Priority Parameters Driver Print Processor
Host Print Queue Data Type Name

[Network Connections]

Local Name Remote Name Type Status User Name

[Running Tasks]

Name Path Process ID Priority Min Working Set Max
Working Set Start Time Version Size File Date
system idle process Not Available 0 0 Not
Available Not Available Not Available Not Available
Not Available Not Available
system Not Available 4 8 Not Available
Not Available 5/18/2009 3:36 PM Not Available
Not Available Not Available
smss.exe Not Available 528 11 200 1380
5/18/2009 3:36 PM Not Available Not Available
Not Available
csrss.exe c:\windows\system32\csrss.exe 612 13 200
1380 5/18/2009 3:36 PM 6.0.6001.18000 7.50 KB
(7,680 bytes) 1/18/2008 11:59 PM
csrss.exe c:\windows\system32\csrss.exe 656 13 200
1380 5/18/2009 3:36 PM 6.0.6001.18000 7.50 KB
(7,680 bytes) 1/18/2008 11:59 PM
wininit.exec:\windows\system32\wininit.exe 664 13 200
1380 5/18/2009 3:36 PM 6.0.6001.18000 121.00 KB
(123,904 bytes) 1/19/2008 12:17 AM
services.exe c:\windows\system32\services.exe 700
9 200 1380 5/18/2009 3:36 PM
6.0.6001.18000 375.50 KB (384,512 bytes) 1/19/2008
12:03 AM
winlogon.exe c:\windows\system32\winlogon.exe 724
13 200 1380 5/18/2009 3:36 PM
6.0.6001.18000 396.50 KB (406,016 bytes) 1/19/2008
12:18 AM
lsass.exe c:\windows\system32\lsass.exe 748 9 200
1380 5/18/2009 3:36 PM 6.0.6001.18000 11.00 KB
(11,264 bytes) 1/19/2008 12:16 AM
lsm.exe c:\windows\system32\lsm.exe 756 8 200
1380 5/18/2009 3:36 PM 6.0.6001.18000 258.50 KB
(264,704 bytes) 1/19/2008 12:43 AM
svchost.exe c:\windows\system32\svchost.exe 916
8 200 1380 5/18/2009 3:36 PM
6.0.6001.18000 27.00 KB (27,648 bytes) 1/19/2008
12:02 AM
svchost.exe c:\windows\system32\svchost.exe 976
8 200 1380 5/18/2009 3:36 PM
6.0.6001.18000 27.00 KB (27,648 bytes) 1/19/2008
12:02 AM
logonui.exe c:\windows\system32\logonui.exe 412
13 200 1380 5/18/2009 3:36 PM
6.0.6001.18000 20.50 KB (20,992 bytes) 1/19/2008
12:17 AM

svchost.exe c:\windows\system32\svchost.exe 424 8 200 1380 5/18/2009 3:36 PM 6.0.6001.18000 27.00 KB (27,648 bytes) 1/19/2008 12:02 AM
svchost.exe c:\windows\system32\svchost.exe 548 8 200 1380 5/18/2009 3:36 PM 6.0.6001.18000 27.00 KB (27,648 bytes) 1/19/2008 12:02 AM
svchost.exe c:\windows\system32\svchost.exe 580 8 200 1380 5/18/2009 3:36 PM 6.0.6001.18000 27.00 KB (27,648 bytes) 1/19/2008 12:02 AM
slsvc.exe c:\windows\system32\slsvc.exe 584 8 200 1380 5/18/2009 3:36 PM 6.0.6001.18000 2.06 MB (2,161,664 bytes) 1/19/2008 1:33 AM
svchost.exe c:\windows\system32\svchost.exe 692 8 200 1380 5/18/2009 3:36 PM 6.0.6001.18000 27.00 KB (27,648 bytes) 1/19/2008 12:02 AM
svchost.exe c:\windows\system32\svchost.exe 1032 8 200 1380 5/18/2009 3:36 PM 6.0.6001.18000 27.00 KB (27,648 bytes) 1/19/2008 12:02 AM
svchost.exe c:\windows\system32\svchost.exe 1060 8 200 1380 5/18/2009 3:36 PM 6.0.6001.18000 27.00 KB (27,648 bytes) 1/19/2008 12:02 AM
svchost.exe c:\windows\system32\svchost.exe 1220 8 200 1380 5/18/2009 3:36 PM 6.0.6001.18000 27.00 KB (27,648 bytes) 1/19/2008 12:02 AM
taskeng.exe c:\windows\system32\taskeng.exe 1352 6 200 1380 5/18/2009 3:36 PM 6.0.6001.18000 259.00 KB (265,216 bytes) 1/19/2008 12:13 AM
spoolsv.exe c:\windows\system32\spoolsv.exe 1624 8 200 1380 5/18/2009 3:37 PM 6.0.6001.18000 261.00 KB (267,264 bytes) 1/19/2008 1:11 AM
svchost.exe c:\windows\system32\svchost.exe 1764 8 200 1380 5/18/2009 3:37 PM 6.0.6001.18000 27.00 KB (27,648 bytes) 1/19/2008 12:02 AM
svchost.exe c:\windows\system32\svchost.exe 1780 8 200 1380 5/18/2009 3:37 PM 6.0.6001.18000 27.00 KB (27,648 bytes) 1/19/2008 12:02 AM
sqlwriter.exe c:\program files\microsoft sql server\90\shared\sqlwriter.exe 1812 8 200 1380 5/18/2009 3:37 PM 2007.100.1600.22 154.02 KB (157,720 bytes) 7/10/2008 5:31 AM
svchost.exe c:\windows\system32\svchost.exe 1920 8 200 1380 5/18/2009 3:37 PM 6.0.6001.18000 27.00 KB (27,648 bytes) 1/19/2008 12:02 AM
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.exe 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

[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
csrsrv	6.0.6001.18000	83.50 KB (85,504 bytes)	1/18/2008 11:59 PM	Microsoft Corporation	c:\windows\system32\csrsrv.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
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
msvcrt	7.0.6001.18000	606.50 KB (621,056 bytes)	1/18/2008 11:52 PM	Microsoft Corporation	c:\windows\system32\msvcrt.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
msctf 6.0.6001.18000 1,016.00 KB (1,040,384 bytes) 1/19/2008 12:09 AM Microsoft Corporation c:\windows\system32\msctf.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
mswsock 6.0.6001.18000 297.00 KB (304,128 bytes) 1/19/2008 12:38 AM Microsoft Corporation c:\windows\system32\mswsock.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
scesrv 6.0.6001.18000 390.00 KB (399,360 bytes) 1/19/2008 12:15 AM Microsoft Corporation c:\windows\system32\scesrv.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
winlogon 6.0.6001.18000 396.50 KB (406,016 bytes) 1/19/2008 12:18 AM Microsoft Corporation c:\windows\system32\winlogon.exe
winsta 6.0.6001.18000 200.50 KB (205,312 bytes) 1/19/2008 12:43 AM Microsoft Corporation c:\windows\system32\winsta.dll
shsvcs 6.0.6001.18000 294.50 KB (301,568 bytes) 1/19/2008 12:21 AM Microsoft Corporation c:\windows\system32\shsvcs.dll
lsass 6.0.6001.18000 11.00 KB (11,264 bytes) 1/19/2008 12:16 AM Microsoft Corporation c:\windows\system32\lsass.exe
lsasrv 6.0.6001.18000 1.61 MB (1,692,160 bytes) 1/19/2008 1:21 AM Microsoft Corporation c:\windows\system32\lsasrv.dll
samsrv 6.0.6001.18000 651.00 KB (666,624 bytes) 1/19/2008 12:19 AM Microsoft Corporation c:\windows\system32\samsrv.dll
cryptdll 6.0.6001.18000 63.50 KB (65,024 bytes) 1/19/2008 12:15 AM Microsoft Corporation c:\windows\system32\cryptdll.dll
dnsapi 6.0.6001.18000 214.50 KB (219,648 bytes) 1/19/2008 12:20 AM Microsoft Corporation c:\windows\system32\dnsapi.dll
ntdsapi 6.0.6001.18000 143.00 KB (146,432 bytes) 1/19/2008 12:20 AM Microsoft Corporation c:\windows\system32\ntdsapi.dll
feclient 6.0.6001.18000 67.00 KB (68,608 bytes) 1/19/2008 12:18 AM Microsoft Corporation c:\windows\system32\feclient.dll
mpr 6.0.6001.18000 83.50 KB (85,504 bytes) 1/19/2008 12:38 AM Microsoft Corporation c:\windows\system32\mpr.dll
slc 6.0.6001.18000 146.50 KB (150,016 bytes) 1/19/2008 1:32 AM Microsoft Corporation c:\windows\system32\slc.dll
sysntfy 6.0.6000.16386 21.00 KB (21,504 bytes) 1/19/2008 12:17 AM Microsoft Corporation c:\windows\system32\sysntfy.dll
wevtapi 6.0.6001.18000 384.50 KB (393,728 bytes) 1/19/2008 12:12 AM Microsoft Corporation c:\windows\system32\wevtapi.dll
iphlpapi 6.0.6001.18000 124.00 KB (126,976 bytes) 1/19/2008 12:36 AM Microsoft Corporation c:\windows\system32\iphlpapi.dll
dhcpcsvc 6.0.6001.18000 262.00 KB (268,288 bytes) 1/19/2008 12:35 AM Microsoft Corporation c:\windows\system32\dhcpcsvc.dll
winnsi 6.0.6001.18000 21.50 KB (22,016 bytes) 1/19/2008 12:36 AM Microsoft Corporation c:\windows\system32\winnsi.dll
dhcpcsvc6 6.0.6001.18000 155.00 KB (158,720 bytes) 1/19/2008 12:35 AM Microsoft Corporation c:\windows\system32\dhcpcsvc6.dll
cngaudit 6.0.6000.16386 14.50 KB (14,848 bytes) 1/19/2008 12:15 AM Microsoft Corporation c:\windows\system32\cngaudit.dll
ncrypt 6.0.6001.18000 247.50 KB (253,440 bytes) 1/19/2008 12:15 AM Microsoft Corporation c:\windows\system32\ncrypt.dll
bcrypt 6.0.6001.18000 299.50 KB (306,688 bytes) 1/19/2008 12:15 AM Microsoft Corporation c:\windows\system32\bcrypt.dll
msprivs 6.0.6000.16386 2.00 KB (2,048 bytes) 1/19/2008 12:16 AM Microsoft Corporation c:\windows\system32\msprivs.dll
kerberos 6.0.6001.18000 639.50 KB (654,848 bytes) 1/19/2008 12:17 AM Microsoft Corporation c:\windows\system32\kerberos.dll
msv1_0 6.0.6001.18000 259.50 KB (265,728 bytes) 1/19/2008 12:16 AM Microsoft Corporation c:\windows\system32\msv1_0.dll
netlogon 6.0.6001.18000 700.00 KB (716,800 bytes) 1/19/2008 12:19 AM Microsoft Corporation c:\windows\system32\netlogon.dll
winbrand 6.0.6001.18000 851.00 KB (871,424 bytes) 1/19/2008 12:02 AM Microsoft Corporation c:\windows\system32\winbrand.dll
wdigest 6.0.6001.18000 193.00 KB (197,632 bytes) 1/19/2008 12:16 AM Microsoft Corporation c:\windows\system32\wdigest.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
oleaut32 6.0.6001.18000 828.00 KB (847,872 bytes) 1/19/2008 12:27 AM Microsoft Corporation c:\windows\system32\oleaut32.dll
scecli 6.0.6001.18000 230.00 KB (235,520 bytes) 1/19/2008 12:15 AM Microsoft Corporation c:\windows\system32\scecli.dll
rassfm 6.0.6001.18000 25.50 KB (26,112 bytes) 1/19/2008 7:51 AM Microsoft Corporation c:\windows\system32\rassfm.dll
dssenh 6.0.6001.18000 197.55 KB (202,296 bytes) 1/19/2008 12:18 AM Microsoft Corporation c:\windows\system32\dssenh.dll
cryptnet 6.0.6001.18000 127.00 KB (130,048 bytes) 1/19/2008 12:15 AM Microsoft Corporation c:\windows\system32\cryptnet.dll

sensapi 6.0.6001.18000 12.50 KB (12,800 bytes) 1/19/2008 12:27 AM Microsoft Corporation c:\windows\system32\sensapi.dll
shlwapi 6.0.6001.18000 443.50 KB (454,144 bytes) 1/19/2008 12:21 AM Microsoft Corporation c:\windows\system32\shlwapi.dll
comctl32 6.10.6001.18000 1.95 MB (2,049,024 bytes) 1/19/2008 3:51 AM Microsoft Corporation c:\windows\winsxs\amd64_microsoft.windows.common-

controls_6595b64144ccf1df_6.0.6001.18000_none_152e7382f3bd50c6\comctl32.dll
lsm 6.0.6001.18000 258.50 KB (264,704 bytes) 1/19/2008 12:43 AM Microsoft Corporation c:\windows\system32\lsm.exe
wmsgapi 6.0.6000.16386 14.00 KB (14,336 bytes) 1/19/2008 12:17 AM Microsoft Corporation c:\windows\system32\wmsgapi.dll
clbcatq 2001.12.6931.18000 597.00 KB (611,328 bytes) 1/19/2008 12:28 AM Microsoft Corporation c:\windows\system32\clbcatq.dll
lsmproxy 6.0.6001.18000 43.50 KB (44,544 bytes) 1/19/2008 12:42 AM Microsoft Corporation c:\windows\system32\lsmproxy.dll
svchost 6.0.6001.18000 27.00 KB (27,648 bytes) 1/19/2008 12:02 AM Microsoft Corporation c:\windows\system32\svchost.exe
umpnpmgr 6.0.6001.18000 304.50 KB (311,808 bytes) 1/18/2008 11:59 PM Microsoft Corporation c:\windows\system32\umpnpmgr.dll
powrprof 6.0.6001.18000 118.50 KB (121,344 bytes) 1/19/2008 12:23 AM Microsoft Corporation c:\windows\system32\powrprof.dll
rpcss 6.0.6001.18000 697.00 KB (713,728 bytes) 1/19/2008 12:27 AM Microsoft Corporation c:\windows\system32\rpcss.dll
FirewallAPI 6.0.6001.18000 685.00 KB (701,440 bytes) 1/19/2008 12:35 AM Microsoft Corporation c:\windows\system32\firewallapi.dll
version 6.0.6001.18000 26.50 KB (27,136 bytes) 1/19/2008 12:24 AM Microsoft Corporation c:\windows\system32\version.dll
wtsapi32 6.0.6001.18000 30.50 KB (31,232 bytes) 1/19/2008 12:42 AM Microsoft Corporation c:\windows\system32\wtsapi32.dll
cabinet 6.0.6001.18000 91.00 KB (93,184 bytes) 1/19/2008 12:23 AM Microsoft Corporation c:\windows\system32\cabinet.dll
fwpuclnt 6.0.6001.18000 761.50 KB (779,776 bytes) 1/19/2008 12:36 AM Microsoft Corporation c:\windows\system32\fwpuclnt.dll
logonui 6.0.6001.18000 20.50 KB (20,992 bytes) 1/19/2008 12:17 AM Microsoft Corporation c:\windows\system32\logonui.exe
authui 6.0.6001.18000 2.17 MB (2,271,744 bytes) 1/19/2008 12:25 AM Microsoft Corporation c:\windows\system32\authui.dll
msimg32 6.0.6001.18000 8.00 KB (8,192 bytes) 1/19/2008 12:07 AM Microsoft Corporation c:\windows\system32\msimg32.dll
uxtheme 6.0.6001.18000 310.00 KB (317,440 bytes) 1/19/2008 12:21 AM Microsoft Corporation c:\windows\system32\uxtheme.dll
gdiplus 5.2.6001.18000 2.09 MB (2,190,848 bytes) 1/19/2008 3:50 AM Microsoft Corporation c:\windows\winsxs\amd64_microsoft.windows.gdiplus_6595b64144ccf1df_1.0.6001.18000_none_56c7f783b549f0ed\gdiplus.dll
duser 6.0.6001.18000 244.50 KB (250,368 bytes) 1/19/2008 12:09 AM Microsoft Corporation c:\windows\system32\duser.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
wevtsvc 6.0.6001.18000 1.42 MB (1,486,336 bytes) 1/19/2008 12:13 AM Microsoft Corporation c:\windows\system32\wevtsvc.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
wmisvc 6.0.6001.18000 216.50 KB (221,696 bytes) 1/19/2008 12:13 AM Microsoft Corporation c:\windows\system32\wbem\wmisvc.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
iphlpsvc 6.0.6001.18000 218.00 KB (223,232 bytes) 1/19/2008 12:36 AM Microsoft Corporation c:\windows\system32\iphlpsvc.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
adsldpc 6.0.6001.18000 224.00 KB (229,376 bytes) 1/19/2008 12:19 AM Microsoft Corporation c:\windows\system32\adsldpc.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
winrnr 6.0.6001.18000 27.00 KB (27,648 bytes) 1/19/2008 12:19 AM Microsoft Corporation c:\windows\system32\winrnr.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 12:13 AM Microsoft Corporation c:\windows\system32\wbem\ncprov.dll
qmgr 7.0.6001.18000 1.03 MB (1,082,368 bytes) 1/19/2008 12:12 AM Microsoft Corporation c:\windows\system32\qmgr.dll
shfolder 6.0.6001.18000 10.00 KB (10,240 bytes) 1/19/2008 12:22 AM Microsoft Corporation c:\windows\system32\shfolder.dll
bitsperf 7.0.6000.16386 22.50 KB (23,040 bytes) 1/19/2008 12:11 AM Microsoft Corporation c:\windows\system32\bitsperf.dll
bitsigd 7.0.6001.18000 45.50 KB (46,592 bytes) 1/19/2008 12:11 AM Microsoft Corporation c:\windows\system32\bitsigd.dll
wuaueng 7.0.6001.18000 2.06 MB (2,156,544 bytes) 1/19/2008 1:11 AM Microsoft Corporation c:\windows\system32\wuaueng.dll
esent 6.0.6001.18000 2.41 MB (2,522,624 bytes) 1/19/2008 12:17 AM Microsoft Corporation c:\windows\system32\esent.dll
winspool 6.0.6001.18000 333.50 KB (341,504 bytes) 1/19/2008 1:11 AM Microsoft Corporation c:\windows\system32\winspool.drv
mspatcha 6.0.6001.18000 45.50 KB (46,592 bytes) 1/19/2008 12:05 AM Microsoft Corporation c:\windows\system32\mspatcha.dll
wbemsvc 6.0.6001.18000 121.00 KB (123,904 bytes) 1/19/2008 12:12 AM Microsoft Corporation c:\windows\system32\wbem\wbemsvc.dll
wups2 7.0.6001.18000 33.00 KB (33,792 bytes) 1/19/2008 1:09 AM Microsoft Corporation c:\windows\system32\wups2.dll
slsvc 6.0.6001.18000 2.06 MB (2,161,664 bytes) 1/19/2008 1:33 AM Microsoft Corporation c:\windows\system32\slsvc.exe
es 2001.12.6931.18000 346.00 KB (354,304 bytes) 1/19/2008 12:27 AM Microsoft Corporation c:\windows\system32\es.dll
nsisvc 6.0.6001.18000 24.00 KB (24,576 bytes) 1/19/2008 12:36 AM Microsoft Corporation c:\windows\system32\nsisvc.dll
wkssvc 6.0.6001.18000 198.00 KB (202,752 bytes) 1/19/2008 12:18 AM Microsoft Corporation c:\windows\system32\wkssvc.dll
w32time 6.0.6001.18000 364.00 KB (372,736 bytes) 1/19/2008 12:15 AM Microsoft Corporation c:\windows\system32\w32time.dll
netprofm 6.0.6001.18000 297.00 KB (304,128 bytes) 1/19/2008 12:38 AM Microsoft Corporation c:\windows\system32\netprofm.dll
npmproxy 6.0.6000.16386 31.50 KB (32,256 bytes) 1/19/2008 12:38 AM Microsoft Corporation c:\windows\system32\npmproxy.dll
uxsms 6.0.6001.18000 32.00 KB (32,768 bytes) 1/19/2008 12:10 AM Microsoft Corporation c:\windows\system32\uxsms.dll
trkwks 6.0.6001.18000 114.50 KB (117,248 bytes) 1/19/2008 12:27 AM Microsoft Corporation c:\windows\system32\trkwks.dll
umrdp 6.0.6001.18000 247.00 KB (252,928 bytes) 1/19/2008 7:52 AM Microsoft Corporation c:\windows\system32\umrdp.dll
umb 6.0.6001.18000 58.50 KB (59,904 bytes) 1/19/2008 12:06 AM Microsoft Corporation c:\windows\system32\umb.dll
printui 6.0.6001.18000 957.50 KB (980,480 bytes) 1/19/2008 1:12 AM Microsoft Corporation c:\windows\system32\printui.dll
cfgmgr32 6.0.6001.18000 17.50 KB (17,920 bytes) 1/18/2008 11:59 PM Microsoft Corporation c:\windows\system32\cfgmgr32.dll
puiapi 6.0.6001.18000 185.50 KB (189,952 bytes) 1/19/2008 1:12 AM Microsoft Corporation c:\windows\system32\puiapi.dll
wdi 6.0.6001.18000 80.00 KB (81,920 bytes) 1/19/2008 12:03 AM Microsoft Corporation c:\windows\system32\wdi.dll
radardt 6.0.6000.16386 77.50 KB (79,360 bytes) 1/19/2008 7:52 AM Microsoft Corporation c:\windows\system32\radardt.dll
netman 6.0.6001.18000 340.00 KB (348,160 bytes) 1/19/2008 12:35 AM Microsoft Corporation 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
hnetcfg 6.0.6001.18000 423.50 KB (433,664 bytes) 1/19/2008 12:35 AM Microsoft Corporation c:\windows\system32\hnetcfg.dll
netcfgx 6.0.6001.18000 492.00 KB (503,808 bytes) 1/19/2008 12:35 AM Microsoft Corporation c:\windows\system32\netcfgx.dll
wbemprox 6.0.6001.18000 42.50 KB (43,520 bytes) 1/19/2008 12:12 AM Microsoft Corporation c:\windows\system32\wbem\wbemprox.dll
dnsrslvr 6.0.6001.18000 115.00 KB (117,760 bytes) 1/19/2008 12:20 AM Microsoft Corporation c:\windows\system32\dnsrslvr.dll
cryptsvc 6.0.6001.18000 161.50 KB (165,376 bytes) 1/19/2008 12:15 AM Microsoft Corporation c:\windows\system32\cryptsvc.dll
nlasvc 6.0.6001.18000 201.50 KB (206,336 bytes) 1/19/2008 12:36 AM Microsoft Corporation c:\windows\system32\nlasvc.dll
ncsi 6.0.6001.18000 106.50 KB (109,056 bytes) 1/19/2008 12:35 AM Microsoft Corporation c:\windows\system32\ncsi.dll
ssdpapi 6.0.6000.16386 49.00 KB (50,176 bytes) 1/19/2008 12:38 AM Microsoft Corporation c:\windows\system32\ssdpapi.dll
termsrv 6.0.6001.18000 534.00 KB (546,816 bytes) 1/19/2008 12:43 AM Microsoft Corporation c:\windows\system32\termsrv.dll

