



TPC BenchmarkTM H
Full Disclosure Report
DELL PowerEdge 6950/AMD Opteron 8220SE DC - 2.8
GHz w/ 2M Cache
Using
Microsoft Windows Server 2003 Enterprise x64 EditionTM
and SQL Server 2005 Enterprise x64 EditionTM



Second Edition

Submitted for Review

May 17, 2006

Dell Inc. PowerEdge 6950 Server with Microsoft Windows Server 2003 Enterprise x64 Edition and SQL Server 2005 Enterprise x64 Edition

Second Printing May 2007

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Abstract

This report document the methodology and results of the TPC Benchmark H test conducted on a PowerEdge 6950 Server using Microsoft SQL Server 2005 Enterprise x64 Edition in conformance with the requirements of the TPC-H Benchmark Specification. The operating system used for the benchmark was Windows Server 2003 Enterprise x64 Edition. The application was written in C and compiled using the Visual Studio Professional Edition compiler.

Hardware	Software	Total System Cost
Dell PowerEdge 6950 with Quad AMD Opteron 8220SE DC - 2.8 GHz w/ 2M Cache Dell PowerVault MD1000 Storage Enclosures	Microsoft Windows Server 2003 Enterprise x64 Edition™ SQL Server 2005 Enterprise x64 Edition™	\$84,387

TPC-H Power@100GB	TPC-H Throughput@100GB	<u>QphH@100GB</u>	\$/QphH@100GB
18,606.0	11,