icaapi 6.0.6000.16386 20.00 KB (20,480 bytes) 1/19/2008 12:42 AM Microsoft Corporation c:\windows\system32\icaapi.dll
regapi 6.0.6001.18000 87.00 KB (89,088 bytes) 1/19/2008 12:42 AM Microsoft Corporation c:\windows\system32\regapi.dll
rdpwsx 6.0.6001.18000 115.00 KB (117,760 bytes) 1/19/2008 12:42 AM Microsoft Corporation c:\windows\system32\rdpwsx.dll
mstlsapi 6.0.6001.18000 135.00 KB (138,240 bytes) 1/19/2008 12:42 AM Microsoft Corporation c:\windows\system32\mstlsapi.dll
msdtckrm 2001.12.6931.18000 386.00 KB (395,264 bytes) 1/19/2008 12:27 AM Microsoft Corporation c:\windows\system32\msdtckrm.dll
wsmsvc 6.0.6001.18000 1.04 MB (1,091,072 bytes) 1/19/2008 12:14 AM Microsoft Corporation c:\windows\system32\wsmsvc.dll
wsmprov 6.0.6001.18000 71.50 KB (73,216 bytes) 1/19/2008 12:13 AM Microsoft Corporation c:\windows\system32\wsmprov.dll
winrsmgr 6.0.6001.18000 294.00 KB (301,056 bytes) 1/19/2008 12:14 AM Microsoft Corporation c:\windows\system32\winrsmgr.dll
httpapi 6.0.6001.18000 32.50 KB (33,280 bytes) 1/19/2008 12:35 AM Microsoft Corporation c:\windows\system32\httpapi.dll
wsmres 6.0.6001.18000 13.00 KB (13,312 bytes) 1/19/2008 12:13 AM Microsoft Corporation c:\windows\system32\wsmres.dll
wevtfwd 6.0.6001.18000 104.50 KB (107,008 bytes) 1/19/2008 12:12 AM Microsoft Corporation c:\windows\system32\wevtfwd.dll
bfe 6.0.6001.18000 447.50 KB (458,240 bytes) 1/19/2008 12:36 AM Microsoft Corporation c:\windows\system32\bfe.dll
mpssvc 6.0.6001.18000 587.00 KB (601,088 bytes) 1/19/2008 12:35 AM Microsoft Corporation c:\windows\system32\mpssvc.dll
wfapigp 6.0.6001.18000 20.00 KB (20,480 bytes) 1/19/2008 12:35 AM Microsoft Corporation c:\windows\system32\wfapigp.dll
dps 6.0.6001.18000 136.00 KB (139,264 bytes) 1/19/2008 12:03 AM Microsoft Corporation c:\windows\system32\dps.dll
taskschd 6.0.6001.18000 640.50 KB (655,872 bytes) 1/19/2008 12:13 AM Microsoft Corporation c:\windows\system32\taskschd.dll
pnpts 6.0.6001.18000 11.50 KB (11,776 bytes) 1/19/2008 12:03 AM Microsoft Corporation c:\windows\system32\pnpts.dll
taskeng 6.0.6001.18000 259.00 KB (265,216 bytes) 1/19/2008 12:13 AM Microsoft Corporation c:\windows\system32\taskeng.exe
dimsjob 6.0.6001.18000 43.00 KB (44,032 bytes) 1/19/2008 12:18 AM Microsoft Corporation c:\windows\system32\dimsjob.dll
pautoenr 6.0.6000.16386 46.00 KB (47,104 bytes) 1/19/2008 12:18 AM Microsoft Corporation c:\windows\system32\pautoenr.dll
certcli 6.0.6001.18000 434.00 KB (444,416 bytes) 1/19/2008 12:16 AM Microsoft Corporation c:\windows\system32\certcli.dll
CertEnroll 6.0.6001.18000 1.58 MB (1,658,368 bytes) 1/19/2008 12:19 AM Microsoft Corporation c:\windows\system32\certenroll.dll
wininet 7.0.6001.18000 988.00 KB (1,011,712 bytes) 1/19/2008 12:27 AM Microsoft Corporation c:\windows\system32\wininet.dll
normaliz 6.0.6000.16386 3.00 KB (3,072 bytes) 1/18/2008 11:59 PM Microsoft Corporation c:\windows\system32\normaliz.dll
iertutil 7.0.6001.18000 366.00 KB (374,784 bytes) 1/19/2008 12:25 AM Microsoft Corporation c:\windows\system32\iertutil.dll
spoolsv 6.0.6001.18000 261.00 KB (267,264 bytes) 1/19/2008 1:11 AM Microsoft Corporation c:\windows\system32\spoolsv.exe
spoolss 6.0.6001.18000 236.00 KB (241,664 bytes) 1/19/2008 1:34 AM Microsoft Corporation c:\windows\system32\spoolss.dll
localspl 6.0.6001.18000 770.00 KB (788,480 bytes) 1/19/2008 1:20 AM Microsoft Corporation c:\windows\system32\localspl.dll
sfc 6.0.6000.16386 6.00 KB (6,144 bytes) 1/18/2008 11:59 PM Microsoft Corporation c:\windows\system32\sfc.dll
tcpmon 6.0.6001.18000 165.00 KB (168,960 bytes) 1/19/2008 1:11 AM Microsoft Corporation c:\windows\system32\tcpmon.dll
snmpapi 6.0.6000.16386 27.00 KB (27,648 bytes) 1/19/2008 12:37 AM Microsoft Corporation c:\windows\system32\snmpapi.dll
wsnmp32 6.0.6001.18000 60.50 KB (61,952 bytes) 1/19/2008 12:37 AM Microsoft Corporation c:\windows\system32\wsnmp32.dll
msxml6 6.20.1076.0 1.65 MB (1,728,512 bytes) 1/19/2008 1:14 AM Microsoft Corporation c:\windows\system32\msxml6.dll
tcpmib 6.0.6000.16386 33.50 KB (34,304 bytes) 1/19/2008 1:11 AM Microsoft Corporation c:\windows\system32\tcpmib.dll
mgmtapi 6.0.6000.16386 22.00 KB (22,528 bytes) 1/19/2008 12:37 AM Microsoft Corporation c:\windows\system32\mgmtapi.dll
usbmon 6.0.6001.18000 43.00 KB (44,032 bytes) 1/19/2008 1:11 AM Microsoft Corporation c:\windows\system32\usbmon.dll
wls0wndh 6.0.6000.16386 9.50 KB (9,728 bytes) 1/19/2008 12:17 AM Microsoft Corporation c:\windows\system32\wls0wndh.dll
wsdmon 6.0.6001.18000 209.00 KB (214,016 bytes) 1/19/2008 1:11 AM Microsoft Corporation c:\windows\system32\wsdmon.dll
wsdapi 6.0.6001.18000 427.00 KB (437,248 bytes) 1/19/2008 12:07 AM Microsoft Corporation c:\windows\system32\wsdapi.dll
fundisc 6.0.6001.18000 162.50 KB (166,400 bytes) 1/19/2008 12:06 AM Microsoft Corporation c:\windows\system32\fundisc.dll
msxml3 8.100.1043.0 1.72 MB (1,807,360 bytes) 1/19/2008 1:14 AM Microsoft Corporation c:\windows\system32\msxml3.dll
win32spl 6.0.6001.18000 641.50 KB (656,896 bytes) 1/19/2008 1:12 AM Microsoft Corporation c:\windows\system32\win32spl.dll
netrap 6.0.6001.18000 21.00 KB (21,504 bytes) 1/19/2008 12:18 AM Microsoft Corporation c:\windows\system32\netrap.dll
printcom 6.0.6001.18000 43.50 KB (44,544 bytes) 1/19/2008 1:10 AM Microsoft Corporation c:\windows\system32\printcom.dll
unidrvui 0.3.6001.18000 863.50 KB (884,224 bytes) 1/19/2008 3:38 AM Microsoft Corporation c:\windows\system32\spool\drivers\x64\3\unidrvui.dll
ipsecsvc 6.0.6001.18000 519.00 KB (531,456 bytes) 1/19/2008 12:36 AM Microsoft Corporation c:\windows\system32\ipsecsvc.dll
FwRemoteSvr 6.0.6001.18000 49.00 KB (50,176 bytes) 1/19/2008 12:35 AM Microsoft Corporation c:\windows\system32\fwremotesvr.dll
regsvc 6.0.6001.18000 201.50 KB (206,336 bytes) 1/19/2008 12:03 AM Microsoft Corporation c:\windows\system32\regsvc.dll
sqlwriter 2007.100.1600.22 154.02 KB (157,720 bytes) 7/10/2008 5:31 AM Microsoft Corporation c:\program files\microsoft sql server\90\shared\sqlwriter.exe
msvcr80 8.0.50727.3053 787.00 KB (805,888 bytes) 4/2/2009 5:49 PM Microsoft Corporation c:\windows\winsxs\amd64_microsoft.vc80.crt_1fc8b3b9a1e18e3b_8.0.50727.3053_none_88e044e32fae7230\msvcr80.dll
sqlwvss 2007.100.1600.22 384.02 KB (393,240 bytes) 7/10/2008 5:31 AM Microsoft Corporation c:\program files\microsoft sql server\90\shared\sqlwvss.dll
msvcp80 8.0.50727.3053 1.02 MB (1,071,616 bytes) 4/2/2009 5:49 PM Microsoft Corporation c:\windows\winsxs\amd64_microsoft.vc80.crt_1fc8b3b9a1e18e3b_8.0.50727.3053_none_88e044e32fae7230\msvcp80.dll
wersvc 6.0.6001.18000 118.00 KB (120,832 bytes) 1/19/2008 12:11 AM Microsoft Corporation c:\windows\system32\wersvc.dll
msdtc 2001.12.6931.18000 104.00 KB (106,496 bytes) 1/19/2008 12:27 AM Microsoft Corporation c:\windows\system32\msdtc.exe
msdtctm 2001.12.6931.18000 1.43 MB (1,497,088 bytes) 1/19/2008 12:28 AM Microsoft Corporation c:\windows\system32\msdtctm.dll
msdtcprx 2001.12.6931.18000 708.50 KB (725,504 bytes) 1/19/2008 12:27 AM Microsoft Corporation c:\windows\system32\msdtcprx.dll
mtxclu 2001.12.6931.18000 350.50 KB (358,912 bytes) 1/19/2008 12:27 AM Microsoft Corporation c:\windows\system32\mtxclu.dll

msdtclog 2001.12.6931.18000 113.00 KB (115,712 bytes) 1/19/2008 12:27 AM Microsoft Corporation c:\windows\system32\msdtclog.dll
xolehlp 2001.12.6931.18000 47.00 KB (48,128 bytes) 1/19/2008 12:27 AM Microsoft Corporation c:\windows\system32\xolehlp.dll
comres 2001.12.6931.18000 1.23 MB (1,291,264 bytes) 1/19/2008 12:27 AM Microsoft Corporation c:\windows\system32\comres.dll
msdtcVSp1res 2001.12.6931.18000 20.50 KB (20,992 bytes) 1/19/2008 12:27 AM Microsoft Corporation c:\windows\system32\msdtcvsp1res.dll
mtxoci 2001.12.6931.18000 148.00 KB (151,552 bytes) 1/19/2008 12:27 AM Microsoft Corporation c:\windows\system32\mtxoci.dll
MsCtfMonitor 6.0.6000.16386 25.50 KB (26,112 bytes) 1/19/2008 12:08 AM Microsoft Corporation c:\windows\system32\msctfmonitor.dll
msutb 6.0.6001.18000 222.50 KB (227,840 bytes) 1/19/2008 12:08 AM Microsoft Corporation c:\windows\system32\msutb.dll
dwmapi 6.0.6001.18000 38.50 KB (39,424 bytes) 1/19/2008 12:10 AM Microsoft Corporation c:\windows\system32\dwmapi.dll
PlaySndSrv 6.0.6000.16386 74.50 KB (76,288 bytes) 1/19/2008 12:43 AM Microsoft Corporation c:\windows\system32\playsndsrv.dll
mmdevapi 6.0.6001.18000 197.50 KB (202,240 bytes) 1/19/2008 12:44 AM Microsoft Corporation c:\windows\system32\mmdevapi.dll
qagent 6.0.6001.18000 245.00 KB (250,880 bytes) 1/19/2008 12:35 AM Microsoft Corporation c:\windows\system32\qagent.dll
qutil 6.0.6001.18000 97.00 KB (99,328 bytes) 1/19/2008 12:34 AM Microsoft Corporation c:\windows\system32\qutil.dll
rdpclip 6.0.6001.18000 187.00 KB (191,488 bytes) 1/19/2008 7:51 AM Microsoft Corporation c:\windows\system32\rdpclip.exe
urlmon 7.0.6001.18000 1.35 MB (1,417,728 bytes) 1/19/2008 12:27 AM Microsoft Corporation c:\windows\system32\urlmon.dll
dwm 6.0.6001.18000 96.50 KB (98,816 bytes) 1/19/2008 12:10 AM Microsoft Corporation c:\windows\system32\dwm.exe
dwmredir 6.0.6001.18000 100.00 KB (102,400 bytes) 1/19/2008 12:10 AM Microsoft Corporation c:\windows\system32\dwmredir.dll
slwga 6.0.6001.18000 14.00 KB (14,336 bytes) 1/19/2008 12:17 AM Microsoft Corporation c:\windows\system32\slwga.dll
explorer 6.0.6001.18000 2.94 MB (3,080,704 bytes) 1/19/2008 12:22 AM Microsoft Corporation c:\windows\explorer.exe
shdocvw 6.0.6001.18000 1.14 MB (1,195,008 bytes) 1/19/2008 12:22 AM 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) 1/19/2008 7:51 AM Microsoft Corporation c:\windows\system32\iconcodecservice.dll
timedate 6.0.6001.18000 860.50 KB (881,152 bytes) 1/19/2008 12:23 AM Microsoft Corporation c:\windows\system32\timedate.cpl
actxprxy 6.0.6001.18000 979.00 KB (1,002,496 bytes) 1/19/2008 1:13 AM Microsoft Corporation c:\windows\system32\actxprxy.dll
ieframe 7.0.6001.18000 6.68 MB (7,004,672 bytes) 1/19/2008 12:32 AM Microsoft Corporation c:\windows\system32\ieframe.dll
ExplorerFrame 6.0.6001.18000 39.00 KB (39,936 bytes) 1/19/2008 12:21 AM Microsoft Corporation c:\windows\system32\explorerframe.dll
networkexplorer 6.0.6001.18000 2.14 MB (2,247,168 bytes) 1/19/2008 12:35 AM Microsoft Corporation c:\windows\system32\networkexplorer.dll
cscapi 6.0.6001.18000 38.00 KB (38,912 bytes) 1/18/2008 11:55 PM Microsoft Corporation c:\windows\system32\cscapi.dll
stobject 6.0.6001.18000 731.00 KB (748,544 bytes) 1/19/2008 12:23 AM Microsoft Corporation c:\windows\system32\stobject.dll
batmeter 6.0.6001.18000 727.50 KB (744,960 bytes) 1/19/2008 12:23 AM Microsoft Corporation c:\windows\system32\batmeter.dll
SndVolSSO 6.0.6000.16386 173.50 KB (177,664 bytes) 1/19/2008 12:44 AM Microsoft Corporation c:\windows\system32\sndvolsso.dll
pnidui 6.0.6001.18000 1.93 MB (2,024,960 bytes) 1/19/2008 12:35 AM Microsoft Corporation c:\windows\system32\pnidui.dll
wlanutil 6.0.6000.16386 10.00 KB (10,240 bytes) 1/19/2008 12:34 AM Microsoft Corporation c:\windows\system32\wlanutil.dll
cscui 6.0.6001.18000 656.50 KB (672,256 bytes) 1/19/2008 7:51 AM Microsoft Corporation c:\windows\system32\cscui.dll
cscdll 6.0.6001.18000 28.00 KB (28,672 bytes) 1/18/2008 11:55 PM Microsoft Corporation c:\windows\system32\cscdll.dll
srchadmin 6.0.6001.18000 292.00 KB (299,008 bytes) 1/19/2008 12:23 AM Microsoft Corporation c:\windows\system32\srchadmin.dll
webcheck 7.0.6001.18000 284.00 KB (290,816 bytes) 1/19/2008 12:26 AM Microsoft Corporation c:\windows\system32\webcheck.dll
imapi2 6.0.6001.18000 396.00 KB (405,504 bytes) 1/19/2008 12:29 AM Microsoft Corporation c:\windows\system32\imapi2.dll
bthprops 6.0.6001.18000 993.50 KB (1,017,344 bytes) 1/19/2008 12:23 AM Microsoft Corporation c:\windows\system32\bthprops.cpl
twext 6.0.6001.18000 114.00 KB (116,736 bytes) 1/19/2008 7:51 AM Microsoft Corporation c:\windows\system32\twext.dll
ntshrui 6.0.6001.18000 347.00 KB (355,328 bytes) 1/19/2008 12:24 AM Microsoft Corporation c:\windows\system32\ntshrui.dll
thumbcache 6.0.6001.18000 102.00 KB (104,448 bytes) 1/19/2008 12:22 AM Microsoft Corporation c:\windows\system32\thumbcache.dll
zipfldr 6.0.6001.18000 377.50 KB (386,560 bytes) 1/19/2008 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
wuauclt 7.0.6001.18000 44.50 KB (45,568 bytes) 1/19/2008 1:09 AM Microsoft Corporation c:\windows\system32\wuauclt.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
sqlservr 2007.100.1600.22 55.14 MB (57,820,696 bytes) 7/10/2008 5:31 AM Microsoft Corporation c:\program files\microsoft sql server\mssql10.mssqlserver\mssql\binn\sqlservr.exe
sqlos 2007.100.1600.22 18.02 KB (18,456 bytes) 7/10/2008 5:31 AM Microsoft Corporation c:\program files\microsoft sql server\mssql10.mssqlserver\mssql\binn\sqlos.dll
pdh 6.0.6001.18000 301.50 KB (308,736 bytes) 1/19/2008 12:03 AM Microsoft Corporation c:\windows\system32\pdh.dll
opends60 2007.100.1600.22 23.52 KB (24,088 bytes) 7/10/2008 4:46 AM Microsoft Corporation c:\program files\microsoft sql server\mssql10.mssqlserver\mssql\binn\opends60.dll
batchparser 2007.100.1600.22 170.52 KB (174,616 bytes) 7/10/2008 4:38 AM Microsoft Corporation c:\program files\microsoft sql server\mssql10.mssqlserver\mssql\binn\batchparser.dll
instapi10 2007.100.1600.22 42.52 KB (43,544 bytes) 7/10/2008 4:39 AM Microsoft Corporation c:\program files\microsoft sql server\100\shared\instapi10.dll
sqlevn70 2007.100.1600.22 1.99 MB (2,090,008 bytes) 7/10/2008 4:58 AM Microsoft Corporation c:\program files\microsoft sql server\mssql10.mssqlserver\mssql\binn\resources\1033\sqlevn70.rll
mscoree 2.0.50727.3053 397.00 KB (406,528 bytes) 4/2/2009 5:49 PM Microsoft Corporation c:\windows\system32\mscoree.dll

security 6.0.6000.16386 5.50 KB (5,632 bytes) 1/19/2008 12:16 AM Microsoft Corporation c:\windows\system32\security.dll
sqlncli10 2007.100.1600.22 3.01 MB (3,158,552 bytes) 7/10/2008 5:31 AM Microsoft Corporation c:\windows\system32\sqlncli10.dll
comdlg32 6.0.6001.18000 536.50 KB (549,376 bytes) 1/19/2008 12:21 AM Microsoft Corporation c:\windows\system32\comdlg32.dll
sqlnclir10 2007.100.1600.22 224.02 KB (229,400 bytes) 7/10/2008 4:58 AM Microsoft Corporation c:\windows\system32\1033\sqlnclir10.rll
xpstar 2007.100.1600.22 536.52 KB (549,400 bytes) 7/10/2008 5:31 AM Microsoft Corporation c:\program files\microsoft sql server\mssql10.mssqlserver\mssql\binn\xpstar.dll
sqlscm 2007.100.1600.22 38.52 KB (39,448 bytes) 7/10/2008 5:31 AM Microsoft Corporation c:\program files\microsoft sql server\mssql10.mssqlserver\mssql\binn\sqlscm.dll
odbc32 6.0.6001.18000 448.00 KB (458,752 bytes) 1/19/2008 12:56 AM Microsoft Corporation c:\windows\system32\odbc32.dll
atl80 8.0.50727.1833 110.50 KB (113,152 bytes) 4/2/2009 6:07 PM Microsoft Corporation c:\windows\winsxs\amd64_microsoft.vc80.atl_1fc8b3b9a1e18e3b_8.0.50727.1833_none_8a17faaf2edd3e00\atl80.dll
odbcint 6.0.6000.16386 224.00 KB (229,376 bytes) 1/19/2008 12:56 AM Microsoft Corporation c:\windows\system32\odbcint.dll
xpstar 2007.100.1600.22 151.02 KB (154,648 bytes) 7/10/2008 4:58 AM Microsoft Corporation c:\program files\microsoft sql server\mssql10.mssqlserver\mssql\binn\resources\1033\xpstar.rll
msinfo32 6.0.6001.18000 398.50 KB (408,064 bytes) 1/18/2008 11:33 PM Microsoft Corporation c:\windows\syswow64\msinfo32.exe
wow64 6.0.6001.18000 229.00 KB (234,496 bytes) 1/18/2008 11:59 PM Microsoft Corporation c:\windows\system32\wow64.dll
wow64win 6.0.6001.18000 294.50 KB (301,568 bytes) 1/19/2008 12:08 AM Microsoft Corporation c:\windows\system32\wow64win.dll
wow64cpu 6.0.6001.18000 17.00 KB (17,408 bytes) 1/18/2008 11:59 PM Microsoft Corporation c:\windows\system32\wow64cpu.dll
wmiprvse 6.0.6001.18000 340.50 KB (348,672 bytes) 1/19/2008 12:13 AM Microsoft Corporation c:\windows\system32\wbem\wmiprvse.exe
cimwin32 6.0.6001.18000 1.99 MB (2,082,304 bytes) 1/19/2008 12:14 AM Microsoft Corporation c:\windows\system32\wbem\cimwin32.dll
framedynos 6.0.6001.18000 275.00 KB (281,600 bytes) 1/19/2008 12:13 AM Microsoft Corporation c:\windows\system32\framedynos.dll
wmi 6.0.6001.18000 5.50 KB (5,632 bytes) 1/19/2008 1:13 AM Microsoft Corporation c:\windows\system32\wmi.dll
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 c:\windows\system32\svchost.exe -k netsvcs Normal localSystem 0
Application Layer Gateway Service ALG Stopped Manual Own Process c:\windows\system32\alg.exe Normal NT AUTHORITY\LocalService 0
Application Information Appinfo Stopped Manual Share Process c:\windows\system32\svchost.exe -k netsvcs Normal LocalSystem 0
Application Management AppMgmt Stopped Manual Share Process c:\windows\system32\svchost.exe -k netsvcs Normal LocalSystem 0
Windows Audio Endpoint Builder AudioEndpointBuilder Stopped Manual Share Process c:\windows\system32\svchost.exe -k localsystemnetworkrestricted Normal LocalSystem 0
Windows Audio AudioSrv Stopped Manual Share Process c:\windows\system32\svchost.exe -k localservicenetworkrestricted Normal NT AUTHORITY\LocalService 0
Base Filtering Engine BFE Running Auto Share Process c:\windows\system32\svchost.exe -k localservicenonetwork Normal NT AUTHORITY\LocalService 0
Background Intelligent Transfer Service BITS Running Auto Share Process c:\windows\system32\svchost.exe -k netsvcs Normal LocalSystem 0
Computer Browser Browser Stopped Disabled Share Process c:\windows\system32\svchost.exe -k netsvcs Normal LocalSystem 0
Certificate Propagation CertPropSvc Running Manual Share Process c:\windows\system32\svchost.exe -k netsvcs Normal LocalSystem 0
Microsoft .NET Framework NGEN v2.0.50727_X86 clr_optimization_v2.0.50727_32 Stopped Manual Own Process c:\windows\microsoft.net\framework\v2.0.50727\mscorsvw.exe Ignore LocalSystem 0
Microsoft .NET Framework NGEN v2.0.50727_X64 clr_optimization_v2.0.50727_64 Stopped Manual Own Process c:\windows\microsoft.net\framework64\v2.0.50727\mscorsvw.exe Ignore LocalSystem 0
COM+ System Application COMSysApp Stopped Manual Own Process c:\windows\system32\dllhost.exe /processid:{02d4b3f1-fd88-11d1-960d-00805fc79235} Normal LocalSystem 0
Cryptographic Services CryptSvc Running Auto Share Process c:\windows\system32\svchost.exe -k networkservice Normal NT Authority\NetworkService 0
Offline Files CscService Stopped Disabled Share Process c:\windows\system32\svchost.exe -k localsystemnetworkrestricted Normal LocalSystem 0
DCOM Server Process Launcher DcomLaunch Running Auto Share Process c:\windows\system32\svchost.exe -k dcomlaunch Normal LocalSystem 0
DHCP Client Dhcp Running Auto Share Process c:\windows\system32\svchost.exe -k localservicenetworkrestricted Normal NT Authority\LocalService 0
DNS Client Dnscache Running Auto Share Process c:\windows\system32\svchost.exe -k networkservice Normal NT AUTHORITY\NetworkService 0
Wired AutoConfig dot3svc Stopped Manual Share Process c:\windows\system32\svchost.exe -k localsystemnetworkrestricted Normal localSystem 0
Diagnostic Policy Service DPS Running Auto Share Process c:\windows\system32\svchost.exe -k localservicenonetwork Normal NT AUTHORITY\LocalService 0
Extensible Authentication Protocol EapHost Stopped Manual Share Process c:\windows\system32\svchost.exe -k netsvcs Normal localSystem 0
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\presentationfontcache.exe Normal NT Authority\LocalService 0
Group Policy Client gpsvc Running Auto Own Process c:\windows\system32\svchost.exe -k gpsvcgroup Normal LocalSystem 0
Human Interface Device Access hidserv Stopped Manual Share Process c:\windows\system32\svchost.exe -k localsystemnetworkrestricted Normal LocalSystem 0
Health Key and Certificate Management hkmsvc Stopped Manual Share Process c:\windows\system32\svchost.exe -k netsvcs Normal localSystem 0
Windows CardSpace idsvc Stopped Manual Share Process "c:\windows\microsoft.net\framework64\v3.0\windows communication foundation\infocard.exe" Normal LocalSystem 0
IKE and AuthIP IPsec Keying Modules IKEEXT Running Auto Share Process c:\windows\system32\svchost.exe -k netsvcs Normal LocalSystem 0
PnP-X IP Bus Enumerator IPBusEnum Stopped Disabled Share Process c:\windows\system32\svchost.exe -k localsystemnetworkrestricted Normal LocalSystem 0
IP Helper iphlpsvc Running Auto Share Process c:\windows\system32\svchost.exe -k netsvcs Normal LocalSystem 0
CNG Key Isolation KeyIso Stopped Manual Share Process c:\windows\system32\lsass.exe Normal LocalSystem 0
KtmRm for Distributed Transaction Coordinator KtmRm Running Auto Share Process c:\windows\system32\svchost.exe -k networkservice Normal NT AUTHORITY\NetworkService 0
Server LanmanServer Running Auto Share Process c:\windows\system32\svchost.exe -k netsvcs Normal LocalSystem 0
Workstation LanmanWorkstation Running Auto Share Process c:\windows\system32\svchost.exe -k localservice Normal NT AUTHORITY\LocalService 0
Link-Layer Topology Discovery Mapper lltdsvc Stopped Manual Share Process c:\windows\system32\svchost.exe -k localservice Normal NT AUTHORITY\LocalService 0
TCP/IP NetBIOS Helper lmhosts Running Auto Share Process c:\windows\system32\svchost.exe -k localservicenetworkrestricted Normal NT AUTHORITY\LocalService 0
Multimedia Class Scheduler MMCSS Stopped Manual Share Process c:\windows\system32\svchost.exe -k netsvcs Normal LocalSystem 0
Windows Firewall MpsSvc Running Auto Share Process c:\windows\system32\svchost.exe -k localservicenonetwork Normal NT Authority\LocalService 0
Distributed Transaction Coordinator MSDTC Running Auto Own Process c:\windows\system32\msdtc.exe Normal NT AUTHORITY\NetworkService 0
Microsoft iSCSI Initiator Service MSiSCSI Stopped Manual Share Process c:\windows\system32\svchost.exe -k netsvcs Normal LocalSystem 0
Windows Installer msiserver Stopped Manual Own Process c:\windows\system32\msiexec /v Normal LocalSystem 0
SQL Server (MSSQLSERVER) MSSQLSERVER Stopped Manual Own Process "c:\program files\microsoft sql server\mssql10.mssqlserver\mssql\binn\sqlservr.exe" -smssqlserver Normal .\administrator 0
SQL Active Directory Helper Service MSSQLServerADHelper100 Stopped Disabled Own Process "c:\program files\microsoft sql server\100\shared\sqladhlp.exe" Normal NT AUTHORITY\NETWORK SERVICE 0
Network Access Protection Agent napagent Stopped Manual Share Process c:\windows\system32\svchost.exe -k networkservice Normal NT AUTHORITY\NetworkService 0
Netlogon Netlogon Stopped Manual Share Process c:\windows\system32\lsass.exe Normal LocalSystem 0
Network Connections Netman Running Manual Share Process c:\windows\system32\svchost.exe -k localsystemnetworkrestricted Normal LocalSystem 0
Network List Service netprofm Running Auto Share Process c:\windows\system32\svchost.exe -k localservice Normal NT AUTHORITY\LocalService 0
Net.Tcp Port Sharing Service NetTcpPortSharing Stopped Disabled Share Process "c:\windows\microsoft.net\framework64\v3.0\windows communication foundation\smsvchost.exe" Normal NT AUTHORITY\LocalService 0
Network Location Awareness NlaSvc Running Auto Share Process c:\windows\system32\svchost.exe -k networkservice Normal NT AUTHORITY\NetworkService 0
Network Store Interface Service nsi Running Auto Share Process c:\windows\system32\svchost.exe -k localservice Normal NT Authority\LocalService 0
Performance Counter DLL Host PerfHost Stopped Manual Own Process c:\windows\syswow64\perfhost.exe Normal NT AUTHORITY\LocalService 0
Performance Logs & Alerts pla Stopped Manual Share Process c:\windows\system32\svchost.exe -k localservicenonetwork Normal NT AUTHORITY\LocalService 0
Plug and Play PlugPlay Running Auto Share Process c:\windows\system32\svchost.exe -k dcomlaunch Normal LocalSystem 0
IPsec Policy Agent PolicyAgent Running Auto Share Process c:\windows\system32\svchost.exe -k networkservicenetworkrestricted Normal NT Authority\NetworkService 0
User Profile Service ProfSvc Running Auto Share Process c:\windows\system32\svchost.exe -k netsvcs Normal LocalSystem 0
Protected Storage ProtectedStorage Stopped Manual Share Process c:\windows\system32\lsass.exe Normal LocalSystem 0
Remote Access Auto Connection Manager RasAuto Stopped Manual Share Process c:\windows\system32\svchost.exe -k netsvcs Normal localSystem 0
Remote Access Connection Manager RasMan Stopped Manual Share Process c:\windows\system32\svchost.exe -k netsvcs Normal localSystem 0
Routing and Remote Access RemoteAccess Stopped Disabled Share Process c:\windows\system32\svchost.exe -k netsvcs Normal localSystem 0
Remote Registry RemoteRegistry Running Auto Share Process c:\windows\system32\svchost.exe -k regsvc Normal NT AUTHORITY\LocalService 0
Remote Procedure Call (RPC) Locator RpcLocator Stopped Manual Own Process c:\windows\system32\locator.exe Normal NT AUTHORITY\NetworkService 0
Remote Procedure Call (RPC) RpcSs Running Auto Share Process c:\windows\system32\svchost.exe -k rpcss Normal NT AUTHORITY\NetworkService 0
Resultant Set of Policy Provider RSoPProv Stopped Manual Share Process c:\windows\system32\rsopprov.exe Normal LocalSystem 0

Special Administration Console Helper sacsvr Stopped Manual Share Process c:\windows\system32\svchost.exe -k netsvcs Normal LocalSystem 0
Security Accounts Manager SamSs Running Auto Share Process c:\windows\system32\lsass.exe Normal LocalSystem 0
Smart Card SCardSvr Stopped Manual Share Process c:\windows\system32\svchost.exe -k localservice Normal NT AUTHORITY\LocalService 0
Task Scheduler Schedule Running Auto Share Process c:\windows\system32\svchost.exe -k netsvcs Normal LocalSystem 0
Smart Card Removal Policy SCPolicySvc Stopped Manual Share Process c:\windows\system32\svchost.exe -k netsvcs Normal LocalSystem 0
Secondary Logon seclogon Running Auto Share Process c:\windows\system32\svchost.exe -k netsvcs Normal LocalSystem 0
System Event Notification Service SENS Running Auto Share Process c:\windows\system32\svchost.exe -k netsvcs Normal LocalSystem 0
Terminal Services Configuration SessionEnv Running Manual Share Process c:\windows\system32\svchost.exe -k netsvcs Normal localSystem 0
Internet Connection Sharing (ICS) SharedAccess Stopped Disabled Share Process c:\windows\system32\svchost.exe -k netsvcs Normal LocalSystem 0
Shell Hardware Detection ShellHWDetection Running Auto Share Process c:\windows\system32\svchost.exe -k netsvcs Ignore LocalSystem 0
Software Licensing slsvc Running Auto Own Process c:\windows\system32\slsvc.exe Normal NT AUTHORITY\NetworkService 0
SL UI Notification Service SLUINotify Stopped Manual Share Process c:\windows\system32\svchost.exe -k localservice Normal NT AUTHORITY\LocalService 0
SNMP Trap SNMPTRAP Stopped Manual Own Process c:\windows\system32\snmptrap.exe Normal NT AUTHORITY\LocalService 0
Print Spooler Spooler Running Auto Own Process c:\windows\system32\spoolsv.exe Normal LocalSystem 0
SQL Server Browser SQLBrowser Stopped Disabled Own Process "c:\program files (x86)\microsoft sql server\90\shared\sqlbrowser.exe" Normal NT AUTHORITY\LOCAL SERVICE 0
SQL Server Agent (MSSQLSERVER) SQLSERVERAGENT Stopped Manual Own Process "c:\program files\microsoft sql server\mssql10.mssqlserver\mssql\binn\sqlagent.exe" -i mssqlserver Normal .\administrator 0
SQL Server VSS Writer SQLWriterRunning Auto Own Process "c:\program files\microsoft sql server\90\shared\sqlwriter.exe" Normal LocalSystem 0
SSDP Discovery SSDPSRV Stopped Disabled Share Process c:\windows\system32\svchost.exe -k localservice Normal NT AUTHORITY\LocalService 0
Secure Socket Tunneling Protocol Service SstpSvc 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 Wecsvc Stopped Manual Share Process c:\windows\system32\svchost.exe -k networkservice Normal NT AUTHORITY\NetworkService 0
Problem Reports and Solutions Control Panel Support wercplsupport Stopped Manual Share Process c:\windows\system32\svchost.exe -k netsvcs Normal localSystem 0
Windows Error Reporting Service WerSvc Running Auto Share Process c:\windows\system32\svchost.exe -k wersvcgroup Ignore localSystem 0
WinHTTP Web Proxy Auto-Discovery Service WinHttpAutoProxySvc Stopped Manual Share Process c:\windows\system32\svchost.exe -k localservice Normal NT AUTHORITY\LocalService 0
Windows Management Instrumentation Winmgmt Running Auto Share Process c:\windows\system32\svchost.exe -k netsvcs Ignore localSystem 0
Windows Remote Management (WS-Management) WinRM Running Auto Share Process c:\windows\system32\svchost.exe -k networkservice Normal NT AUTHORITY\NetworkService 0
WMI Performance Adapter wmiApSrv Stopped Manual Own Process c:\windows\system32\wbem\wmiapsrv.exe Normal localSystem 0
Portable Device Enumerator Service WPDBusEnum Stopped Manual Share Process

c:\windows\system32\svchost.exe -k localsystemnetworkrestricted
Normal LocalSystem 0
Windows Update wuauserv Running Auto Share Process
c:\windows\system32\svchost.exe -k netsvcs Normal
LocalSystem 0
Windows Driver Foundation - User-mode Driver Framework wudfsvc
Stopped Manual Share Process
c:\windows\system32\svchost.exe -k localsystemnetworkrestricted
Normal LocalSystem 0

[Program Groups]

Group Name Name User Name
Start Menu Default:Start Menu Default
Start Menu\Programs Default:Start Menu\Programs Default
Start Menu\Programs\Accessories Default:Start
Menu\Programs\Accessories Default
Start Menu\Programs\Accessories\Accessibility Default:Start
Menu\Programs\Accessories\Accessibility Default
Start Menu\Programs\Accessories\System Tools Default:Start
Menu\Programs\Accessories\System Tools Default
Start Menu\Programs\Maintenance Default:Start
Menu\Programs\Maintenance Default
Start Menu Public:Start Menu Public
Start Menu\Programs Public:Start Menu\Programs Public
Start Menu\Programs\Accessories Public:Start
Menu\Programs\Accessories Public
Start Menu\Programs\Accessories\Accessibility Public:Start
Menu\Programs\Accessories\Accessibility Public
Start Menu\Programs\Accessories\System Tools Public:Start
Menu\Programs\Accessories\System Tools Public
Start Menu\Programs\Administrative Tools Public:Start
Menu\Programs\Administrative Tools Public
Start Menu\Programs\Administrative Tools\Terminal Services
Public:Start Menu\Programs\Administrative Tools\Terminal
Services Public
Start Menu\Programs\Broadcom Public:Start Menu\Programs\Broadcom
Public
Start Menu\Programs\Extras and Upgrades Public:Start
Menu\Programs\Extras and Upgrades Public
Start Menu\Programs\Fusion-io Public:Start Menu\Programs\Fusion-io
Public
Start Menu\Programs\Fusion-io\ioManager Public:Start
Menu\Programs\Fusion-io\ioManager Public
Start Menu\Programs\Maintenance Public:Start
Menu\Programs\Maintenance Public
Start Menu\Programs\Microsoft SQL Server 2008 Public:Start
Menu\Programs\Microsoft SQL Server 2008 Public
Start Menu\Programs\Microsoft SQL Server 2008\Configuration Tools
Public: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:\mnthead\Fusion1\tpch100g\tpch100g_load1.mdf',
        SIZE            = 5500MB,
        FILEGROWTH      = 10)
,
(       NAME            = tpch100g_load5,
        FILENAME        =
'D:\mnthead\Fusion1\tpch100g\tpch100g_load5.mdf',
        SIZE            = 5500MB,
        FILEGROWTH      = 10)
,
(       NAME            = tpch100g_load9,
        FILENAME        =
'D:\mnthead\Fusion1\tpch100g\tpch100g_load9.mdf',
        SIZE            = 5500MB,
        FILEGROWTH      = 10)
,
(       NAME            = tpch100g_load13,
        FILENAME        =
'D:\mnthead\Fusion1\tpch100g\tpch100g_load13.mdf',
        SIZE            = 5500MB,
        FILEGROWTH      = 10)
,
(       NAME            = tpch100g_load17,
        FILENAME        =
'D:\mnthead\Fusion1\tpch100g\tpch100g_load17.mdf',
        SIZE            = 5500MB,
        FILEGROWTH      = 10)
,
(       NAME            = tpch100g_load21,
        FILENAME        =
'D:\mnthead\Fusion1\tpch100g\tpch100g_load21.mdf',
        SIZE            = 5500MB,
        FILEGROWTH      = 10)
,
(       NAME            = tpch100g_load25,
        FILENAME        =
'D:\mnthead\Fusion1\tpch100g\tpch100g_load25.mdf',
        SIZE            = 5500MB,
        FILEGROWTH      = 10)
,
(       NAME            = tpch100g_load29,
        FILENAME        =
'D:\mnthead\Fusion1\tpch100g\tpch100g_load29.mdf',
        SIZE            = 5500MB,
        FILEGROWTH      = 10)
,
(       NAME            = tpch100g_load2,
        FILENAME        =
'D:\mnthead\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


Parallel Partitioned Table Load

Load Partitioned Tables from FlatFile_Dir_1
.
.
.
Load Partitioned Tables from FlatFile_Dir_8

bulk insert %DBNAME%..%TABLE%
from
'%FLATFILE_DIR_1%\%TABLE%.tbl.%PARALLEL_PRO
CESS%'
with (FieldTerminator = '|', RowTerminator
='|\n',tablock,ROWS_PER_BATCH=%BCP_ROWS%)


Parallel Load Simple Tables

bulk insert %DBNAME%..NATION
from '%FLATFILE_DIR_1%\nation.tbl'
with (FieldTerminator = '|', RowTerminator ='|\n',tablock)

bulk insert %DBNAME%..REGION
from '%FLATFILE_DIR_1%\region.tbl'
with (FieldTerminator = '|', RowTerminator ='|\n',tablock)


-- 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:    DROPLOADFG.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:\mnthead\Fusion1\TPCHbackup1b'
GO
sp_addumpdevice 'disk', 'BackupDev2b',
'D:\mnthead\Fusion2\TPCHbackup2b'
GO
sp_addumpdevice 'disk', 'BackupDev3b',
'D:\mnthead\Fusion3\TPCHbackup3b'
GO
sp_addumpdevice 'disk', 'BackupDev4b',
'D:\mnthead\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.l
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)
```

```
--
--  File:    CREATERFK.SQL
--        Microsoft TPC-H Benchmark Kit Ver. 2.7.0-1005
```

```
--          Copyright Microsoft, 2006 - 2009
--

use tpch100g

IF NOT EXISTS ( SELECT name FROM sysobjects WHERE
name = 'FK_S_NATIONKEY' )
   ALTER TABLE SUPPLIER ADD CONSTRAINT
FK_S_NATIONKEY
      FOREIGN KEY (S_NATIONKEY) REFERENCES
NATION(N_NATIONKEY)
GO

IF NOT EXISTS ( SELECT name FROM sysobjects WHERE
name = 'FK_PS_PARTKEY' )
   ALTER TABLE PARTSUPP ADD CONSTRAINT
FK_PS_PARTKEY
      FOREIGN KEY (PS_PARTKEY) REFERENCES
PART(P_PARTKEY)
GO

IF NOT EXISTS ( SELECT name FROM sysobjects WHERE
name = 'FK_PS_SUPPKEY' )
   ALTER TABLE PARTSUPP ADD CONSTRAINT
FK_PS_SUPPKEY
      FOREIGN KEY (PS_SUPPKEY) REFERENCES
SUPPLIER(S_SUPPKEY)
GO

IF NOT EXISTS ( SELECT name FROM sysobjects WHERE
name = 'FK_C_NATIONKEY' )
   ALTER TABLE CUSTOMER ADD CONSTRAINT
FK_C_NATIONKEY
      FOREIGN KEY (C_NATIONKEY) REFERENCES
NATION(N_NATIONKEY)
GO

IF NOT EXISTS ( SELECT name FROM sysobjects WHERE
name = 'FK_O_CUSTKEY' )
   ALTER TABLE ORDERS ADD CONSTRAINT
FK_O_CUSTKEY
      FOREIGN KEY (O_CUSTKEY) REFERENCES
CUSTOMER(C_CUSTKEY)
GO

IF NOT EXISTS ( SELECT name FROM sysobjects WHERE
name = 'FK_N_REGIONKEY' )
   ALTER TABLE NATION ADD CONSTRAINT
FK_N_REGIONKEY
      FOREIGN KEY (N_REGIONKEY) REFERENCES
REGION(R_REGIONKEY)
GO

IF NOT EXISTS ( SELECT name FROM sysobjects WHERE
name = 'FK_L_ORDERKEY' )
   ALTER TABLE LINEITEM ADD CONSTRAINT
FK_L_ORDERKEY
      FOREIGN KEY (L_ORDERKEY) REFERENCES
ORDERS(O_ORDERKEY)
GO

IF NOT EXISTS ( SELECT name FROM sysobjects WHERE
name = 'FK_L_PARTKEY' )
   ALTER TABLE LINEITEM ADD CONSTRAINT
FK_L_PARTKEY
      FOREIGN KEY (L_PARTKEY) REFERENCES
PART(P_PARTKEY)
GO

IF NOT EXISTS ( SELECT name FROM sysobjects WHERE
name = 'FK_L_SUPPKEY' )
   ALTER TABLE LINEITEM ADD CONSTRAINT
FK_L_SUPPKEY
      FOREIGN KEY (L_SUPPKEY) REFERENCES
SUPPLIER(S_SUPPKEY)
GO

IF NOT EXISTS ( SELECT name FROM sysobjects WHERE
name = 'FK_L_PARTKEY_SUPPKEY' )
   ALTER TABLE LINEITEM ADD CONSTRAINT
FK_L_PARTKEY_SUPPKEY
      FOREIGN KEY (L_PARTKEY,L_SUPPKEY)
REFERENCES PARTSUPP(PS_PARTKEY, PS_SUPPKEY)
GO
```

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,                                  @skey,

        @o_key,                                 @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,
```

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

                                                set
rowcount @cnt

                                                select
@rand_supp_key= PS_SUPPKEY
                                                from
PARTSUPP
                                                where
PS_PARTKEY    = @rand_part_key

                                                set
rowcount 0
                                        end
                                        else
                                        begin
                                                select
@rand_part_key  = 0,
                                                @rand_supp_key = 0
                                        end

                                        select     @rand_o_key
= ROUND((RAND() * @multiplier),0,1)

                                        select     @cnt
= (count(*) + 1)/2
                                        from       LINEITEM
                                        where      L_ORDERKEY
= @rand_o_key


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

                        set         rowcount @cnt

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

                        set         rowcount 0

                        select      @rand_delta       = (RAND()*100)

   --       Insert @rand_o_key, @rand_o_key, and
@rand_delta into acid_values table
                        insert      into acid_values
values(@acid_test,

                        @rand_o_key,
```

```
        @rand_l_key,

        @rand_delta,

        @rand_part_key,

        @rand_supp_key,

        @counter)

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


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

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

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

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

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

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

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

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

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

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



-- File:    CONS_TRAN.SQL
--          Microsoft TPC-H Benchmark Kit Ver. 2.7.0-1005
--          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",
```

```
        @counter    "SEQ NUMBER"

exec    acid_tran_com   @rand_o_key,
                        @rand_l_key,
                        @rand_delta

go
-- File:    DUR_TRAN.SQL
--          Microsoft TPC-H Benchmark Kit Ver. 2.7.0-1005
--          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
                                @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,
                                        @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
```

```
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),
```

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

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

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

        insert into HISTORY_ACI values( @pkey,
                                        @skey,

    @o_key,
                                        @l_key,
                                        @delta,


    getdate())

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

    commit transaction T

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

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

end

go


-- ACIDQ.SQL
--
-- TPC-H Version 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
```

Appendix C

```
--          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,
```

```
                                        @skey,
        @o_key,
                                        @l_key,
                                        @delta,
        getdate())

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

        commit transaction T

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

```
-- 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
```

```
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,
                                                @skey,
                                                @o_key,
                                                                @l_key,
                                                                @delta,

                                                getdate())

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

                rollback transaction T

--      ACID CODE BEGIN
print " "
print "Timestamp after rollback of ACID transaction (T1):"
select convert(char(30), getdate(), 9)
print " "
print "O_TOTALPRICE from Orders Table after rollback:"
select  O_TOTALPRICE
from    ORDERS
where   O_ORDERKEY = @o_key
print " "
print "Data from LINEITEM after rollback:"
select  L_QUANTITY   'L_QUANTITY',
        L_EXTENDEDPRICE 'L_EXTENDEDPRICE',
        L_PARTKEY    'L_PARTKEY',
        L_SUPPKEY    'L_SUPPKEY',
        L_TAX        'L_TAX',
        L_DISCOUNT   'L_DISCOUNT'
from    LINEITEM
where   L_ORDERKEY  = @o_key and
        L_LINENUMBER        = @l_key
print " "
print "Row from HISTORY:"
select  *
from    HISTORY_ACI
where   H_O_KEY = @o_key and
        H_L_KEY     = @l_key
print " "
print " "
print "TPC-H ACID Transaction End:"
select convert(char(30), getdate(),9)
print " "
end
--      ACID CODE END

                select  @rprice 'RPrice',
                        @quantity 'Quantity',
```

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

end

go


-- File:    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"

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)),
      l.L_ORDERKEY,

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

-- Select data from temporary table...
print ' '
print 'Select all rows from temporary table'
print ' '
```

Appendix C

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


-- Select data from temporary table...
print ' '
print 'Select all rows from temporary table'
print ' '
SELECT  o_orderkey 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
```

```
                        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 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
                )

--
--      These selects should result in Zero or One row(s)
found
--

-- Durability Stream 1
select  *
from    acid_values
where   seq_num between 11 and 210 and
        not exists (    select  *
                        from    HISTORY_DUR
                        where   H_O_KEY = acid_o_key
and                             H_L_KEY = acid_l_key
and                             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 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
        WHEREa.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
WHEREo_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_EXTENDEDPRICE *
(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(CAST(L_E
XTENDEDPRICE 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
WHEREo_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
```

```
:: 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--  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
```

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```
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,
          @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
```

```
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

```
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
WHEREL_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
GO

-- 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
WHEREL_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

```
-- using default substitutions


/* TPC_H  Query 1 - Pricing Summary Report */

SELECT          L_RETURNFLAG,
        L_LINESTATUS,
        SUM(L_QUANTITY)
        AS SUM_QTY,
        SUM(L_EXTENDEDPRICE)
        AS SUM_BASE_PRICE,
        SUM(L_EXTENDEDPRICE*(1-L_DISCOUNT))
        AS SUM_DISC_PRICE,
        SUM(L_EXTENDEDPRICE*(1-
L_DISCOUNT)*(1+L_TAX))      AS SUM_CHARGE,
        AVG(L_QUANTITY)
        AS AVG_QTY,
        AVG(L_EXTENDEDPRICE)
        AS AVG_PRICE,
        AVG(L_DISCOUNT)
        AS AVG_DISC,
        COUNT_BIG(*)
        AS COUNT_ORDER
FROM    LINEITEM
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

(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
QKuHYh,vZGiwu2FWEJoLDx04                33-429-790-
6131 uriously regular requests hag
9937.840000             Supplier#000005969      ROMANIA
108438      Manufacturer#1
ANDENSOSmk,miq23Xfb5RWt6dvUcvt6Qa       29-520-
```

692-3537 efully express instructions. regular requests against the slyly fin
9936.220000 Supplier#000005250 UNITED KINGDOM 249 Manufacturer#4 B3rqp0xbSEim4Mpy2RH J 33-320-228-2957 etect about the furiously final accounts. slyly ironic pinto beans sleep inside the furiously
9923.770000 Supplier#000002324 GERMANY 29821 Manufacturer#4 y3OD9UywSTOk 17-779-299-1839 ackages boost blithely. blithely regular deposits c
9871.220000 Supplier#000006373 GERMANY 43868 Manufacturer#5 J8fcXWsTqM 17-813-485-8637 etect blithely bold asymptotes. fluffily ironic platelets wake furiously; blit
9870.780000 Supplier#000001286 GERMANY 81285 Manufacturer#2 YKA,E2fjiVd7eUrzp2Ef8j1QxGo2DFnosaTEH 17-516-924-4574 regular accounts. furiously unusual courts above the fi
9870.780000 Supplier#000001286 GERMANY 181285 Manufacturer#4 YKA,E2fjiVd7eUrzp2Ef8j1QxGo2DFnosaTEH 17-516-924-4574 regular accounts. furiously unusual courts above the fi
9852.520000 Supplier#000008973 RUSSIA 18972 Manufacturer#2 t5L67YdBYYH6o,Vz24jpDyQ9 32-188-594-7038 rns wake final foxes. carefully unusual depende
9847.830000 Supplier#000008097 RUSSIA 130557 Manufacturer#2 xMe97bpE69NzdwLoX 32-375-640-3593 the special excuses. silent sentiments serve carefully final ac
9847.570000 Supplier#000006345 FRANCE 86344 Manufacturer#1 VSt3rzk3qG698u6ld8HhOByvrTcSTSvQlDQDag 16-886-766-7945 ges. slyly regular requests are. ruthless, express excuses cajole blithely across the unu
9847.570000 Supplier#000006345 FRANCE 173827 Manufacturer#2 VSt3rzk3qG698u6ld8HhOByvrTcSTSvQlDQDag 16-886-766-7945 ges. slyly regular requests are. ruthless, express excuses cajole blithely across the unu
9836.930000 Supplier#000007342 RUSSIA 4841 Manufacturer#4 JOlK7C1,7xrEZSSOw 32-399-414-5385 blithely carefully bold theodolites. fur
9817.100000 Supplier#000002352 RUSSIA 124815 Manufacturer#2 4LfoHUZjgjEbAKw TgdKcgOc4D4uCYw 32-551-831-1437 wake carefully alongside of the carefully final ex
9817.100000 Supplier#000002352 RUSSIA 152351 Manufacturer#3 4LfoHUZjgjEbAKw TgdKcgOc4D4uCYw 32-551-831-1437 wake carefully alongside of the carefully final ex
9739.860000 Supplier#000003384 FRANCE 138357 Manufacturer#2 o,Z3v4POifevE k9U1b 6J1ucX,I 16-494-913-5925 s after the furiously bold packages sleep fluffily idly final requests: quickly final
9721.950000 Supplier#000008757 UNITED KINGDOM 156241 Manufacturer#3 Atg6GnM4dT2 33-821-407-2995 eep furiously sauternes; quickl
9681.330000 Supplier#000008406 RUSSIA 78405 Manufacturer#1 ,qUuXcftUl 32-139-873-8571 haggle slyly regular excuses. quic
9643.550000 Supplier#000005148 ROMANIA 107617 Manufacturer#1 kT4ciVFslx9z4s79p Js825 29-252-617-4850 final excuses. final ideas boost quickly furiously speci
9624.820000 Supplier#000001816 FRANCE 34306 Manufacturer#3 e7vab91vLJPWxxZnewmnDBpDmxYHrb 16-392-237-6726 e packages are around the special ideas. special, pending foxes us
9624.780000 Supplier#000009658 ROMANIA 189657 Manufacturer#1 oE9uBgEfSS4opIcepXyAYM,x 29-748-876-2014 ronic asymptotes wake bravely final
9612.940000 Supplier#000003228 ROMANIA 120715 Manufacturer#2 KDdpNKN3cWu7ZSrbdqp7AfSLxx,qWB 29-325-784-8187 warhorses. quickly even deposits sublate daringly ironic instructions. slyly blithe t
9612.940000 Supplier#000003228 ROMANIA 198189 Manufacturer#4 KDdpNKN3cWu7ZSrbdqp7AfSLxx,qWB 29-325-784-8187 warhorses. quickly even deposits sublate daringly ironic instructions. slyly blithe t
9571.830000 Supplier#000004305 ROMANIA 179270 Manufacturer#2 qNHZ7WmCzygwMPRDO9Ps 29-973-481-1831 kly carefully express asymptotes. furiou
9558.100000 Supplier#000003532 UNITED KINGDOM 88515 Manufacturer#4 EOeuiiOn21OVpTlGguufFDFsbN1p0lhpxHp 33-152-301-2164 foxes. quickly even excuses use. slyly special foxes nag bl
9492.790000 Supplier#000005975 GERMANY 25974 Manufacturer#5 S6mIiCTx82z7lV 17-992-579-4839 arefully pending accounts. blithely regular excuses boost carefully carefully ironic p
9461.050000 Supplier#000002536 UNITED KINGDOM 20033 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 AiC5YAH,gdu0i7 33-152-491-1126 nag against the final requests. furiously unusual packages cajole blit

Appendix D

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 1xhLoOUM7I3mZ1mKnerw 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,wL1,6WzGBJLNBUCKlsV 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,h9VIxjjr9ARHFvKgMDf 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 af0O5pg83lPU4IDVmEylXZVqYZQzSDlYLAmR 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 R7cG26TtXrHAP9 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
8862.240000 Supplier#000003323 ROMANIA 73322 Manufacturer#3 W9 lYcsC9FwBqk3ItL

29-736-951-3710 ly pending ideas sleep about the furiously unu
8841.590000 Supplier#000005750 ROMANIA 100729 Manufacturer#5 Erx3lAgu0g62iaHF9x50uMH4EgeN9hEG 29-344-502-5481 gainst the pinto beans. fluffily unusual dependencies affix slyly even deposits.
8781.710000 Supplier#000003121 ROMANIA 13120 Manufacturer#5 wNqTogx238ZYCamFb,50v,bj 4IbNFW9Bvw1xP 29-707-291-5144 s wake quickly ironic ideas
8754.240000 Supplier#000009407 UNITED KINGDOM 179406 Manufacturer#4 CHRCbkaWcf5B 33-903-970-9604 e ironic requests. carefully even foxes above the furious
8691.060000 Supplier#000004429 UNITED KINGDOM 126892 Manufacturer#2 k,BQms5UhoAF1B2Asi,fLib 33-964-337-5038 efully express deposits kindle after the deposits. final
8655.990000 Supplier#000006330 RUSSIA 193810 Manufacturer#2 UozlaENr0ytKe2w6CeIEWFWn iO3S8Rae7Ou 32-561-198-3705 symptotes use about the express dolphins. requests use after the express platelets. final, ex
8638.360000 Supplier#000002920 RUSSIA 75398 Manufacturer#1 Je2a8bszf3L 32-122-621-7549 ly quickly ironic requests. even requests whithout t
8638.360000 Supplier#000002920 RUSSIA 170402 Manufacturer#3 Je2a8bszf3L 32-122-621-7549 ly quickly ironic requests. even requests whithout t
8607.690000 Supplier#000006003 UNITED KINGDOM 76002 Manufacturer#2 EH9wADcEiuenM0NR08zDwMidw,52Y2RyILEiA 33-416-807-5206 ar, pending accounts. pending depende
8569.520000 Supplier#000005936 RUSSIA 5935 Manufacturer#5 jXaNZ6vwnEWJ2ksLZJpjtgt0bY2a3AU 32-644-251-7916 . regular foxes nag carefully atop the regular, silent deposits. quickly regular packages
8564.120000 Supplier#000000033 GERMANY 110032 Manufacturer#1 gfeKpYw3400L0SDywXA6Ya1Qmq1w6YB9f3R 17-138-897-9374 n sauternes along the regular asymptotes are regularly along the
8553.820000 Supplier#000003979 ROMANIA 143978 Manufacturer#4 BfmVhCAnCMY3jzpjUMy4CNWs9 HzpdQR7INJU 29-124-646-4897 ic requests wake against the blithely unusual accounts. fluffily r
8517.230000 Supplier#000009529 RUSSIA 37025 Manufacturer#5 e44R8o7JAIS9iMcr 32-565-297-8775 ove the even courts. furiously special platelets
8517.230000 Supplier#000009529 RUSSIA 59528 Manufacturer#2 e44R8o7JAIS9iMcr 32-565-297-8775 ove the even courts. furiously special platelets
8503.700000 Supplier#000006830 RUSSIA 44325 Manufacturer#4 BC4WFCYRUZyaIgchU 4S 32-147-878-5069 pades cajole. furious packages among the carefully express excuses boost furiously across th
8457.090000 Supplier#000009456 UNITED KINGDOM 19455 Manufacturer#1 7SBhZs8gP1cJjT0Qf433YBk 33-858-440-4349 cing requests along the furiously unusual deposits promise among the furiously unus
8441.400000 Supplier#000003817 FRANCE 141302 Manufacturer#2 hU3fz3xL78 16-339-356-5115 ely even ideas. ideas wake slyly furiously unusual instructions. pinto beans sleep ag
8432.890000 Supplier#000003990 RUSSIA 191470 Manufacturer#1 wehBBp1RQbfxAYDASS75MsywmsKHRVdkrvNe6m 32-839-509-9301 ep furiously. packages should have to haggle slyly across the deposits. furiously regu
8431.400000 Supplier#000002675 ROMANIA 5174 Manufacturer#1 HJFStOu9R5NGPOegKhgbzBdyvrG2yh8w 29-474-643-1443 ithely express pinto beans. blithely even foxes haggle. furiously regular theodol
8407.040000 Supplier#000005406 RUSSIA 162889 Manufacturer#4 j7 gYF5RW8DC5UrjKC 32-626-152-4621 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. finally regular pinto beans sleep carefully special
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 dqblvV8dCNAorGlJ 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
8152.610000 Supplier#000002731 ROMANIA 15227 Manufacturer#4 nluXJCuY1tu

```
29-805-463-2030  special requests. even, regular warhorses affix among the final gr
8109.090000 Supplier#000009186 FRANCE 99185 Manufacturer#1 wgfosrVPexl9pEXWywaqlBMDYYf 16-668-570-1402 tions haggle slyly about the sil
8102.620000 Supplier#000003347 UNITED KINGDOM 18344 Manufacturer#5 m CtXS2S16i 33-454-274-8532 egrate with the slyly bold instructions. special foxes haggle silently among the
8046.070000 Supplier#000008780 FRANCE 191222 Manufacturer#3 AczzuE0UK9osj ,Lx0Jmh 16-473-215-6395 onic platelets cajole after the regular instructions. permanently bold excuses
8042.090000 Supplier#000003245 RUSSIA 135705 Manufacturer#4 Dh8Ikg39onrbOL4DyTfGw8a9oKUX3d9Y 32-836-132-8872 osits. packages cajole slyly. furiously regular deposits cajole slyly. q
8042.090000 Supplier#000003245 RUSSIA 150729 Manufacturer#1 Dh8Ikg39onrbOL4DyTfGw8a9oKUX3d9Y 32-836-132-8872 osits. packages cajole slyly. furiously regular deposits cajole slyly. q
7992.400000 Supplier#000006108 FRANCE 118574 Manufacturer#1 8tBydnTDwUqfBfFV4l3 16-974-998-8937  ironic ideas? fluffily even instructions wake. blithel
7980.650000 Supplier#000001288 FRANCE 13784 Manufacturer#4 zE,7HgVPrCn 16-646-464-8247 ully bold courts. escapades nag slyly. furiously fluffy theodo
7950.370000 Supplier#000008101 GERMANY 33094 Manufacturer#5 kkYvL6IuvojJgTNG IKkaXQDYgx8ILohj 17-627-663-8014 arefully unusual requests x-ray above the quickly final deposits.
7937.930000 Supplier#000009012 ROMANIA 83995 Manufacturer#2 iUiTziH,Ek3i4lwSgunXMgrcTzwdb 29-250-925-9690 to the blithely ironic deposits nag sly
7914.450000 Supplier#000001013 RUSSIA 125988 Manufacturer#2 riRcntps4KEDtYScjpMIWeYF6mNnR 32-194-698-3365  busily bold packages are dolphi
7912.910000 Supplier#000004211 GERMANY 159180 Manufacturer#5 2wQRVovHrm3,v03IKzfTd,1PYsFXQFFOG 17-266-947-7315 ay furiously regular platelets. cou
7912.910000 Supplier#000004211 GERMANY 184210 Manufacturer#4 2wQRVovHrm3,v03IKzfTd,1PYsFXQFFOG 17-266-947-7315 ay furiously regular platelets. cou
7894.560000 Supplier#000007981 GERMANY 85472 Manufacturer#4 NSJ96vMROAbeXP 17-963-404-3760 ic platelets affix after the furiously
7887.080000 Supplier#000009792 GERMANY 164759 Manufacturer#3 Y28ITVeYriT3kIGdV2K8fSZ V2UqT5H1Otz 17-988-938-4296 ckly around the carefully fluffy theodolites. slyly ironic pack
7871.500000 Supplier#000007206 RUSSIA 104695 Manufacturer#1 3w fNCnrVmvJjE95sgWZzvW 32-432-452-7731 ironic requests. furiously final theodolites cajole. final, express packages sleep. quickly reg
7852.450000 Supplier#000005864 RUSSIA 8363 Manufacturer#4 WCNfBPZeSXh3h,c 32-454-883-3821 usly unusual pinto beans. brave ideas sleep carefully quickly ironi
7850.660000 Supplier#000001518 UNITED KINGDOM 86501 Manufacturer#1 ONda3YJiHKJOC 33-730-383-3892 ifts haggle fluffily pending pai
7843.520000 Supplier#000006683 FRANCE 11680 Manufacturer#4 2Z0JGkiv01Y00oCFwUGfviIbhzCdy 16-464-517-8943  express, final pinto beans x-ray slyly asymptotes. unusual, unusual

(100 row(s) affected)

-- using default substitutions

/* TPC_H  Query 3 - Shipping Priority */

SELECT          TOP 10
        L_ORDERKEY,
        SUM(L_EXTENDEDPRICE*(1-L_DISCOUNT))
        AS REVENUE,
        O_ORDERDATE,
        O_SHIPPRIORITY
FROM    CUSTOMER,
        ORDERS,
        LINEITEM
WHERE   C_MKTSEGMENT        = 'BUILDING' AND
        C_CUSTKEY     = O_CUSTKEY AND
        L_ORDERKEY    = O_ORDERKEY AND
        O_ORDERDATE         < '1995-03-15' AND
        L_SHIPDATE    > '1995-03-15'
GROUP BY        L_ORDERKEY,
                O_ORDERDATE,
                O_SHIPPRIORITY
ORDER BY        REVENUE DESC,
                O_ORDERDATE
L_ORDERKEY          REVENUE
O_ORDERDATE O_SHIPPRIORITY
-------------------- ------------------------ ----------- --------------
2456423              406181.011100            1995-03-05  0
3459808              405838.698900            1995-03-04  0
492164               390324.061000            1995-02-19  0
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
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
WHEREO_ORDERDATE            >= '1993-07-01' AND
        O_ORDERDATE             < dateadd (mm, 3,  cast
('1993-07-01' as date)) AND
        EXISTS          (       SELECT          *
                                FROM   LINEITEM
                                WHEREL_ORDERKEY
        = O_ORDERKEY AND

        L_COMMITDATE            < L_RECEIPTDATE
                        )
GROUP BY        O_ORDERPRIORITY
ORDER BY        O_ORDERPRIORITY
O_ORDERPRIORITY ORDER_COUNT
--------------- -----------
1-URGENT        10594
2-HIGH          10476
3-MEDIUM        10410
4-NOT SPECIFIED 10556
5-LOW           10487

(5 row(s) affected)

-- using default substitutions

/* TPC_H  Query 5 - Local Supplier Volume */

SELECT          N_NAME,
        SUM(L_EXTENDEDPRICE*(1-L_DISCOUNT))
        AS REVENUE
FROM   CUSTOMER,
        ORDERS,
        LINEITEM,
        SUPPLIER,
        NATION,
        REGION
WHEREC_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_EXTENDEDPRICE*L_DISCOUNT)
        AS REVENUE
FROM   LINEITEM
WHEREL_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_EXTENDEDPRICE*(1-
L_DISCOUNT)  AS VOLUME
                FROM   SUPPLIER,
                        LINEITEM,
                        ORDERS,
                        CUSTOMER,
                        NATION N1,
                        NATION N2
                WHERES_SUPPKEY      = L_SUPPKEY
AND
                        O_ORDERKEY  =
L_ORDERKEY AND
                        C_CUSTKEY      = O_CUSTKEY
AND
                        S_NATIONKEY =
N1.N_NATIONKEY AND
```

```
                C_NATIONKEY = N2.N_NATIONKEY AND
                (       (N1.N_NAME = 'FRANCE'   AND N2.N_NAME = 'GERMANY')
                        OR
                        (N1.N_NAME = 'GERMANY'  AND N2.N_NAME = 'FRANCE')
                ) AND
                L_SHIPDATE BETWEEN '1995-01-01' AND '1996-12-31'
        )       AS SHIPPING
GROUP BY        SUPP_NATION,
                CUST_NATION,
                L_YEAR
ORDER BY        SUPP_NATION,
                CUST_NATION,
                L_YEAR
SUPP_NATION             CUST_NATION             L_YEAR REVENUE
----------------------- ----------------------- ----------- ----------
FRANCE                  GERMANY                 1995 54639732.733600
FRANCE                  GERMANY                 1996 54633083.307600
GERMANY                 FRANCE                  1995 52531746.669700
GERMANY                 FRANCE                  1996 52520549.022400

(4 row(s) affected)

-- using default substitutions

/* TPC_H  Query 8 - National Market Share */

SELECT          O_YEAR,
        SUM(CASE        WHEN NATION = 'BRAZIL'
                        THEN VOLUME
                        ELSE 0
                        END) / SUM(VOLUME) AS MKT_SHARE
FROM    (       SELECT
        datepart(yy,O_ORDERDATE)        AS O_YEAR,
                        L_EXTENDEDPRICE * (1-L_DISCOUNT) AS VOLUME,
                        N2.N_NAME
        AS NATION
                FROM    PART,
                        SUPPLIER,
                        LINEITEM,
                        ORDERS,
                        CUSTOMER,
                        NATION N1,
                        NATION N2,
                        REGION
                WHERE   P_PARTKEY = L_PARTKEY AND
                        S_SUPPKEY = L_SUPPKEY AND
                        L_ORDERKEY = O_ORDERKEY AND
                        O_CUSTKEY = C_CUSTKEY AND
                        C_NATIONKEY = N1.N_NATIONKEY AND
                        N1.N_REGIONKEY = R_REGIONKEY AND
                        R_NAME = 'AMERICA' AND
                        S_NATIONKEY = N2.N_NATIONKEY AND
                        O_ORDERDATE BETWEEN '1995-01-01' AND '1996-12-31' AND
                        P_TYPE = 'ECONOMY ANODIZED STEEL'
        )       AS ALL_NATIONS
GROUP BY        O_YEAR
ORDER BY        O_YEAR
O_YEAR      MKT_SHARE
----------- ------------------------
1995        0.034436
1996        0.041486

(2 row(s) affected)

-- using default substitutions

/* TPC_H  Query 9 - Product Type Profit Measure */

SELECT          NATION,
        O_YEAR,
        SUM(AMOUNT)         AS SUM_PROFIT
FROM    (       SELECT          N_NAME
                                AS NATION,
                        datepart(yy, O_ORDERDATE)
                        AS O_YEAR,
                        L_EXTENDEDPRICE*(1-L_DISCOUNT)-PS_SUPPLYCOST*L_QUANTITY
        AS AMOUNT
                FROM    PART,
                        SUPPLIER,
                        LINEITEM,
                        PARTSUPP,
                        ORDERS,
                        NATION
                WHERE   S_SUPPKEY = L_SUPPKEY AND
                        PS_SUPPKEY = L_SUPPKEY AND
                        PS_PARTKEY = L_PARTKEY AND
                        P_PARTKEY = L_PARTKEY AND
```

```
                    O_ORDERKEY  =
L_ORDERKEY AND
                    S_NATIONKEY =
N_NATIONKEY AND
                    P_NAME                LIKE
'%%green%%'
          )         AS PROFIT
GROUP BY  NATION,
          O_YEAR
ORDER BY  NATION,
          O_YEAR    DESC
```

NATION	O_YEAR	SUM_PROFIT
ALGERIA	1998	31342867.234500
ALGERIA	1997	57138193.023300
ALGERIA	1996	56140140.133000
ALGERIA	1995	53051469.653400
ALGERIA	1994	53867582.128600
ALGERIA	1993	54942718.132400
ALGERIA	1992	54628034.712700
ARGENTINA	1998	30211185.708100
ARGENTINA	1997	50805741.752300
ARGENTINA	1996	51923746.575500
ARGENTINA	1995	49298625.766600
ARGENTINA	1994	50835610.109500
ARGENTINA	1993	51646079.177500
ARGENTINA	1992	50410314.994800
BRAZIL	1998	27217924.383200
BRAZIL	1997	48378669.198900
BRAZIL	1996	50482870.357200
BRAZIL	1995	47623383.634900
BRAZIL	1994	47840165.725600
BRAZIL	1993	49054694.035100
BRAZIL	1992	48667639.084200
CANADA	1998	30379833.768500
CANADA	1997	50465052.311400
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
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

```
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
WHEREC_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
```

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 64EaJ5vMAHWJlBOxJklpNc2RJiWE 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 Zgy4s50l2GKN4pLDPBU8m342gIw6R 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 iANyZHjqhyy7Ajah0pTrYyhJ 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 HgiV0phqhaIa9aydNoIlb 29-915-458-2654 nusual, even instructions: furiously stealthy n

(20 row(s) affected)

-- using default substitutions

/* TPC_H Query 11 - Important Stock Indentification */

```
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) *
0.0001000000
                        FROM    PARTSUPP,
                                SUPPLIER,
                                NATION
                        WHEREPS_SUPPKEY    =
S_SUPPKEY       AND
                                S_NATIONKEY =
N_NATIONKEY AND
                                N_NAME
        = 'GERMANY'
```

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

```
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
WHEREO_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
```

```
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
WHEREL_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
WHEREL_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
WHERES_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
WHEREP_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_CNTDESC,
                P_BRAND,
```

Appendix D

P_TYPE,
P_SIZE

P_BRAND	P_TYPE	P_SIZE	SUPPLIER_CNT
Brand#41	MEDIUM BRUSHED TIN	3	28
Brand#54	STANDARD BRUSHED COPPER	14	27
Brand#11	STANDARD BRUSHED TIN	23	24
Brand#11	STANDARD BURNISHED BRASS	36	24
Brand#15	MEDIUM ANODIZED NICKEL	3	24
Brand#15	SMALL ANODIZED BRASS	45	24
Brand#15	SMALL BURNISHED NICKEL	19	24
Brand#21	MEDIUM ANODIZED COPPER	3	24
Brand#22	SMALL BRUSHED NICKEL	3	24
Brand#22	SMALL BURNISHED BRASS	19	24
Brand#25	MEDIUM BURNISHED COPPER	36	24
Brand#31	PROMO POLISHED COPPER	36	24
Brand#33	LARGE POLISHED TIN	23	24
Brand#33	PROMO POLISHED STEEL	14	24
Brand#35	PROMO BRUSHED NICKEL	14	24
Brand#41	ECONOMY BRUSHED STEEL	9	24
Brand#41	ECONOMY POLISHED TIN	19	24
Brand#41	LARGE PLATED COPPER	36	24
Brand#42	ECONOMY PLATED BRASS	3	24
Brand#42	STANDARD POLISHED TIN	49	24
Brand#43	PROMO BRUSHED TIN	3	24
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

```
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
WHEREP_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
WHEREO_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
```

```
Customer#000054602      54602   5832321         1997-
02-09   471220.080000           307.000000
Customer#000105995      105995  2096705         1994-
07-03   469692.580000           307.000000
Customer#000148885      148885  2942469         1992-
05-31   469630.440000           313.000000
Customer#000114586      114586  551136          1993-
05-19   469605.590000           308.000000
Customer#000105260      105260  5296167         1996-
09-06   469360.570000           303.000000
Customer#000147197      147197  1263015         1997-
02-02   467149.670000           320.000000
Customer#000064483      64483   2745894         1996-
07-04   466991.350000           304.000000
Customer#000136573      136573  2761378         1996-
05-31   461282.730000           301.000000
Customer#000016384      16384   502886          1994-
04-12   458378.920000           312.000000
Customer#000117919      117919  2869152         1996-
06-20   456815.920000           317.000000
Customer#000012251      12251   735366          1993-
11-24   455107.260000           309.000000
Customer#000120098      120098  1971680         1995-
06-14   453451.230000           308.000000
Customer#000066098      66098   5007490         1992-
08-07   453436.160000           304.000000
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
Customer#000141098      141098  565574          1995-
09-24   430986.690000           301.000000
Customer#000093392      93392   5200102         1997-
01-22   425487.510000           304.000000
Customer#000015631      15631   1845057         1994-
05-12   419879.590000           302.000000
Customer#000112987      112987  4439686         1996-
09-17   418161.490000           305.000000
Customer#000012599      12599   4259524         1998-
02-12   415200.610000           304.000000
Customer#000105410      105410  4478371         1996-
03-05   412754.510000           302.000000
Customer#000149842      149842  5156581         1994-
05-30   411329.350000           302.000000
Customer#000010129      10129   5849444         1994-
03-21   409129.850000           309.000000
Customer#000069904      69904   1742403         1996-
10-19   408513.000000           305.000000
Customer#000017746      17746   6882            1997-
04-09   408446.930000           303.000000
Customer#000013072      13072   1481925         1998-
03-15   399195.470000           301.000000
Customer#000082441      82441   857959          1994-
02-07   382579.740000           305.000000
Customer#000088703      88703   2995076         1994-
01-30   363812.120000           302.000000

(57 row(s) affected)

-- using default substitutions

/* TPC_H  Query 19 - Discounted Revenue */

SELECT          SUM(L_EXTENDEDPRICE* (1 -
L_DISCOUNT)) AS REVENUE
FROM    LINEITEM,
        PART
WHERE(          P_PARTKEY       = L_PARTKEY
                                AND
                P_BRAND                 = 'Brand#12'
                                                AND
                P_CONTAINER IN ( 'SM CASE', 'SM
BOX', 'SM PACK', 'SM PKG')              AND
                L_QUANTITY      >= 1
                                AND
                L_QUANTITY      <= 1 + 10
                                AND
                P_SIZE          BETWEEN 1 AND 5
                                        AND
                L_SHIPMODE      IN ('AIR', 'AIR REG')
                                AND
                L_SHIPINSTRUCT          = 'DELIVER IN
PERSON'
        )
        OR
        (       P_PARTKEY       = L_PARTKEY
                                AND
                P_BRAND                 = 'Brand#23'
                                                AND
```

```
                P_CONTAINER IN ( 'MED BAG', 'MED
BOX', 'MED PKG', 'MED PACK') AND
                L_QUANTITY  >= 10
                            AND
                L_QUANTITY  <= 10 + 10
                            AND
                P_SIZE      BETWEEN 1 AND 10
                            AND
                L_SHIPMODE  IN ('AIR', 'AIR REG')
                            AND
                L_SHIPINSTRUCT      = 'DELIVER IN
PERSON'
        )
        OR
        (       P_PARTKEY   = L_PARTKEY
                            AND
                P_BRAND             = 'Brand#34'
                                              AND
                P_CONTAINER IN ( 'LG CASE', 'LG
BOX', 'LG PACK', 'LG PKG')          AND
                L_QUANTITY  >= 20
                            AND
                L_QUANTITY  <= 20 + 10
                            AND
                P_SIZE      BETWEEN 1 AND 15
                            AND
                L_SHIPMODE  IN ('AIR', 'AIR REG')
                            AND
                L_SHIPINSTRUCT      = 'DELIVER IN
PERSON'
        )
REVENUE
-----------------------
3083843.057800

(1 row(s) affected)

-- using default substitutions

/* TPC_H  Query 20 - Potential Part Promotion */

SELECT          S_NAME,
        S_ADDRESS
FROM    SUPPLIER,
        NATION
WHERES_SUPPKEY      IN      (       SELECT
        PS_SUPPKEY
                                    FROM
        PARTSUPP
                                    WHERE
        PS_PARTKEY in       (       SELECT
        P_PARTKEY

                FROM    PART

                WHEREP_NAME like 'forest%%'

        )       AND
                                                PS_AVAILQTY
                >       (       SELECT          0.5 *
sum(L_QUANTITY)

                        FROM    LINEITEM

                        WHEREL_PARTKEY      = PS_PARTKEY
                AND

                                L_SUPPKEY       = PS_SUPPKEY
                AND

                                L_SHIPDATE      >= '1994-01-01'
                AND

                                L_SHIPDATE      <
dateadd(yy,1,cast('1994-01-01' as date))

                )
                                        )       AND
                S_NATIONKEY = N_NATIONKEY       AND
                N_NAME                  = 'CANADA'
ORDER BY        S_NAME
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
l6i2nMwVuovfKnuVgaSGK2rDy65DlAFLegiL7
Supplier#000000761
zlSLelQUj2XrvTTFnv7WAcYZGvvMTx882d4
Supplier#000000884      bmhEShejaS
Supplier#000000887      urEaTejH5POADP2ARrf
Supplier#000000935      ij98czM
2KzWe7dDTOxB8sq0UfCdvrX
Supplier#000000975      ,AC e,tBpNwKb5xMUzeohxlRn,
hdZJo73gFQF8y
Supplier#000001263      rQWr6nf8ZhB2TAiIDIvo5Io
Supplier#000001399      LmrocnIMSyYOWuANx7
Supplier#000001446      lch9HMNU1R7a0LIybsUodVknk6
Supplier#000001454      TOpimgu2TVXIjhiL93h,
Supplier#000001500      wDmF5xLxtQch9ctVu,
Supplier#000001602      uKNWIeafaM644
Supplier#000001626      UhxNRzUu1dtFmp0
Supplier#000001682      pXTkGxrTQVyH1Rr
```

Appendix D

Supplier#000001699 Q9C4rfJ26oijVPqqcqVXeRI
Supplier#000001700 7hMlCof1Y5zLFg
Supplier#000001726 TeRY7TtTH24sEword7yAaSkjx8
Supplier#000001730 Rc8e,1Pybn r6zo0VJIEiD0UD vhk
Supplier#000001746
qWsendlOekQG1aW4uq06uQaCm51se8lirv7 hBRd
Supplier#000001752 Fra7outx41THYJaRThdOGiBk
Supplier#000001856
jXcRgzYF0ah05iR8p6w5SbJJLcUGyYiURPvFwUWM
Supplier#000001931 FpJbMU2h6ZR2eBv8I9NIxF
Supplier#000001939 Nrk,JA4bfReUs
Supplier#000001990
DSDJkCgBJzuPg1yuM,CUdLnsRliOxkkHezTCA
Supplier#000002020 jB6r1d7MxP6co
Supplier#000002022 dwebGX7Id2pc25YvY33
Supplier#000002036 20ytTtVObjKUUI2WCB0A
Supplier#000002204
uYmlr46C06udCqanj0KiRsoTQakZsEyssL
Supplier#000002243 nSOEV3JeOU79
Supplier#000002245
hz2qWXWVjOyKhqPYMoEwz6zFkrTaDM
Supplier#000002282
ES21K9dxoW1I1TzWCj7ekdlNwSWnv1Z 6mQ,BKn
Supplier#000002303 nCoWfpB6YOymbgOht7ltfklpkHl
Supplier#000002373 RzHSxOTQmElCjxIBiVA52Z
JB58rJhPRylR
Supplier#000002419 qydBQd14I5l5mVXa4fYY
Supplier#000002481
nLKHUOn2Ml9TOA06Znq9GEMcIlMO2
Supplier#000002571 JZUugz04c iJFLrlGsz9O N,W
1rVHNIReyq
Supplier#000002585
CsPoKpw2QuTY4AV1NkWuttneIa4SN
Supplier#000002630 ZIQAvjNUY9KH5ive zm7k
VlPiDl7CCo21
Supplier#000002719
4nnzQI2CbqREQUuIsXTBVUkaP4mNS3
Supplier#000002721 HVdFAN2JHMQSpKm
Supplier#000002730 lIFxR4fzm31C6,muzJwl84z
Supplier#000002775 yDclaDaBD4ihH
Supplier#000002853 rTNAOItXka
Supplier#000002875 6JgMi
9Qt6VmwL3Ltt1SRlKww0keLQ,RAZa
Supplier#000002934 m,trBENywSArwg3DhB
Supplier#000002941 Naddba 8YTEKekZyP0
Supplier#000002960
KCPCEsRGGo6vx8TygHh60nAYf9rStQT2T
Supplier#000002980
B9k9yVsyaXvWktOSHezqHiAEp9id0SKzkw
Supplier#000003062
LSQNgqY1xnOzz9zBCapy7HwOZQ
Supplier#000003087 ANwe8QsZ4rgj1HSqVz991eWQ
Supplier#000003089 s5b VCIZqMSZVa r
g7LTdcg29GbTE7rI1x
Supplier#000003095 HxON3jJhUi3zjt,r mTD
Supplier#000003201
E87yws6I,t0qNs4QW7UzExKiJnJDZWue
Supplier#000003213 pxrRP4irQ1VoyfQ,dTf3
Supplier#000003241 j06SU,LS9O3mwjAMOViANeIhb
Supplier#000003275 9xO4nyJ2QJcX6vGf
Supplier#000003288
EDdfNt7E5Uc,xLTupoIgYL4yY7ujh,
Supplier#000003313
El2I7we,049SPrvomUm4hZwJoOhZkvLxLJXgVH
Supplier#000003314
jnisU8MzqO4iUB3zsPcrysMw3DDUojS4q7LD
Supplier#000003380
jPv0V,pszouuFT3YsAqlP,kxT3u,gTFiEbRt,x
Supplier#000003403 e3X2o ,KCG9tsHji8A
XXCxiF2hZWBw
Supplier#000003421 Sh3dt9W5oeofFWovnFhrg,
Supplier#000003441 zvFJIzS,oUuShHjpcX
Supplier#000003590 sy79CMLxqb,Cbo
Supplier#000003607 lNqFHQYjwSAkf
Supplier#000003625
qY588W0Yk5iaUy1RXTgNrEKrMAjBYHcKs
Supplier#000003656 eEYmmO2gmD
JdfG32XtDgJV,db56
Supplier#000003782
iVsPZg7bk06TqNMwi0LKbLUrC1zmrg
Supplier#000003918 meRvRCsJoAbfqd0Re4
Supplier#000003941 Pmb05mQfBMS618O7WKqZJ
9vyv
Supplier#000003994 W00LZp3NjK0
Supplier#000004005
V723F1wCy2eA4OgIu8TjBtOVUHp
Supplier#000004033 ncsAhv9Je,kFXTNjfb2
Supplier#000004140 0hL7DJyYjcHL
Supplier#000004165
wTJ2dZNQA8P2oi99N6DT47ndHy,XKD2
Supplier#000004207
tF64pwiOM4IkWjN3mS,e06WuAjLx
Supplier#000004236
dl,HPtJmGipxYsSqn9wmqkuWjst,mCeJ8O6T
Supplier#000004246 Xha aXQF7u4qU3LsHD
Supplier#000004278 bBddbpBxIVp Di9
Supplier#000004343 GK3sbopqrQEkWLMvVBFCG
Supplier#000004346 S3076LEOwo
Supplier#000004388 VfZ l1J,mwp4aS
Supplier#000004406
Ah0ZaLu6VwufPWUz,7kbXgYZhauEaHqGIg
Supplier#000004430
yvSsKNSTL5HLXBET4luOsPNLxKzAMk
Supplier#000004522
xXtCKwsZDArxIBGDfzX2PgobGZsBg
Supplier#000004527 p
pVXCnxgcklWF6A1o3OHY3qW6
Supplier#000004542 NJSbLJDroYG2y1r3rDiKg
Supplier#000004574 1HvGwnVueZ5CIndc
Supplier#000004655 67NqBc4 t3PG3F8aO
IsqWNq4kGaPowYL
Supplier#000004701 6jX4u47URzIMHf
Supplier#000004711 bEzjp1QdQu ls2ERMxv0km
vn6bu2zXlL1
Supplier#000004987 UFx1upJ8MvOvgFjA8
Supplier#000005000 DeX804 w0H8FrCUvahgy
ilbuzBX3NK
Supplier#000005100 OfvYPs3Io,wEvvLHNaLuCX

Appendix D

Supplier#000005192 JDp4rhXiDw0kf6RH
Supplier#000005195 Woi3b2ZaicPh ZSfu1EfXhE
Supplier#000005283 5fxYXxwXy,TQX,MqDC2hxzyQ
Supplier#000005300 gXG28YqpxU
Supplier#000005386 Ub6AAfHpWLWP
Supplier#000005426 9Dz2OVT1q
sb4BK71ljQ1XjPBYRPvO
Supplier#000005484 saFdOR
qW7AFY,3asPqiiAa11Mo22pCoN0BtPrKo
Supplier#000005505 d2sbjG43KwMPX
Supplier#000005506 On f5ypzoWgB
Supplier#000005516
XsN99Ks9wEvcohU6jRD2MeebQFf76mD8vovuY
Supplier#000005536
Nzo9tGkpgbHT,EZ4D,77MYKl4ah1C
Supplier#000005605 7Vj6Eil0mThqkM
Supplier#000005631
14TVrjlzo2SJEBYCDgpMwTlvwSqC
Supplier#000005730 5rkb0PSews
HvxkL8JaD41UpnSF2cg8H1
Supplier#000005736 2dq XTYhtYWSfp
Supplier#000005737 dmEWcS32C3kx,d,B95 OmYn48
Supplier#000005797 ,o,OebwRbSDmVl9gN9fpWPCiqB
UogvlSR
Supplier#000005836 tx3SjPD2ZuWGFBRH,
Supplier#000005875
lK,sYiGzB94hSyHy9xvSZFbVQNCZe2LXZuGbS
Supplier#000005974
REhR5jE,lLusQXvf54SwYySgsSSVFhu
Supplier#000005989 rjFY,5kgLpBu7c
Supplier#000006059 4m0cv8MwJ9yX2vlwI Z
Supplier#000006065 UiI2Cy3W4Tu5sLk
LuvXLRy6KihlGv
Supplier#000006070 TalC5m0pDrO6DZbngfmGmqe
Supplier#000006109 rY5gbfh3dKHnylcQUTPGCwnbe
Supplier#000006121
S92ycWwEzYYw4GspCBJN1WMuHhoZ
Supplier#000006215
j2iEbTsl,5PWdqWZ7k1yiISb7qtiiZljDIPEo
Supplier#000006217 RVN23SYT9jenUeaWGXUd
Supplier#000006274 S3yTZWqxTKUq g QQgcW9
AqhCkNZsW51hHuwU
Supplier#000006435 xIgE69XszYbnO4Eon7cHHO8y
Supplier#000006463 7 wkdj2EO49iotley2kmIM
ADpLSszGV3RNWj
Supplier#000006493 ojV
f,sNaB6Hm7r,fknDVTL63raJgAjZK
Supplier#000006521 b9 2zjHzxR
Supplier#000006607 3F 2e2gqD5u5B
Supplier#000006706
Ak4ga,ePu1QZ6C3qkrqjosaX0gxvqS9vkbe
Supplier#000006761
n4jhxGMqB5prD1HhpLvwrWStOLlla
Supplier#000006808 HGd2Xo
9nEcHJhZvXjXxWKIpApT
Supplier#000006858
fnlINT885vBBhsWwTGiZ0o22thwGY16h GHJj21
Supplier#000006872 XIDPiA7PLXCWK6SeEcld
Supplier#000006949 mLxYUJhsGcLtKe
,GFirNu183AvT
Supplier#000006985
PrUUiboQpy,OtgJ01Z4BxJQUyrw9c3I
Supplier#000007072 2tRyX9M1a
4Rcm57s779F1ANG9jlpK
Supplier#000007098
G3j8g0KC4OcbAu2OVoPHrXQWMCUdjq8wgCHOExu
Supplier#000007135 ls DoKV7V5ulfQy9V
Supplier#000007160
TqDGBULB3cTqIT6FKDvm9BS4e4v,zwYiQPb
Supplier#000007169 tEc95D2moN9S84nd55O,dlnW
Supplier#000007322 wr7dgte5q
MAjiY0uwmi3MyDkSMX1
Supplier#000007365 51xhROLvQMJ05DndtZWt
Supplier#000007398 V8eE6oZ00OFNU,
Supplier#000007402 4UVv58ery1rjmqSR5
Supplier#000007448 yhhpWiJi7EJ6Q5VCaQ
Supplier#000007477
9m9j0wfhWzCvVHxkU,PpAxwSH0h
Supplier#000007509 q8,V6LJRoHJjHcOuSG7aLTMg
Supplier#000007561 rMcFg2530VC
Supplier#000007789
rQ7cUcPrtudOyO3svNSkimqH6qrfWT2Sz
Supplier#000007801 69fi,U1r6enUb
Supplier#000007818 yhhc2CQec Jrvc8zqBi83
Supplier#000007885
u3sicchh5ZpyTUpN1cJKNcAoabIWgY
Supplier#000007918 r,v9mBQ6LoEYyj1
Supplier#000007926 ErzCF80K9Uy
Supplier#000007957 ELwnio14ssoU1 dRyZIL OK3Vtzb
Supplier#000007965 F7Un5lJ7p5hhj
Supplier#000007968
DsF9UlZ2Fo6HXN9aErvyg1ikHoD582HSGZpP
Supplier#000007998
LnASFBfYRFOo9d6d,asBvVq9Lo2P
Supplier#000008168 aOa82a8ZbKCnfDLX
Supplier#000008231 IK7eGw Yj90sTdpsP,vcqWxLB
Supplier#000008243 2AyePMkDqmzVzjGTizXthFLo8h
EiudCMxOmIIG
Supplier#000008275 BlbNDfWg,gpXKQlLN
Supplier#000008323 75I18sZmASwm
POeheRMdj9tmpyeQ,BfCXN5BIAb
Supplier#000008366
h778cEj14BuW9OEKlvPTWq4iwASR6EBBXN7zeS8
Supplier#000008423
RQhKnkAhR0DAr3Ix4Q1weMMn00hNe Kq
Supplier#000008480 4sSDA4ACReklNjEm5T6b
Supplier#000008532
Uc29q4,5xVdDOF87UZrxhr4xWS0ihEUXuh
Supplier#000008595 MH0iB73GQ3z UW3O DbCbqmc
Supplier#000008610
SgVgP90vP452sUNTgzL9zKwXHXAzV6tV
Supplier#000008705 aE,trRNdPx,4yinTD9O3DebDIp
Supplier#000008742 HmPlQEzKCPEcTUL14,kKq
Supplier#000008841 I 85Lu1sekbg2xrSIzm0
Supplier#000008895
2cH4okfaLSZTTg8sKRbbJQxkmeFu2Esj

```
Supplier#000008967      2kwEHyMG
7FwozNImAUE6mH0hYtqYculJM
Supplier#000008972      w2vF6 D5YZO3visPXsqVfLADTK
Supplier#000009032      qK,trB6Sdy4Dz1BRUFNy
Supplier#000009147      rOAuryHxpZ9eOvx
Supplier#000009252      F7cZaPUHwh1
ZKyj3xmAVWC1XdP ue1p5m,i
Supplier#000009278      RqYTzgxj93CLX 0mcYfCENOefD
Supplier#000009327      uoqMdf7e7Gj9dbQ53
Supplier#000009430      igRqmneFt
Supplier#000009567      r4Wfx4c3xsEAjcGj71HHZByornl
D9vrztXlv4
Supplier#000009601      51m637bO,Rw5DnHWFUvLacRx9
Supplier#000009709
rRnCbHYgDgl9PZYnyWKVYSUW0vKg
Supplier#000009753      wLhVEcRmd7PkJF4FBnGK7Z
Supplier#000009796      z,y4Idmr15DOvPUqYG
Supplier#000009799       4wNjXGa4OKWl
Supplier#000009811      E3iuyq7UnZxU7oPZIe2Gu6
Supplier#000009812
APFRMy3lCbgFga53n5t9DxzFPQPgnjrGt32
Supplier#000009862      rJzweWeN58
Supplier#000009868      ROjGgx5gvtkmnUUoeyy7v
Supplier#000009869
ucLqxzrpBTRMewGSM29t0rNTM30g1Tu3Xgg3mKag
Supplier#000009899      7XdpAHrzr1t,UQFZE
Supplier#000009974
7wJ,J5DKcxSU4Kp1cQLpbcAvB5AsvKT

(204 row(s) affected)

-- using default substitutions

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

SELECT          TOP 100
        S_NAME,
        COUNT(*)        AS NUMWAIT
FROM    SUPPLIER,
        LINEITEM L1,
        ORDERS,
        NATION
WHERES_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
                        WHEREL2.L_ORDERKEY
        = L1.L_ORDERKEY     AND
                                L2.L_SUPPKEY <>
L1.L_SUPPKEY
                )       AND
        NOT EXISTS      (       SELECT          *
                                FROM    LINEITEM L3
                                WHERE
        L3.L_ORDERKEY               =
L1.L_ORDERKEY               AND
                                L3.L_SUPPKEY
        <> L1.L_SUPPKEY             AND

        L3.L_RECEIPTDATE    > L3.L_COMMITDATE
                        )       AND
        S_NATIONKEY = N_NATIONKEY       AND
        N_NAME              = 'SAUDI ARABIA'
GROUP BY        S_NAME
ORDER BY        NUMWAIT     DESC,
                S_NAME
S_NAME              NUMWAIT
------------------------- -----------
Supplier#000002829      20
Supplier#000005808      18
Supplier#000000262      17
Supplier#000000496      17
Supplier#000002160      17
Supplier#000002301      17
Supplier#000002540      17
Supplier#000003063      17
Supplier#000005178      17
Supplier#000008331      17
Supplier#000002005      16
Supplier#000002095      16
Supplier#000005799      16
Supplier#000005842      16
Supplier#000006450      16
Supplier#000006939      16
Supplier#000009200      16
Supplier#000009727      16
Supplier#000000486      15
Supplier#000000565      15
Supplier#000001046      15
Supplier#000001047      15
Supplier#000001161      15
Supplier#000001336      15
Supplier#000001435      15
Supplier#000003075      15
Supplier#000003335      15
Supplier#000005649      15
Supplier#000006027      15
Supplier#000006795      15
Supplier#000006800      15
Supplier#000006824      15
Supplier#000007131      15
Supplier#000007382      15
Supplier#000008913      15
Supplier#000009787      15
Supplier#000000633      14
Supplier#000001960      14
Supplier#000002323      14
Supplier#000002490      14
Supplier#000002993      14
Supplier#000003101      14
Supplier#000004489      14
Supplier#000005435      14
```

```
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

(100 row(s) affected)
```

```
-- using default substitutions

/* TPC_H  Query 22 - Global Sales Opportunity */

SELECT          CNTRYCODE,
        COUNT(*)        AS NUMCUST,
        SUM(C_ACCTBAL)      AS TOTACCTBAL
FROM    (       SELECT
        SUBSTRING(C_PHONE,1,2)      AS
CNTRYCODE,
                        C_ACCTBAL
                FROM    CUSTOMER
                WHERESUBSTRING(C_PHONE,1,2)
        IN      ('13', '31', '23', '29', '30', '18', '17')    AND
                        C_ACCTBAL               >
        (       SELECT          AVG(C_ACCTBAL)

        FROM    CUSTOMER

        WHEREC_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)
```

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

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 RUSSIA 0.0000010000
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: 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>
#ifndef VMS
#include <sys/types.h>
#endif
#if defined(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_STRT(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->clen);
   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].clen);
      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->clen);
   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 =
print_prep(tbl, -num);
                                                if (dfp
== NULL) return(-1);
                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 LINTEITEM tables
--
WHILE @startdate < @enddate
        BEGIN
        --
        --  Insert into ORDERS and LINEITEM tables
        --
        INSERT_TRANS:
        SET @success = 1
        BEGIN TRANSACTION

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

```
                        PRINT ERROR_MESSAGE()
                        SELECT          @ErrorNumber =
ERROR_NUMBER(),
                                @ErrorSeverity =
ERROR_SEVERITY(),
                                @ErrorState =
ERROR_STATE(),
                                @ErrorLine =
ERROR_LINE(),
                                @ErrorProcedure =
ISNULL(ERROR_PROCEDURE(), '-');
                        SELECT @ErrorMessage =
N'Error %%d, Level %%d, State %%d, Procedure %%s, Line
%%d, ' +

                'Message: '+ ERROR_MESSAGE();
                        IF (@@trancount>0)
                                ROLLBACK
TRANSACTION
                        RAISERROR
                            (
                            @ErrorMessage,
                            @ErrorSeverity,
                            1,
                            @ErrorNumber,    --
parameter: original error number.
                            @ErrorSeverity,  -- parameter:
original error severity.
                            @ErrorState,     -- parameter:
original error state.
                            @ErrorProcedure, --
parameter: original error procedure name.
                            @ErrorLine       -- parameter:
original error line number.
                            );
                        END
        END CATCH

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

        COMMIT TRANSACTION

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

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

        END
END

GO
```

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
TRANSACTION
                        END
                ELSE
                        BEGIN                       -- not a
deadlock
                        PRINT ERROR_MESSAGE()
                        SELECT          @ErrorNumber =
ERROR_NUMBER(),
                            @ErrorSeverity =
ERROR_SEVERITY(),
                            @ErrorState =
ERROR_STATE(),
                            @ErrorLine =
ERROR_LINE(),
                            @ErrorProcedure =
ISNULL(ERROR_PROCEDURE(), '-');
```

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

                'Message: '+ ERROR_MESSAGE();
                        IF (@@trancount>0)
                                ROLLBACK
TRANSACTION
                        RAISERROR
                            (
                            @ErrorMessage,
                            @ErrorSeverity,
                            1,
                            @ErrorNumber,    --
parameter: original error number.
                            @ErrorSeverity,  -- parameter:
original error severity.
                            @ErrorState,     -- parameter:
original error state.
                            @ErrorProcedure, --
parameter: original error procedure name.
                            @ErrorLine       -- parameter:
original error line number.
                            );
                        END
        END CATCH

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

        COMMIT TRANSACTION

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

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

        END
END

GO
```

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

' Stucture 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 lInstId As Long

   ParentInstId = 0

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

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

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

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

   sLabel = msLblThroughputRF12Mgr
   sIt = 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(lInstId) & _
         " and iterator_value = " & MakeStringFieldValid(sIt)
   mrecDtls.FindFirst sSql
   If mrecDtls.NoMatch = True Then
      MsgBox "Step " & "'" & sLabel & "'" & _
            " not found for iterator " & "'" & sIt & "'" & ". " & _
            "The Throughput Run was not completely
executed!"
      Exit Function
   End If

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

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

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

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

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

End Function

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

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

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

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

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

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

arQuerySequence(miStreamPowerRun + 7, miQueryIdMin) = 18
arQuerySequence(miStreamPowerRun + 7, miQueryIdMin + 1) = 8
arQuerySequence(miStreamPowerRun + 7, miQueryIdMin + 2) = 20
arQuerySequence(miStreamPowerRun + 7, miQueryIdMin + 3) = 21

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

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

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

```
    arQuerySequence(miStreamPowerRun + 9, miQueryIdMin
+ 18) = 9
    arQuerySequence(miStreamPowerRun + 9, miQueryIdMin
+ 19) = 14
    arQuerySequence(miStreamPowerRun + 9, miQueryIdMin
+ 20) = 5
    arQuerySequence(miStreamPowerRun + 9, miQueryIdMin
+ 21) = 16

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

End Sub

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

    Dim strSQL As String

    On Error GoTo QueryRunDetailsErr

    Screen.MousePointer = vbHourglass

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

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

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

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

    'mrecDtls.Close
    CloseDbAndWsp

    Screen.MousePointer = vbDefault

    Exit Sub

QueryRunDetailsErr:

    Screen.MousePointer = vbDefault
    DisplayErrors

    CloseDbAndWsp

End Sub

Public Sub QueryAndSetSFStreams(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."
          '    mrecDtls.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
TPCHMetrics form.
   ' Validates all the user inputs and calls a function to
generate
   ' the reports if inputs are valid.
   ' Initializes module-level variables to the values input by the
user
   Dim sTemp As String

   On Error GoTo GenerateSelectedErr

   ' Initialize the enabled value for the type of report being
generated
   mbRunType(eRunType.Power) = _
         (frmTPCHMetrics.chkRun(eRunType.Power).Value =
vbChecked)
   mbRunType(eRunType.Throughput) = _

(frmTPCHMetrics.chkRun(eRunType.Throughput).Value =
vbChecked)

   If (Not mbRunType(eRunType.Power) And Not
mbRunType(eRunType.Throughput)) Then
      MsgBox "Atleast one report type must be selected."
      Exit Sub
   End If

      ' Initialize the workspace definition file
   msDbFile = Trim(frmTPCHMetrics.txtDbFile)
   If msDbFile = gsEmptyString Then
      MsgBox "Please enter the workspace definition file (.stp)
containing the run history."
      Exit Sub
   End If

   ' Initialize the MasterLog file
   msOutput = Trim(frmTPCHMetrics.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(frmTPCHMetrics.cboStreams.Text)
      If sTemp = gsEmptyString Then
         MsgBox "Please enter the number of throughput
streams that were executed."
         Exit Sub
      End If

      If IsNumeric(sTemp) = False Then
         MsgBox "The number of throughput streams must be
numeric."
         Exit Sub
      End If

      miStreamIdHi = CInt(sTemp)
      If miStreamIdHi < 1 Or miStreamIdHi > miStreamIdMax
Then
         MsgBox "Number of throughput streams must range
from 1 to 10. " & _
                "Disable the throughput run checkbox if no
throughput streams were executed."
         Exit Sub
      End If
   End If

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

```
   If msOutput = gsEmptyString Then
      MsgBox "Please enter the output file name."
      Exit Sub
   End If

   msOutput = MakePathValid(msOutput)
   If msOutput = gsEmptyString Then
      MsgBox "The output file path is not valid. Please enter a
valid path."
      Exit Sub
   End If

   If Dir$(msOutput, vbNormal + vbHidden + vbReadOnly +
vbSystem) <> gsEmptyString Then
      MsgBox "The output file already exists. Please delete it
or enter a new one."
      Exit Sub
   End If

   ' Initialize the 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, msFmtNumberPadWZeroes)

   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 GetEndStepItThroughput(iQueryId As
Integer) As String
   ' Returns the iterator value for the passed in query identifier
   ' for the throughput run
   ' Returns the iterator value that marks the end of execution
for the query
   ' E.g. in the HP version of the TPC-H Kit, query 15 is
executed in
   ' 2 parts. Therefore, the iterator value for the start of query
15
   ' is 15V but the the iterator value for the end of query 15 is
15

   Debug.Assert iQueryId = miQuery15
   GetEndStepItThroughput = miQuery15

End Function
#End If

Private Function LabelStartThroughput(iStream As Integer, _
      iQuery As Integer) As String
   ' Returns the step label for the passed in query and stream in
the
   ' throughput run
   ' Returns the label that marks the start of execution for the
query
   ' E.g. TPC-H Kit, Stream1, RF1: the start time for the
refresh function
   ' is the start time for the step, 'Throughput - Semaphore
Loop for RF Delay'
   ' but the end time for the refresh function is the end time for
the step,
   ' 'Throughput - Execute Stream1 RF1'
   ' Similarly, in the HP version of the TPC-H Kit, Throughput
Run, RF1:
   ' the start time for RF1 is the start time for the step,
   ' 'Wait for Throughput Run' but the end time for RF1 is the
end time
   ' for the step, 'Throughput RF1'

   #If TPCH_KIT Then
      Select Case iQuery
         Case miQueryIdRF1
            LabelStartThroughput = IIf(iStream =
miStreamPowerRun + 1, _
                  msStartStepLabelThroughputRF1First, _
                  msLblThroughputRF1)

         Case miQueryIdRF2
            LabelStartThroughput = msLblThroughputRF2

         Case Else
            LabelStartThroughput =
msStepLabelThroughputOther & _
                  Format$(iStream, msFmtNumberWOZeroes)
      End Select
   #Else
      Select Case iQuery
         Case miQueryIdRF1
```

```
            LabelStartThroughput =
msStartStepLabelThroughputRF1

         Case miQueryIdRF2
            LabelStartThroughput =
msStartStepLabelThroughputRF2

         Case Else
            LabelStartThroughput =
msStartStepLabelThroughputOther & _
                  Format$(iStream, msFmtNumberPadWZeroes)
      End Select
   #End If

End Function
Private Function LabelEndThroughput(iStream As Integer,
iQuery As Integer) As String
   ' Returns the step label for the passed in query and stream in
the
   ' throughput run
   ' Returns the label that marks the end of execution for the
query
   ' E.g. TPC-H Kit, Stream1, RF1: the start time for the
refresh function
   ' is the start time for the step, 'Throughput - Semaphore
Loop for RF Delay'
   ' but the end time for the refresh function is the end time for
the step,
   ' 'Throughput - Execute Stream1 RF1'
   ' Similarly, in the HP version of the TPC-H Kit, Throughput
Run, RF1:
   ' the start time for RF1 is the start time for the step,
   ' 'Wait for Throughput Run' but the end time for RF1 is the
end time
   ' for the step, 'Throughput RF1'

#If TPCH_KIT Then
   Select Case iQuery
      Case miQueryIdRF1
         LabelEndThroughput = msLblThroughputRF1

      Case miQueryIdRF2
         LabelEndThroughput = IIf(iStream = miStreamIdHi, _
               msLblThroughputRF2,
msEndStepLabelThroughputRF2Rest)

      Case Else
         Debug.Assert True
   End Select

#Else
   LabelEndThroughput = msEndStepLabelThroughputRF1
#End If

End Function

Private Function IteratorThroughput(iStream As Integer,
iQuery As Integer) As String
   ' Returns the iterator value for the passed in stream and
query
   ' for the throughput run
   ' Returns the iterator value that marks the start of execution
for the query
   ' E.g. in the HP version of the TPC-H Kit, query 15 is
executed in
   ' 2 parts. Therefore, the iterator value for the start of query
15
   ' is 15V but the the iterator value for the end of query 15 is
15

#If TPCH_KIT Then
   Dim iQIndex As Integer
#End If

   Select Case iQuery
      Case miQueryIdRF1
         IteratorThroughput = msFirstRFIterator

      Case miQueryIdRF2
         IteratorThroughput = msFirstRFIterator

      Case Else
         #If TPCH_KIT Then
            ' The step iterates from 1 to 22 but the queries are
generated
            ' by qgen in the order that they should be executed
in.
            ' e.g. Stream1Q1.sql contains the query
corresponding to
            ' Stream 1, Query 21
            For iQIndex = miQueryIdMin To miQueryIdMax
Step 1
               If arQuerySequence(iStream, iQIndex) = iQuery
Then
                  Exit For
               End If
            Next iQIndex

            IteratorThroughput = Format$(iQIndex,
msFmtNumberWOZeroes)
         #Else
            IteratorThroughput = Format$(iQuery,
msFmtNumberWOZeroes)
            If iQuery = miQuery15 Then
               ' Query 15 starts with the creation of the view
               ' The query file is 15V + StreamId.sql and the
iterator
               ' value is 15V
               IteratorThroughput = IteratorThroughput & "V"
            End If
         #End If
   End Select

End Function
Private Function IteratorPowerRF(iStream As Integer, iQuery
As Integer) As String
```

```
   ' Returns the iterator value for the passed in query in the
PowerRun

   Debug.Assert iQuery = miQueryIdRF1 Or iQuery =
miQueryIdRF2

   Select Case iQuery
      Case miQueryIdRF1
         IteratorPowerRF = msFirstRFIterator

      Case miQueryIdRF2
         IteratorPowerRF = msFirstRFIterator

   End Select

End Function

Private Sub CollectStats()
   ' This function determines the start time, end time and start
time for
   ' the next step (if applicable) for each query in each stream

   Dim iStreamId As Integer
   Dim 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

               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!"
                     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!"
                     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
               iNextStream = iStreamId
               sLabel = LabelStartThroughput(iNextStream,
iNextQuery)
```

```
            sSql = "step_label = " &
MakeStringFieldValid(sLabel)
            #If TPCH_KIT Then
               sIt = IteratorThroughput(iNextStream,
iNextQuery)
               sSql = sSql & " and iterator_value = " &
MakeStringFieldValid(sIt)
            #Else
               sIt = IteratorThroughput(iNextStream,
iNextQuery)
               sSql = sSql & " and iterator_value = " &
MakeStringFieldValid(sIt)
            #End If

            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 interpretted 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
         lRunId = mrecDtls.Fields("run_id").Value
         cboLoad.AddItem CStr(lRunId)

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

   mrecDtls.Close

   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(mlRunId)
  Print #hOutputFile, "Database Scale Factor:" & vbTab &
CStr(mfSF)
  Print #hOutputFile, "Query Streams for Throughput Test:"
& vbTab & CStr(miStreamIdHi)
  Print #hOutputFile, "Measurement Interval in Throughput
Test (Ts):" & vbTab & CStr(fElapsedThroughput) & vbTab &
vbTab & _
              "Start Time: " & vbTab & sStartTm & vbTab
& vbTab & _
              "End Time: " & vbTab & sEndTm
  Print #hOutputFile, "TPC-H Power:" & vbTab &
CStr(fQppPower)
  Print #hOutputFile, "TPC-H Throughput:" & vbTab &
CStr(fQppThroughput)
  Print #hOutputFile, "TPC-H Composite Query-Per-Hour
Rating (QphH):" & vbTab & CStr(fQppH)
  Print #hOutputFile,

  ' Print Query names in column header
  Print #hOutputFile, vbTab;

  For iQIndex = miQueryIdMin To miQueryIdRF1 - 1
    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 TPCH timing intervals for each query in timing grid
  For iSIndex = miStreamIdLo To miStreamIdHi

    sPrint = "Stream " & Format$(iSIndex,
msFmtNumberPadWZeroes) & vbTab
    Print #hOutputFile, sPrint;

    For iQIndex = miQueryIdMin To miQueryIdMax Step 1

      sPrint = CStr(arExecutionDtls(iSIndex,
iQIndex).ElapsedTpch) & vbTab
      Print #hOutputFile, sPrint;
    Next iQIndex

    Print #hOutputFile,

  Next iSIndex

  Print #hOutputFile,
  Print #hOutputFile, "Elapsed times for each step"
  Print #hOutputFile,

  ' Print elapsed times for each query in timing grid
  For iSIndex = miStreamIdLo To miStreamIdHi

    sPrint = "Stream " & Format$(iSIndex,
msFmtNumberPadWZeroes) & vbTab
    Print #hOutputFile, sPrint;

    For iQIndex = miQueryIdMin To miQueryIdMax Step 1

      sPrint = CStr(arExecutionDtls(iSIndex,
iQIndex).ElapsedTime) & vbTab
      Print #hOutputFile, sPrint;
    Next iQIndex

    Print #hOutputFile,

  Next iSIndex

  Print #hOutputFile,
  Print #hOutputFile, vbTab & 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)
  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
```

RF1_exec.cmd

```
Rem This File creates load and exec files, launch parallel
loads, create indexes and launch parallel execs for the RF1
stored procedure
@setlocal ENABLEDELAYEDEXPANSION


REM RF stream num
set TPCH_RF_STREAM_NUM=%1

REM output dir
set TPCH_RUN_NUM=%2

REM Master log comment
set TPCH_COMMENT_STR=%3


set TPCH_NUM_RF_EXEC_STREAMS=%4
set TPCH_NUM_RF_EXEC_TOTAL=%5
set TPCH_RF_EXEC_BATCH_SIZE=%6
set TPCH_UF_DIR=%7
set TPCH_NUM_RF_LOAD_STREAMS=%8
set TPCH_NUM_RF_LOAD_FILES=%9



set
TPCH_OUTPUT_DIR=%TPCH_OUTPUT_DIR_PREFIX%\
%TPCH_RUN_NUM%
if not exist %TPCH_OUTPUT_DIR% md
%TPCH_OUTPUT_DIR%
set
TPCH_MASTERLOG_FILE=%TPCH_OUTPUT_DIR%\%T
PCH_MASTERLOG_NAME%

echo !DATE! !TIME! Start: Executing
%TPCH_COMMENT_STR%_STREAM_%TPCH_RF_STR
EAM_NUM% >> %TPCH_MASTERLOG_FILE%

pushd %TPCH_OUTPUT_DIR%

REM Create Tables

        echo !DATE! !TIME! Start: create_tables_RF1 >>
%TPCH_MASTERLOG_FILE%


        call
%TPCH_AUTOMATION_CMD_PATH%\execSQLFileList.
cmd create_tables_RF1_%TPCH_RF_STREAM_NUM%.txt
%TPCH_RUN_NUM% no no no


        echo !DATE! !TIME! End: create_tables_RF1 >>
%TPCH_MASTERLOG_FILE%


REM launch parallel loads

        echo !DATE! !TIME! Start:
launch_parallel_loads_RF1  >>
%TPCH_MASTERLOG_FILE%
        call
%TPCH_AUTOMATION_CMD_PATH%\SemExecMain.cm
d %TPCH_RUN_NUM%
RF1_Load_List_%TPCH_RF_STREAM_NUM%.txt
%TPCH_NUM_RF_LOAD_STREAMS%
        echo !DATE! !TIME! End:
launch_parallel_loads_RF1  >>
%TPCH_MASTERLOG_FILE%


REM create indexes
        echo !DATE! !TIME! Start: create_indexes_RF1  >>
%TPCH_MASTERLOG_FILE%
        call
%TPCH_AUTOMATION_CMD_PATH%\RFs\startCollectW
rapper.cmd %TPCH_RUN_NUM%
%TPCH_COMMENT_STR%_Create_Indexes

        call
%TPCH_AUTOMATION_CMD_PATH%\execSQLFileList.
cmd create_indices_RF1_%TPCH_RF_STREAM_NUM%.txt
%TPCH_RUN_NUM% no no no

        call
%TPCH_AUTOMATION_CMD_PATH%\RFs\stopCollectW
```



```
rapper.cmd %TPCH_RUN_NUM%
%TPCH_COMMENT_STR%_Create_Indexes
        echo !DATE! !TIME! End: create_indexes_RF1  >>
%TPCH_MASTERLOG_FILE%

REM launch parallel execs

        echo !DATE! !TIME! Start:
launch_parallel_execs_RF1  >>
%TPCH_MASTERLOG_FILE%
        call
%TPCH_AUTOMATION_CMD_PATH%\SemExecMain.cm
d %TPCH_RUN_NUM%
RF1_Execute_List_%TPCH_RF_STREAM_NUM%.txt
%TPCH_NUM_RF_EXEC_STREAMS%
        echo !DATE! !TIME! End:
launch_parallel_execs_RF1  >>
%TPCH_MASTERLOG_FILE%

REM Drop Tables

        echo !DATE! !TIME! Start: drop_tables_RF1 >>
%TPCH_MASTERLOG_FILE%
        call
%TPCH_AUTOMATION_CMD_PATH%\execSQLFileList.
cmd drop_tables_RF1_%TPCH_RF_STREAM_NUM%.txt
%TPCH_RUN_NUM% no no no
        echo !DATE! !TIME! End: drop_tables_RF1 >>
%TPCH_MASTERLOG_FILE%


echo !DATE! !TIME! End: Executing
%TPCH_COMMENT_STR%_STREAM_%TPCH_RF_STR
EAM_NUM% >> %TPCH_MASTERLOG_FILE%

REM sqlcmd -E -i
%TPCH_AUTOMATION_SQL%\Dump_Row_Count.sql -o
Post_RF1_Row_count_%TPCH_RF_STREAM_NUM%.txt

endlocal
```

RF1_preCreate.cmd

```
Rem This File creates load and exec files, launch parallel
loads, create indexes and launch parallel execs for the RF1
stored procedure

@setlocal ENABLEDELAYEDEXPANSION

REM RF stream num
set TPCH_RF_STREAM_NUM=%1

REM output dir
set TPCH_RUN_NUM=%2

REM Master log comment
set TPCH_COMMENT_STR=%3
set TPCH_NUM_RF_EXEC_STREAMS=%4
set TPCH_NUM_RF_EXEC_TOTAL=%5
set TPCH_RF_EXEC_BATCH_SIZE=%6
set TPCH_UF_DIR=%7
set TPCH_NUM_RF_LOAD_STREAMS=%8
set TPCH_NUM_RF_LOAD_FILES=%9

set
TPCH_OUTPUT_DIR=%TPCH_OUTPUT_DIR_PREFIX%\
%TPCH_RUN_NUM%
if not exist %TPCH_OUTPUT_DIR% md
%TPCH_OUTPUT_DIR%
set
TPCH_MASTERLOG_FILE=%TPCH_OUTPUT_DIR%\%T
PCH_MASTERLOG_NAME%

pushd %TPCH_OUTPUT_DIR%

REM create tables and indexes

copy
%TPCH_AUTOMATION_SQL%\RF_templ\Create_RF1_Ta
bles.sql
echo Create_RF1_Tables.sql >
create_tables_RF1_%TPCH_RF_STREAM_NUM%.txt

copy
%TPCH_AUTOMATION_SQL%\RF_templ\Drop_RF1_Tabl
es.sql
echo Drop_RF1_Tables.sql >
drop_tables_RF1_%TPCH_RF_STREAM_NUM%.txt

copy
%TPCH_AUTOMATION_SQL%\RF_templ\Create_RF1_Ind
ices.sql
echo Create_RF1_Indices.sql >
create_indices_RF1_%TPCH_RF_STREAM_NUM%.txt


REM create load files

if exist
(RF1_Load_List_%TPCH_RF_STREAM_NUM%.txt) del
RF1_Load_List_%TPCH_RF_STREAM_NUM%.txt

set /A LOCAL_CURR_STREAM = 1
:outerLoopLoadCreate

        set /A LOCAL_CURR_LOAD =
%LOCAL_CURR_STREAM%


        :innerLoopLoadCreate

        REM create load file
        set SET_FILE_NUM=%LOCAL_CURR_LOAD%

        echo :setvar ffLoc %TPCH_UF_DIR%\
                >
```

```
load_RF1_input.%TPCH_RF_STREAM_NUM%.%LOCAL_
CURR_LOAD%.sql
        echo :setvar partNo %LOCAL_CURR_LOAD%
                                        >>
load_RF1_input.%TPCH_RF_STREAM_NUM%.%LOCAL_
CURR_LOAD%.sql
        type
%TPCH_AUTOMATION_SQL%\RF_templ\Load_RF1_tmpl
.sql                    >>
load_RF1_input.%TPCH_RF_STREAM_NUM%.%LOCAL_
CURR_LOAD%.sql

        REM add it to load file list
        echo
load_RF1_input.%TPCH_RF_STREAM_NUM%.%LOCAL_
CURR_LOAD%.sql >>
RF1_Load_List_%TPCH_RF_STREAM_NUM%.txt

        set /A LOCAL_CURR_LOAD =
%LOCAL_CURR_LOAD% +
%TPCH_NUM_RF_LOAD_STREAMS%
        if %LOCAL_CURR_LOAD% LEQ
%TPCH_NUM_RF_LOAD_FILES% goto
innerLoopLoadCreate


set /A LOCAL_CURR_STREAM =
%LOCAL_CURR_STREAM% + 1
if %LOCAL_CURR_STREAM% LEQ
%TPCH_NUM_RF_LOAD_STREAMS% goto
outerLoopLoadCreate


REM create exec files

if exist
(RF1_Execute_List_%TPCH_RF_STREAM_NUM%.txt) del
RF1_Execute_List_%TPCH_RF_STREAM_NUM%.txt

set /A LOCAL_CURR_STREAM = 1
:outerLoopExecCreate

        set /A LOCAL_CURR_EXEC =
%LOCAL_CURR_STREAM%


        :innerLoopExecCreate

        REM create exec file

        echo :setvar currExec %LOCAL_CURR_EXEC%
                >
exec_RF1_input.%TPCH_RF_STREAM_NUM%.%LOCAL_
CURR_EXEC%.sql
        echo :setvar batchSize
%TPCH_RF_EXEC_BATCH_SIZE%               >>
exec_RF1_input.%TPCH_RF_STREAM_NUM%.%LOCAL_
CURR_EXEC%.sql
        echo :setvar numParallelExecs
%TPCH_NUM_RF_EXEC_STREAMS%   >>
exec_RF1_input.%TPCH_RF_STREAM_NUM%.%LOCAL_
CURR_EXEC%.sql
        echo :setvar totalExecs
%TPCH_NUM_RF_EXEC_TOTAL%                >>
exec_RF1_input.%TPCH_RF_STREAM_NUM%.%LOCAL_
CURR_EXEC%.sql
        type
%TPCH_AUTOMATION_SQL%\RF_templ\Execute_RF1_t
mpl.sql>>
exec_RF1_input.%TPCH_RF_STREAM_NUM%.%LOCAL_
CURR_EXEC%.sql

        REM add it to exec file list
        echo
exec_RF1_input.%TPCH_RF_STREAM_NUM%.%LOCAL_
CURR_EXEC%.sql >>
RF1_Execute_List_%TPCH_RF_STREAM_NUM%.txt

        set /A LOCAL_CURR_EXEC =
%LOCAL_CURR_EXEC% +
%TPCH_NUM_RF_EXEC_STREAMS%
        if %LOCAL_CURR_EXEC% LEQ
%TPCH_NUM_RF_EXEC_TOTAL% goto
innerLoopExecCreate

set /A LOCAL_CURR_STREAM =
%LOCAL_CURR_STREAM% + 1
if %LOCAL_CURR_STREAM% LEQ
%TPCH_NUM_RF_EXEC_STREAMS% goto
outerLoopExecCreate


endlocal
```

RF2_exec.cmd

```
Rem This File creates load and exec files, launch parallel
loads, create indexes and launch parallel execs for the RF2
stored procedure
@setlocal ENABLEDELAYEDEXPANSION

REM RF stream num
set TPCH_RF_STREAM_NUM=%1

REM output dir
set TPCH_RUN_NUM=%2

REM Master log comment
set TPCH_COMMENT_STR=%3

set TPCH_NUM_RF_EXEC_STREAMS=%4
set TPCH_NUM_RF_EXEC_TOTAL=%5
set TPCH_RF_EXEC_BATCH_SIZE=%6
set TPCH_UF_DIR=%7
set TPCH_NUM_RF_LOAD_STREAMS=%8
set TPCH_NUM_RF_LOAD_FILES=%9
```

```
set
TPCH_OUTPUT_DIR=%TPCH_OUTPUT_DIR_PREFIX%\
%TPCH_RUN_NUM%
if not exist %TPCH_OUTPUT_DIR% md
%TPCH_OUTPUT_DIR%
set
TPCH_MASTERLOG_FILE=%TPCH_OUTPUT_DIR%\%T
PCH_MASTERLOG_NAME%

echo !DATE! !TIME! Start: Executing
%TPCH_COMMENT_STR%_STREAM_%TPCH_RF_STR
EAM_NUM% >> %TPCH_MASTERLOG_FILE%

pushd %TPCH_OUTPUT_DIR%

REM create tables

        echo !DATE! !TIME! Start: create_tables_RF2 >>
%TPCH_MASTERLOG_FILE%


call
%TPCH_AUTOMATION_CMD_PATH%\execSQLFileList.
cmd create_tables_RF2_%TPCH_RF_STREAM_NUM%.txt
%TPCH_RUN_NUM% no no no



        echo !DATE! !TIME! End: create_tables_RF2 >>
%TPCH_MASTERLOG_FILE%
REM launch parallel loads

        echo !DATE! !TIME! Start:
launch_parallel_loads_RF2  >>
%TPCH_MASTERLOG_FILE%
                call
%TPCH_AUTOMATION_CMD_PATH%\SemExecMain.cm
d %TPCH_RUN_NUM%
RF2_Load_List_%TPCH_RF_STREAM_NUM%.txt
%TPCH_NUM_RF_LOAD_STREAMS%
        echo !DATE! !TIME! End:
launch_parallel_loads_RF2  >>
%TPCH_MASTERLOG_FILE%

REM create indexes
        echo !DATE! !TIME! Start: create_indexes_RF2  >>
%TPCH_MASTERLOG_FILE%
        call
%TPCH_AUTOMATION_CMD_PATH%\RFs\startCollectW
rapper.cmd %TPCH_RUN_NUM%
%TPCH_COMMENT_STR%_Create_Indexes

        call
%TPCH_AUTOMATION_CMD_PATH%\execSQLFileList.
cmd create_indices_RF2_%TPCH_RF_STREAM_NUM%.txt
%TPCH_RUN_NUM% no no no

        call
%TPCH_AUTOMATION_CMD_PATH%\RFs\stopCollectW
rapper.cmd %TPCH_RUN_NUM%
%TPCH_COMMENT_STR%_Create_Indexes
        echo !DATE! !TIME! End: create_indexes_RF2  >>
%TPCH_MASTERLOG_FILE%

REM launch parallel execs

        echo !DATE! !TIME! Start:
launch_parallel_execs_RF2  >>
%TPCH_MASTERLOG_FILE%
                call
%TPCH_AUTOMATION_CMD_PATH%\SemExecMain.cm
d %TPCH_RUN_NUM%
RF2_Execute_List_%TPCH_RF_STREAM_NUM%.txt
%TPCH_NUM_RF_EXEC_STREAMS%
        echo !DATE! !TIME! End:
launch_parallel_execs_RF2  >>
%TPCH_MASTERLOG_FILE%


REM Drop Tables

        echo !DATE! !TIME! Start: drop_tables_RF2 >>
%TPCH_MASTERLOG_FILE%
        call
%TPCH_AUTOMATION_CMD_PATH%\execSQLFileList.
cmd drop_tables_RF2_%TPCH_RF_STREAM_NUM%.txt
%TPCH_RUN_NUM% no no no
        echo !DATE! !TIME! End: drop_tables_RF2 >>
%TPCH_MASTERLOG_FILE%

        Rem Skip this step this the update step is
incremented through step master
        rem call
%TPCH_AUTOMATION_CMD_PATH%\execSQLFileList.
cmd
Increment_Update_Set_RF2_%TPCH_RF_STREAM_NUM
%.txt %TPCH_RUN_NUM% no no no

echo !DATE! !TIME! End: Executing
%TPCH_COMMENT_STR%_STREAM_%TPCH_RF_STR
EAM_NUM% >> %TPCH_MASTERLOG_FILE%

rem sqlcmd -E -i
%TPCH_AUTOMATION_SQL%\Dump_Row_Count.sql -o
Post_RF2_Row_count_%TPCH_RF_STREAM_NUM%.txt

endlocal
```

RF2_preCreate.cmd

```
Rem This File creates load and exec files, launch parallel
loads, create indexes and launch parallel execs for the RF2
stored procedure
@setlocal ENABLEDELAYEDEXPANSION

REM RF stream num
set TPCH_RF_STREAM_NUM=%1
```

```
REM output dir
set TPCH_RUN_NUM=%2

REM Master log comment
set TPCH_COMMENT_STR=%3

set TPCH_NUM_RF_EXEC_STREAMS=%4
set TPCH_NUM_RF_EXEC_TOTAL=%5
set TPCH_RF_EXEC_BATCH_SIZE=%6
set TPCH_UF_DIR=%7
set TPCH_NUM_RF_LOAD_STREAMS=%8
set TPCH_NUM_RF_LOAD_FILES=%9

set
TPCH_OUTPUT_DIR=%TPCH_OUTPUT_DIR_PREFIX%\
%TPCH_RUN_NUM%
if not exist %TPCH_OUTPUT_DIR% md
%TPCH_OUTPUT_DIR%
set
TPCH_MASTERLOG_FILE=%TPCH_OUTPUT_DIR%\%T
PCH_MASTERLOG_NAME%

pushd %TPCH_OUTPUT_DIR%

REM create tables and indexes etc

REM Diff from RF1
echo :setvar totalSegments
%TPCH_NUM_RF_LOAD_FILES% >
Create_RF2_Tables.sql
type
%TPCH_AUTOMATION_SQL%\RF_templ\Create_RF2_Ta
bles.sql  >> Create_RF2_Tables.sql
copy
%TPCH_AUTOMATION_SQL%\RF_templ\Increment_Upd
ate_Set.sql

echo Create_RF2_Tables.sql >
create_tables_RF2_%TPCH_RF_STREAM_NUM%.txt

copy
%TPCH_AUTOMATION_SQL%\RF_templ\Create_RF2_Ind
ices.sql
echo Create_RF2_Indices.sql >
create_indices_RF2_%TPCH_RF_STREAM_NUM%.txt

echo :setvar totalSegments
%TPCH_NUM_RF_LOAD_FILES% >
Drop_RF2_Tables.sql
type
%TPCH_AUTOMATION_SQL%\RF_templ\Drop_RF2_Tabl
es.sql  >> Drop_RF2_Tables.sql
echo Drop_RF2_Tables.sql >
drop_tables_RF2_%TPCH_RF_STREAM_NUM%.txt
echo Increment_Update_Set.sql >>
Increment_Update_Set_RF2_%TPCH_RF_STREAM_NUM
%.txt


REM create load files

if exist
(RF2_Load_List_%TPCH_RF_STREAM_NUM%.txt) del
RF2_Load_List_%TPCH_RF_STREAM_NUM%.txt

set /A LOCAL_CURR_STREAM = 1
:outerLoopLoadCreate

        set /A LOCAL_CURR_LOAD =
%LOCAL_CURR_STREAM%

        :innerLoopLoadCreate

        REM create load file
        set SET_FILE_NUM=%LOCAL_CURR_LOAD%



        echo :setvar ffLoc %TPCH_UF_DIR%\
                                        >
load_RF2_input.%TPCH_RF_STREAM_NUM%.%LOCAL_
CURR_LOAD%.sql
        echo :setvar partNo %LOCAL_CURR_LOAD%
                                                >>
load_RF2_input.%TPCH_RF_STREAM_NUM%.%LOCAL_
CURR_LOAD%.sql
        type
%TPCH_AUTOMATION_SQL%\RF_templ\Load_RF2_tmpl
.sql                                    >>
load_RF2_input.%TPCH_RF_STREAM_NUM%.%LOCAL_
CURR_LOAD%.sql

        REM add it to load file list
        echo
load_RF2_input.%TPCH_RF_STREAM_NUM%.%LOCAL_
CURR_LOAD%.sql >>
RF2_Load_List_%TPCH_RF_STREAM_NUM%.txt

        set /A LOCAL_CURR_LOAD =
%LOCAL_CURR_LOAD% +
%TPCH_NUM_RF_LOAD_STREAMS%
        if %LOCAL_CURR_LOAD% LEQ
%TPCH_NUM_RF_LOAD_FILES% goto
innerLoopLoadCreate


set /A LOCAL_CURR_STREAM =
%LOCAL_CURR_STREAM% + 1
if %LOCAL_CURR_STREAM% LEQ
%TPCH_NUM_RF_LOAD_STREAMS% goto
outerLoopLoadCreate

REM create exec files
```

```
if exist
(RF2_Execute_List_%TPCH_RF_STREAM_NUM%.txt) del
RF2_Execute_List_%TPCH_RF_STREAM_NUM%.txt

set /A LOCAL_CURR_STREAM = 1
:outerLoopExecCreate

        set /A LOCAL_CURR_EXEC =
%LOCAL_CURR_STREAM%

        :innerLoopExecCreate

        REM create exec file

        echo :setvar currExec %LOCAL_CURR_EXEC%
                >
exec_RF2_input.%TPCH_RF_STREAM_NUM%.%LOCAL_
CURR_EXEC%.sql
        echo :setvar batchSize
%TPCH_RF_EXEC_BATCH_SIZE%                >>
exec_RF2_input.%TPCH_RF_STREAM_NUM%.%LOCAL_
CURR_EXEC%.sql
        echo :setvar numParallelExecs
%TPCH_NUM_RF_EXEC_STREAMS%   >>
exec_RF2_input.%TPCH_RF_STREAM_NUM%.%LOCAL_
CURR_EXEC%.sql
        echo :setvar totalExecs
%TPCH_NUM_RF_EXEC_TOTAL%                 >>
exec_RF2_input.%TPCH_RF_STREAM_NUM%.%LOCAL_
CURR_EXEC%.sql
        type
%TPCH_AUTOMATION_SQL%\RF_templ\Execute_RF2_t
mpl.sql>>
exec_RF2_input.%TPCH_RF_STREAM_NUM%.%LOCAL_
CURR_EXEC%.sql

        REM add it to exec file list
        echo
exec_RF2_input.%TPCH_RF_STREAM_NUM%.%LOCAL_
CURR_EXEC%.sql >>
RF2_Execute_List_%TPCH_RF_STREAM_NUM%.txt

        set /A LOCAL_CURR_EXEC =
%LOCAL_CURR_EXEC% +
%TPCH_NUM_RF_EXEC_STREAMS%
        if %LOCAL_CURR_EXEC% LEQ
%TPCH_NUM_RF_EXEC_TOTAL% goto
innerLoopExecCreate

set /A LOCAL_CURR_STREAM =
%LOCAL_CURR_STREAM% + 1
if %LOCAL_CURR_STREAM% LEQ
%TPCH_NUM_RF_EXEC_STREAMS% goto
outerLoopExecCreate

echo Increment_Update_Set.sql >>
Increment_Update_Set_RF2_%TPCH_RF_STREAM_NUM
%.txt
        endlocal
```

RFStreams_exec.cmd

```
Rem This File launches
%TPCH_NUM_THROUGHPUT_STREAMS% RF Streams
in the Throughput RF phase

@setlocal ENABLEDELAYEDEXPANSION

REM output dir
set TPCH_RUN_NUM=%1
set
TPCH_OUTPUT_DIR=%TPCH_OUTPUT_DIR_PREFIX%\
%TPCH_RUN_NUM%

set TPCH_NUM_RF_EXEC_STREAMS=%2
set TPCH_NUM_RF_EXEC_TOTAL=%3
set TPCH_RF_EXEC_BATCH_SIZE=%4
set TPCH_UF_DIR=%5
set TPCH_NUM_RF_LOAD_STREAMS=%6
set TPCH_NUM_RF_LOAD_FILES=%7

pushd %TPCH_OUTPUT_DIR%
REM Exec each stream

set /A LOCAL_CURR_STREAM = 1
:outerRFLoop

        REM  exec RF1
        call
%TPCH_AUTOMATION_CMD_PATH%\RFs\RF1_exec.cm
d %LOCAL_CURR_STREAM% %TPCH_RUN_NUM%
Throughput_RF1_Stream%LOCAL_CURR_STREAM%
%TPCH_NUM_RF_EXEC_STREAMS%
%TPCH_NUM_RF_EXEC_TOTAL%
%TPCH_RF_EXEC_BATCH_SIZE% %TPCH_UF_DIR%
%TPCH_NUM_RF_LOAD_STREAMS%
%TPCH_NUM_RF_LOAD_FILES%

        REM  exec RF2
        call
%TPCH_AUTOMATION_CMD_PATH%\RFs\RF2_exec.cm
d %LOCAL_CURR_STREAM% %TPCH_RUN_NUM%
Throughput_RF2_Stream%LOCAL_CURR_STREAM%
%TPCH_NUM_RF_EXEC_STREAMS%
%TPCH_NUM_RF_EXEC_TOTAL%
%TPCH_RF_EXEC_BATCH_SIZE% %TPCH_UF_DIR%
%TPCH_NUM_RF_LOAD_STREAMS%
%TPCH_NUM_RF_LOAD_FILES%


        set /A LOCAL_CURR_STREAM =
%LOCAL_CURR_STREAM% + 1
if %LOCAL_CURR_STREAM% LEQ
%TPCH_NUM_THROUGHPUT_STREAMS% goto
outerRFLoop
```

```
if exist
%TPCH_AUTOMATION_CMD_PATH%\CollectRFPlans.c
md (
        call
%TPCH_AUTOMATION_CMD_PATH%\CollectRFPlans.c
md %TPCH_RUN_NUM%
)

popd

endlocal
```

RFStreams_preCreate.cmd

```
Rem This File launches
%TPCH_NUM_THROUGHPUT_STREAMS% RF Streams
in the Throughput RF phase

@setlocal ENABLEDELAYEDEXPANSION

REM output dir
set TPCH_RUN_NUM=%1
set
TPCH_OUTPUT_DIR=%TPCH_OUTPUT_DIR_PREFIX%\
%TPCH_RUN_NUM%

set TPCH_NUM_RF_EXEC_STREAMS=%2
set TPCH_NUM_RF_EXEC_TOTAL=%3
set TPCH_RF_EXEC_BATCH_SIZE=%4
set TPCH_UF_DIR=%5
set TPCH_NUM_RF_LOAD_STREAMS=%6
set TPCH_NUM_RF_LOAD_FILES=%7
set TPCH_NUM_THROUGHPUT_STREAMS=%8

pushd %TPCH_OUTPUT_DIR%
REM Exec each stream

set /A LOCAL_CURR_STREAM = 1
:outerRFLoop

        REM  exec RF1
        call
%TPCH_AUTOMATION_CMD_PATH%\GateRFs\RF1_pre
Create.cmd %LOCAL_CURR_STREAM%
%TPCH_RUN_NUM%
Throughput_RF1_Stream%LOCAL_CURR_STREAM%
%TPCH_NUM_RF_EXEC_STREAMS%
%TPCH_NUM_RF_EXEC_TOTAL%
%TPCH_RF_EXEC_BATCH_SIZE% %TPCH_UF_DIR%
%TPCH_NUM_RF_LOAD_STREAMS%
%TPCH_NUM_RF_LOAD_FILES%

        REM  exec RF2
        call
%TPCH_AUTOMATION_CMD_PATH%\GateRFs\RF2_pre
Create.cmd %LOCAL_CURR_STREAM%
%TPCH_RUN_NUM%
Throughput_RF1_Stream%LOCAL_CURR_STREAM%
%TPCH_NUM_RF_EXEC_STREAMS%
%TPCH_NUM_RF_EXEC_TOTAL%
%TPCH_RF_EXEC_BATCH_SIZE% %TPCH_UF_DIR%
%TPCH_NUM_RF_LOAD_STREAMS%
%TPCH_NUM_RF_LOAD_FILES%

        set /A LOCAL_CURR_STREAM =
%LOCAL_CURR_STREAM% + 1
if %LOCAL_CURR_STREAM% LEQ
%TPCH_NUM_THROUGHPUT_STREAMS% goto
outerRFLoop

)

popd

endlocal
```

startCollectWrapper.cmd

```
@setlocal ENABLEDELAYEDEXPANSION

set TPCH_RUN_NUM=%1
set CommentStr=%2

        start
%TPCH_AUTOMATION_CMD_PATH%\startPerfmonColle
ction.cmd %TPCH_RUN_NUM% %CommentStr%

endlocal
```

stopCollectWrapper.cmd

```
@setlocal ENABLEDELAYEDEXPANSION

set TPCH_RUN_NUM=%1
set CommentStr=%2

        call
%TPCH_AUTOMATION_CMD_PATH%\stopPerfmonColle
ction.cmd %CommentStr%

endlocal
```

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
   lpstrFileTitle As String
   nMaxFileTitle As Long
   lpstrInitialDir As String
   lpstrTitle As String
   Flags As Long
   nFileOffset As Integer
   nFileExtension As Integer
   lpstrDefExt As String
   lCustData As Long
   lpfnHook As Long
   lpTemplateName As Long
End Type

Private Declare Function GetOpenFileName Lib
"COMDLG32" _
      Alias "GetOpenFileNameA" (file As OPENFILENAME)
As Long

Public Const MAX_PATH = 255
Public Const gsEmptyString As String = ""
Public Const gsSQ As String = "'"
Public Const gsPeriod As String = "."
Public Const gsDefDBFileExt As String = ".stp"
Public Const gsFileSeparator = "\"
Public Const gsPipe = "|"
Public Const gsNullValue = "null"

Private Const ms_DLG_TITLE_OPEN = "Open"

Private Enum EOpenFile
   OFN_OVERWRITEPROMPT = &H2
   OFN_HIDEREADONLY = &H4
   OFN_FILEMUSTEXIST = &H1000
   OFN_EXPLORER = &H80000
End Enum

Private Const ml_FILE_DB_FLAGS =
OFN_FILEMUSTEXIST
' Note: The flag below is meaningless, since it doesn't work
for open file dialogs
Private Const ml_FILE_OUTPUT_FLAGS =
OFN_OVERWRITEPROMPT

Private Const ms_FILE_ALL_FILTER = "|All Files (*.*)|*.*"
Private Const ms_FILE_DB_FILTER = "Stepmaster
Workspace Files (*" & gsDefDBFileExt & ")|*" &
gsDefDBFileExt
Private Const ms_FILE_OUTPUT_FILTER = "Text Files
(*.txt)|*.txt"
Public Function MakeStringFieldValid(strField As String) As
String
   ' Returns a string that can be appended to any insert
   ' or modify (sql) statement

   ' It checks whether the text is empty
   ' If so, it returns the string, "null"
   If strField = gsEmptyString Then
      MakeStringFieldValid = gsNullValue
   Else
      ' Single-quotes have to be replaced by two single-quotes,
      ' since a single-quote is the identifier delimiter
      ' character - call a procedure to do the replace
      MakeStringFieldValid = ReplaceSubString(strField,
gsSQ, gsSQ & gsSQ)

      ' Replace pipe characters with the corresponding chr
function
      MakeStringFieldValid = ReplaceSubString(strField,
gsPipe, "' & Chr(124) & "')

      ' Enclose the string in single quotes
      MakeStringFieldValid = gsSQ & strField & gsSQ

   End If

End Function
Public Function ReplaceSubString(ByVal MainString As
String, _
      ByVal ReplaceString As String, _
      ByVal ReplaceWith As String) As String

   ' Replaces all occurrences of ReplaceString in MainString
with ReplaceWith

   Dim intPos As Integer
   Dim strTemp As String

   strTemp = MainString

   intPos = InStr(strTemp, ReplaceString)
   Do While intPos <> 0
      strTemp = Left(strTemp, intPos - 1) & ReplaceWith & _
            Mid(strTemp, intPos + Len(ReplaceString))
```

```
      intPos = InStr(intPos + Len(ReplaceString) + 1, strTemp,
ReplaceString)
   Loop
   ReplaceSubString = strTemp

End Function

Public Function ShowFileOpenDialog(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 ShowFileOpenDialogErr

   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
      ShowFileOpenDialog = Left$(opfile.lpstrFile,
InStr(opfile.lpstrFile, vbNullChar) - 1)
   Else
      ShowFileOpenDialog = strOldFile
   End If

   Exit Function

ShowFileOpenDialogErr:
   Call DisplayErrors
   ' Reset the selection to the passed in file, if any
   ShowFileOpenDialog = 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
```

TPCHMetrics Statistics Collection Scripts

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
```

TPCHMetrics.frm

```
VERSION 5.00
Begin VB.Form frmTPCHMetrics
   BorderStyle     =   3  'Fixed Dialog
   Caption         =   "TPCH Reports"
   ClientHeight    =   7320
   ClientLeft      =   45
   ClientTop       =   330
   ClientWidth     =   6495
   Icon            =   "TPCHMetrics.frx":0000
   LinkTopic       =   "Form1"
   MaxButton       =   0   'False
   MinButton       =   0   'False
   ScaleHeight     =   7320
   ScaleWidth      =   6495
   ShowInTaskbar   =   0   'False
   StartUpPosition =   2  'CenterScreen
   Begin VB.ComboBox cboStreams
      Height          =   315
      Left            =   3420
      TabIndex        =   6
      Top             =   4680
      Width           =   1215
   End
   Begin VB.ComboBox cboSF
      Height          =   315
      Left            =   1740
      TabIndex        =   5
      Top             =   4680
      Width           =   1215
   End
   Begin VB.CommandButton cmdReport
      Caption         =   "Generate"
      Default         =   -1  'True
      Height          =   495
      Left            =   1920
      TabIndex        =   9
      Top             =   6600
      Width           =   1215
```

```
End
Begin VB.CommandButton cmdExit
  Cancel        =   -1  'True
  Caption       =   "Exit"
  Height        =   495
  Left          =   3360
  TabIndex      =   10
  Top           =   6600
  Width         =   1215
End
Begin VB.TextBox txtMasterLogFile
  Height        =   375
  Left          =   660
  TabIndex      =   16
  Top           =   1440
  Width         =   4695
End
Begin VB.CommandButton cmdBrowseLog
  Caption       =   "..."
  Height        =   375
  Left          =   5340
  TabIndex      =   2
  Top           =   1440
  Width         =   495
End
Begin VB.Frame fraRun
  Caption       =   "Generate Report for:"
  Height        =   615
  Left          =   1560
  TabIndex      =   15
  Top           =   5520
  Width         =   3375
  Begin VB.CheckBox chkRun
    Caption       =   "Power Run"
    Height        =   255
    Index         =   1
    Left          =   240
    TabIndex      =   7
    Top           =   240
    Width         =   1215
  End
  Begin VB.CheckBox chkRun
    Caption       =   "Throughput Run"
    Height        =   255
    Index         =   2
    Left          =   1560
    TabIndex      =   8
    Top           =   240
    Width         =   1575
  End
End
Begin VB.ComboBox cboRunId
  Height        =   315
  Left          =   2220
  TabIndex      =   4
  Top           =   3480
  Width         =   2055
End
Begin VB.CommandButton cmdBrowseOutput
  Caption       =   "..."
  Height        =   375
  Left          =   5340
  TabIndex      =   3
  Top           =   2400
  Width         =   495
End
Begin VB.TextBox txtReport
  Height        =   375
  Left          =   660
  TabIndex      =   14
  Top           =   2400
  Width         =   4695
End
Begin VB.TextBox txtDbFile
  Height        =   375
  Left          =   660
  TabIndex      =   12
  Top           =   480
  Width         =   4695
End
Begin VB.CommandButton cmdBrowse
  Caption       =   "..."
  Height        =   375
  Left          =   5340
  TabIndex      =   1
  Top           =   480
  Width         =   495
End
Begin VB.Frame fraSFandStreams
  Height        =   1095
  Left          =   1320
  TabIndex      =   18
  Top           =   4080
  Width         =   3855
  Begin VB.Label lblSF
    AutoSize      =   -1  'True
    Caption       =   "Scale Factor:"
    Height        =   195
    Left          =   600
    TabIndex      =   20
    Top           =   240
    Width         =   945
  End
  Begin VB.Label lblStreams
    AutoSize      =   -1  'True
    Caption       =   "Throughput Streams"
    Height        =   195
    Left          =   2040
    TabIndex      =   19
    Top           =   240
    Width         =   1440
  End
End
Begin VB.Line Line3
  X1            =   60
  X2            =   6540
  Y1            =   3960
  Y2            =   3960
```

```
  End
  Begin VB.Line Line4
    X1           =   -60
    X2           =   6420
    Y1           =   5280
    Y2           =   5280
  End
  Begin VB.Line Line2
    X1           =   60
    X2           =   6540
    Y1           =   3000
    Y2           =   3000
  End
  Begin VB.Label Label1
    AutoSize       =   -1  'True
    Caption        =   "MasterLog File:"
    Height         =   195
    Left           =   720
    TabIndex       =   17
    Top            =   1080
    Width          =   1080
  End
  Begin VB.Label lblReport
    AutoSize       =   -1  'True
    Caption        =   "Report file:"
    Height         =   195
    Left           =   720
    TabIndex       =   13
    Top            =   2040
    Width          =   765
  End
  Begin VB.Label lblWspFile
    AutoSize       =   -1  'True
    Caption        =   "Workspace Definition file:"
    Height         =   195
    Left           =   720
    TabIndex       =   11
    Top            =   120
    Width          =   1815
  End
  Begin VB.Line Line1
    X1           =   60
    X2           =   6540
    Y1           =   6360
    Y2           =   6360
  End
  Begin VB.Label lblRunId
    AutoSize       =   -1  'True
    Caption        =   "Run Identifier:"
    Height         =   195
    Left           =   2692
    TabIndex       =   0
    Top            =   3120
    Width          =   990
  End
End
Attribute VB_Name = "frmTPCHMetrics"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = False
Attribute VB_PredeclaredId = True
Attribute VB_Exposed = False
'  FILE:       frmTpchMetrics.frm
'              Reporting Program for Microsoft TPC-H Kit Ver.
2.7.0-1004
'              Copyright Microsoft, 2008
'              All Rights Reserved
'
'
'  PURPOSE:    Main form 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 Sub cboRunId_LostFocus()

    Call QueryAndSetSFStreams(Me.txtDbFile.Text)

End Sub

Private Sub cboSF_Change()

    ' Event triggered when the scale factor is modified.

    Call SFChanged

End Sub

Private Sub chkRun_Click(Index As Integer)
    ' Event triggered when the user checks/unchecks the Power
Run or
    ' Throughput Run checkbox

    Call NumStreamsEnabled(Index)

End Sub

Private Sub cmdBrowse_Click()
    ' Event triggered when the user clicks on the browse
command for the
    ' workspace definition file

    Dim sDbFile As String
    Dim sDbFileOld As String

    ' Call a procedure to display the Open File dialog
    sDbFile = BrowseStpFile(Me.txtDbFile)
    If sDbFile <> gsEmptyString Then
        Me.txtDbFile = sDbFile

        ' If the user selects a new workspace definition file, load
all run
```

```
      ' identifiers in the workspace in the 'Run Identifier'
combo box
      If sDbFile <> sDbFileOld Then
         Call LoadRunIds(Me.cboRunId, sDbFile)
      End If
   End If

End Sub

Private Sub cmdBrowseLog_Click()
   ' Event triggered when the user clicks on the browse
command for the
   ' MasterLog file

   Dim sOutput As String

   ' Call a procedure to display the Open File dialog
   sOutput = BrowseOutputFile(Me.txtMasterLogFile)
   If sOutput <> gsEmptyString Then
      Me.txtMasterLogFile = sOutput
   End If

End Sub

Private Sub cmdBrowseOutput_Click()
   ' Event triggered when the user clicks on the browse
command for the
   ' report file

   Dim sOutput As String

   ' Call a procedure to display the Open File dialog
   sOutput = BrowseOutputFile(Me.txtReport)
   If sOutput <> gsEmptyString Then
      Me.txtReport = sOutput
   End If

End Sub

Private Sub cmdExit_Click()
   ' Event triggered when the user clicks on the Exit command

   ' Unload the input form
   Unload Me

End Sub


Private Sub cmdReport_Click()
   ' Event triggered when the user clicks on the Generate
command

   ' Call a procedure to perform validations and generate the
TPCH Metrics report
   Call GenerateSelected

End Sub
```

```
Private Sub Form_Load()

   ' Startup procedure for this project
   Me.Caption = "TPC-H Metrics (Version 2.7.0-1004)"

   ' Perform initialization

   ' Set default values for Generate Power and Throughput run
report (on by default)
   Me.chkRun(eRunType.Power).Value = vbChecked
   Me.chkRun(eRunType.Throughput).Value = vbChecked

   ' Enable the number of throughput streams only if the
Throughput run is checked
   Call NumStreamsEnabled(eRunType.Throughput)

   ' Call a procedure to initialize data structures
   Call Initialize

End Sub
```

TPCHMetrics.vbp

```
Type=Exe
Reference=*\G{00020430-0000-0000-C000-
000000000046}#2.0#0#C:\WINDOWS\SysWow64\stdole2.tl
b#OLE Automation
Reference=*\G{00025E01-0000-0000-C000-
000000000046}#5.0#0#C:\WINDOWS\SysWow64\dao360.dl
l#Microsoft DAO 3.6 Object Library
Reference=*\G{1B31AB30-D7C1-41DB-B654-
C9FA1A7D267F}#1.0#0#C:\WINDOWS\SysWow64\SMTi
me.dll#SMTime 1.0 Type Library
Form=TPCHMetrics.frm
Module=Utility; Utility.bas
Module=ErrHandling; ErrHandling.bas
Module=TPCHReports; TPCHReports.bas
IconForm="frmTPCHMetrics"
Startup="frmTPCHMetrics"
HelpFile=""
Title="TPCHMetrics"
ExeName32="TPCHMetrics.exe"
Path32=".."
Command32=""
Name="TPCHMetrics"
HelpContextID="0"
CompatibleMode="0"
MajorVer=2
MinorVer=7
RevisionVer=1004
AutoIncrementVer=0
ServerSupportFiles=0
VersionCompanyName="Microsoft"
CondComp="TPCH_KIT = -1"
CompilationType=-1
OptimizationType=0
FavorPentiumPro(tm)=0
CodeViewDebugInfo=0
```

```
NoAliasing=0
BoundsCheck=0
OverflowCheck=0
FlPointCheck=0
FDIVCheck=0
UnroundedFP=0
StartMode=0
Unattended=0
Retained=0
ThreadPerObject=0
MaxNumberOfThreads=1
DebugStartupOption=0

[MS Transaction Server]
AutoRefresh=1
```

TPCHMetrics.vbw

```
frmTPCHMetrics = 0, 0, 453, 440, Z, 0, 0, 464, 412, C
Utility = 44, 44, 497, 484,
ErrHandling = 66, 66, 519, 506,
TPCHReports = 110, 110, 563, 550,
```

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

' Stucture 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 lInstId As Long

   ParentInstId = 0

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

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

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

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

   sLabel = msLblThroughputRF12Mgr
   sIt = 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(lInstId) & _
         " and iterator_value = " & MakeStringFieldValid(sIt)
   mrecDtls.FindFirst sSql
   If mrecDtls.NoMatch = True Then
      MsgBox "Step " & "'" & sLabel & "'" & _
            " not found for iterator " & "'" & sIt & "'" & ". " & _
            "The Throughput Run was not completely
executed!"
```

```
      Exit Function
   End If

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

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

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

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

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

End Function

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

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

arQuerySequence(miStreamPowerRun + 3, miQueryIdMin + 21) = 3

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

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

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

arQuerySequence(miStreamPowerRun + 6, miQueryIdMin + 12) = 12
arQuerySequence(miStreamPowerRun + 6, miQueryIdMin + 13) = 1
arQuerySequence(miStreamPowerRun + 6, miQueryIdMin + 14) = 5
arQuerySequence(miStreamPowerRun + 6, miQueryIdMin + 15) = 16
arQuerySequence(miStreamPowerRun + 6, miQueryIdMin + 16) = 2
arQuerySequence(miStreamPowerRun + 6, miQueryIdMin + 17) = 14
arQuerySequence(miStreamPowerRun + 6, miQueryIdMin + 18) = 19
arQuerySequence(miStreamPowerRun + 6, miQueryIdMin + 19) = 20
arQuerySequence(miStreamPowerRun + 6, miQueryIdMin + 20) = 17
arQuerySequence(miStreamPowerRun + 6, miQueryIdMin + 21) = 21

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

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

arQuerySequence(miStreamPowerRun + 9, miQueryIdMin) = 8
arQuerySequence(miStreamPowerRun + 9, miQueryIdMin + 1) = 13
arQuerySequence(miStreamPowerRun + 9, miQueryIdMin + 2) = 2

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

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

End Sub

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

   Dim strSQL As String

   On Error GoTo QueryRunDetailsErr

   Screen.MousePointer = vbHourglass

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

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

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

   Set mrecDtls = mDB.OpenRecordset(strSQL,
dbOpenSnapshot)
   If mrecDtls.RecordCount = 0 Then
```

```
    Screen.MousePointer = vbDefault
    MsgBox "There are no records in the database for the run
identifier." & _
           " Unable to generate reports."
  Else
    Call CollectStats
  End If

  'mrecDtls.Close
  CloseDbAndWsp

  Screen.MousePointer = vbDefault

  Exit Sub

QueryRunDetailsErr:

  Screen.MousePointer = vbDefault
  DisplayErrors

  CloseDbAndWsp

End Sub

Public Sub QueryAndSetSFStreams(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."
      '   mrecDtls.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
TPCHMetrics form.
    ' Validates all the user inputs and calls a function to
generate
    ' the reports if inputs are valid.
    ' Initializes module-level variables to the values input by the
user
    Dim sTemp As String

    On Error GoTo GenerateSelectedErr

    ' Initialize the enabled value for the type of report being
generated
    mbRunType(eRunType.Power) = _
          (frmTPCHMetrics.chkRun(eRunType.Power).Value =
vbChecked)
    mbRunType(eRunType.Throughput) = _

(frmTPCHMetrics.chkRun(eRunType.Throughput).Value =
vbChecked)

    If (Not mbRunType(eRunType.Power) And Not
mbRunType(eRunType.Throughput)) Then
       MsgBox "Atleast one report type must be selected."
       Exit Sub
    End If

       ' Initialize the workspace definition file
    msDbFile = Trim(frmTPCHMetrics.txtDbFile)
    If msDbFile = gsEmptyString Then
       MsgBox "Please enter the workspace definition file (.stp)
containing the run history."
       Exit Sub
    End If

    ' Initialize the MasterLog file
    msOutput = Trim(frmTPCHMetrics.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(frmTPCHMetrics.cboStreams.Text)
      If sTemp = gsEmptyString Then
         MsgBox "Please enter the number of throughput
streams that were executed."
         Exit Sub
      End If

      If IsNumeric(sTemp) = False Then
         MsgBox "The number of throughput streams must be
numeric."
         Exit Sub
      End If

      miStreamIdHi = CInt(sTemp)
      If miStreamIdHi < 1 Or miStreamIdHi > miStreamIdMax
Then
         MsgBox "Number of throughput streams must range
from 1 to 10. " & _
                "Disable the throughput run checkbox if no
throughput streams were executed."
         Exit Sub
      End If
   End If

   ' Initialize the report file and ensure that it doesn't already
exist
   msOutput = Trim(frmTPCHMetrics.txtReport)
   If msOutput = gsEmptyString Then
      MsgBox "Please enter the output file name."
      Exit Sub
   End If

   msOutput = MakePathValid(msOutput)
   If msOutput = gsEmptyString Then
      MsgBox "The output file path is not valid. Please enter a
valid path."
      Exit Sub
   End If

   If Dir$(msOutput, vbNormal + vbHidden + vbReadOnly +
vbSystem) <> gsEmptyString Then
      MsgBox "The output file already exists. Please delete it
or enter a new one."
      Exit Sub
   End If

   ' Initialize the 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, msFmtNumberPadWZeroes)

   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 GetEndStepItThroughput(iQueryId As
Integer) As String
   ' Returns the iterator value for the passed in query identifier
   ' for the throughput run
   ' Returns the iterator value that marks the end of execution
for the query
   ' E.g. in the HP version of the TPC-H Kit, query 15 is
executed in
   ' 2 parts. Therefore, the iterator value for the start of query
15
   ' is 15V but the the iterator value for the end of query 15 is
15

   Debug.Assert iQueryId = miQuery15
   GetEndStepItThroughput = miQuery15

End Function
#End If

Private Function LabelStartThroughput(iStream As Integer, _
      iQuery As Integer) As String
   ' Returns the step label for the passed in query and stream in
the
   ' throughput run
   ' Returns the label that marks the start of execution for the
query
   ' E.g. TPC-H Kit, Stream1, RF1: the start time for the
refresh function
   ' is the start time for the step, 'Throughput - Semaphore
Loop for RF Delay'
```

```
   ' but the end time for the refresh function is the end time for
the step,
   ' 'Throughput - Execute Stream1 RF1'
   ' Similarly, in the HP version of the TPC-H Kit, Throughput
Run, RF1:
   ' the start time for RF1 is the start time for the step,
   ' 'Wait for Throughput Run' but the end time for RF1 is the
end time
   ' for the step, 'Throughput RF1'

   #If TPCH_KIT Then
      Select Case iQuery
         Case miQueryIdRF1
            LabelStartThroughput = IIf(iStream =
miStreamPowerRun + 1, _
                  msStartStepLabelThroughputRF1First, _
                  msLblThroughputRF1)

         Case miQueryIdRF2
            LabelStartThroughput = msLblThroughputRF2

         Case Else
            LabelStartThroughput =
msStepLabelThroughputOther & _
                  Format$(iStream, msFmtNumberWOZeroes)
      End Select
   #Else
      Select Case iQuery
         Case miQueryIdRF1
            LabelStartThroughput =
msStartStepLabelThroughputRF1

         Case miQueryIdRF2
            LabelStartThroughput =
msStartStepLabelThroughputRF2

         Case Else
            LabelStartThroughput =
msStartStepLabelThroughputOther & _
                  Format$(iStream, msFmtNumberPadWZeroes)
      End Select
   #End If

End Function
Private Function LabelEndThroughput(iStream As Integer,
iQuery As Integer) As String
   ' Returns the step label for the passed in query and stream in
the
   ' throughput run
   ' Returns the label that marks the end of execution for the
query
   ' E.g. TPC-H Kit, Stream1, RF1: the start time for the
refresh function
   ' is the start time for the step, 'Throughput - Semaphore
Loop for RF Delay'
   ' but the end time for the refresh function is the end time for
the step,
   ' 'Throughput - Execute Stream1 RF1'
   ' Similarly, in the HP version of the TPC-H Kit, Throughput
Run, RF1:
   ' the start time for RF1 is the start time for the step,
   ' 'Wait for Throughput Run' but the end time for RF1 is the
end time
   ' for the step, 'Throughput RF1'

#If TPCH_KIT Then
   Select Case iQuery
      Case miQueryIdRF1
         LabelEndThroughput = msLblThroughputRF1

      Case miQueryIdRF2
         LabelEndThroughput = IIf(iStream = miStreamIdHi, _
               msLblThroughputRF2,
msEndStepLabelThroughputRF2Rest)

      Case Else
         Debug.Assert True
   End Select

#Else
   LabelEndThroughput = msEndStepLabelThroughputRF1
#End If

End Function

Private Function IteratorThroughput(iStream As Integer,
iQuery As Integer) As String
   ' Returns the iterator value for the passed in stream and
query
   ' for the throughput run
   ' Returns the iterator value that marks the start of execution
for the query
   ' E.g. in the HP version of the TPC-H Kit, query 15 is
executed in
   ' 2 parts. Therefore, the iterator value for the start of query
15
   ' is 15V but the the iterator value for the end of query 15 is
15

#If TPCH_KIT Then
   Dim iQIndex As Integer
#End If

   Select Case iQuery
      Case miQueryIdRF1
         IteratorThroughput = msFirstRFIterator

      Case miQueryIdRF2
         IteratorThroughput = msFirstRFIterator

      Case Else
         #If TPCH_KIT Then
            ' The step iterates from 1 to 22 but the queries are
generated
            ' by qgen in the order that they should be executed
in.
```

```
            ' e.g. Stream1Q1.sql contains the query
corresponding to
            ' Stream 1, Query 21
            For iQIndex = miQueryIdMin To miQueryIdMax
Step 1
               If arQuerySequence(iStream, iQIndex) = iQuery
Then
                  Exit For
               End If
            Next iQIndex

            IteratorThroughput = Format$(iQIndex,
msFmtNumberWOZeroes)
         #Else
            IteratorThroughput = Format$(iQuery,
msFmtNumberWOZeroes)
            If iQuery = miQuery15 Then
               ' Query 15 starts with the creation of the view
               ' The query file is 15V + StreamId.sql and the
iterator
               ' value is 15V
               IteratorThroughput = IteratorThroughput & "V"
            End If
         #End If
   End Select

End Function
Private Function IteratorPowerRF(iStream As Integer, iQuery
As Integer) As String
   ' Returns the iterator value for the passed in query in the
PowerRun

   Debug.Assert iQuery = miQueryIdRF1 Or iQuery =
miQueryIdRF2

   Select Case iQuery
      Case miQueryIdRF1
         IteratorPowerRF = msFirstRFIterator

      Case miQueryIdRF2
         IteratorPowerRF = msFirstRFIterator

   End Select

End Function

Private Sub CollectStats()
   ' This function determines the start time, end time and start
time for
   ' the next step (if applicable) for each query in each stream

   Dim iStreamId As Integer
   Dim 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

               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!"
                  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!"
                  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
            iNextStream = iStreamId
            sLabel = LabelStartThroughput(iNextStream,
iNextQuery)
            sSql = "step_label = " &
MakeStringFieldValid(sLabel)
            #If TPCH_KIT Then
                sIt = IteratorThroughput(iNextStream,
iNextQuery)
                sSql = sSql & " and iterator_value = " &
MakeStringFieldValid(sIt)
            #Else
                sIt = IteratorThroughput(iNextStream,
iNextQuery)
                sSql = sSql & " and iterator_value = " &
MakeStringFieldValid(sIt)
            #End If

            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 interpretted 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
         lRunId = mrecDtls.Fields("run_id").Value
         cboLoad.AddItem CStr(lRunId)

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

   mrecDtls.Close

   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(mlRunId)
   Print #hOutputFile, "Database Scale Factor:" & vbTab &
CStr(mfSF)
   Print #hOutputFile, "Query Streams for Throughput Test:"
& vbTab & CStr(miStreamIdHi)
   Print #hOutputFile, "Measurement Interval in Throughput
Test (Ts):" & vbTab & CStr(fElapsedThroughput) & vbTab &
vbTab & _
                  "Start Time: " & vbTab & sStartTm & vbTab
& vbTab & _
                  "End Time: " & vbTab & sEndTm
   Print #hOutputFile, "TPC-H Power:" & vbTab &
CStr(fQppPower)
   Print #hOutputFile, "TPC-H Throughput:" & vbTab &
CStr(fQppThroughput)
   Print #hOutputFile, "TPC-H Composite Query-Per-Hour
Rating (QphH):" & vbTab & CStr(fQppH)
   Print #hOutputFile,

   ' Print Query names in column header
   Print #hOutputFile, vbTab;

   For iQIndex = miQueryIdMin To miQueryIdRF1 - 1
      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 TPCH timing intervals for each query in timing grid
   For iSIndex = miStreamIdLo To miStreamIdHi

      sPrint = "Stream " & Format$(iSIndex,
msFmtNumberPadWZeroes) & vbTab
      Print #hOutputFile, sPrint;

      For iQIndex = miQueryIdMin To miQueryIdMax Step 1

         sPrint = CStr(arExecutionDtls(iSIndex,
iQIndex).ElapsedTpch) & vbTab
         Print #hOutputFile, sPrint;
      Next iQIndex

      Print #hOutputFile,

   Next iSIndex

   Print #hOutputFile,
   Print #hOutputFile, "Elapsed times for each step"
   Print #hOutputFile,
```

```
   ' Print elapsed times for each query in timing grid
   For iSIndex = miStreamIdLo To miStreamIdHi

      sPrint = "Stream " & Format$(iSIndex,
msFmtNumberPadWZeroes) & vbTab
      Print #hOutputFile, sPrint;

      For iQIndex = miQueryIdMin To miQueryIdMax Step 1

         sPrint = CStr(arExecutionDtls(iSIndex,
iQIndex).ElapsedTime) & vbTab
         Print #hOutputFile, sPrint;
      Next iQIndex

      Print #hOutputFile,

   Next iSIndex

   Print #hOutputFile,
   Print #hOutputFile, vbTab & 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)

    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
    lpstrFileTitle As String
    nMaxFileTitle As Long
    lpstrInitialDir As String
    lpstrTitle As String
    Flags As Long
    nFileOffset As Integer
    nFileExtension As Integer
    lpstrDefExt As String
    lCustData As Long
    lpfnHook As Long
    lpTemplateName As Long
End Type

Private Declare Function GetOpenFileName Lib
"COMDLG32" _
       Alias "GetOpenFileNameA" (file As OPENFILENAME)
As Long

Public Const MAX_PATH = 255
Public Const gsEmptyString As String = ""
Public Const gsSQ As String = "'"
Public Const gsPeriod As String = "."
Public Const gsDefDBFileExt As String = ".stp"
Public Const gsFileSeparator = "\"
Public Const gsPipe = "|"
Public Const gsNullValue = "null"

Private Const ms_DLG_TITLE_OPEN = "Open"
```

```
Private Enum EOpenFile
   OFN_OVERWRITEPROMPT = &H2
   OFN_HIDEREADONLY = &H4
   OFN_FILEMUSTEXIST = &H1000
   OFN_EXPLORER = &H80000
End Enum

Private Const ml_FILE_DB_FLAGS =
OFN_FILEMUSTEXIST
' Note: The flag below is meaningless, since it doesn't work
for open file dialogs
Private Const ml_FILE_OUTPUT_FLAGS =
OFN_OVERWRITEPROMPT

Private Const ms_FILE_ALL_FILTER = "|All Files (*.*)|*.*"
Private Const ms_FILE_DB_FILTER = "Stepmaster
Workspace Files (*" & gsDefDBFileExt & ")|*" &
gsDefDBFileExt
Private Const ms_FILE_OUTPUT_FILTER = "Text Files
(*.txt)|*.txt"
Public Function MakeStringFieldValid(strField As String) As
String
   ' Returns a string that can be appended to any insert
   ' or modify (sql) statement

   ' It checks whether the text is empty
   ' If so, it returns the string, "null"
   If strField = gsEmptyString Then
      MakeStringFieldValid = gsNullValue
   Else
      ' Single-quotes have to be replaced by two single-quotes,
      ' since a single-quote is the identifier delimiter
      ' character - call a procedure to do the replace
      MakeStringFieldValid = ReplaceSubString(strField,
gsSQ, gsSQ & gsSQ)

      ' Replace pipe characters with the corresponding chr
function
      MakeStringFieldValid = ReplaceSubString(strField,
gsPipe, "' & Chr(124) & "')

      ' Enclose the string in single quotes
      MakeStringFieldValid = gsSQ & strField & gsSQ

   End If

End Function
Public Function ReplaceSubString(ByVal MainString As
String, _
      ByVal ReplaceString As String, _
      ByVal ReplaceWith As String) As String

   ' Replaces all occurrences of ReplaceString in MainString
with ReplaceWith

   Dim intPos As Integer
   Dim strTemp As String
      strTemp = MainString

   intPos = InStr(strTemp, ReplaceString)
   Do While intPos <> 0
      strTemp = Left(strTemp, intPos - 1) & ReplaceWith & _
            Mid(strTemp, intPos + Len(ReplaceString))
      intPos = InStr(intPos + Len(ReplaceString) + 1, strTemp,
ReplaceString)
   Loop
   ReplaceSubString = strTemp

End Function

Public Function ShowFileOpenDialog(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 ShowFileOpenDialogErr

   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
      ShowFileOpenDialog = Left$(opfile.lpstrFile,
InStr(opfile.lpstrFile, vbNullChar) - 1)
   Else
      ShowFileOpenDialog = strOldFile
   End If

   Exit Function

ShowFileOpenDialogErr:
   Call DisplayErrors
   ' Reset the selection to the passed in file, if any
   ShowFileOpenDialog = 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 F

Appendix G: Price Quotations:

Microsoft Corporation
One Microsoft Way
Redmond, WA 98052-6399

Tel 425 882 8080
Fax 425 936 7329
http://www.microsoft.com/

Microsoft

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=mnp&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.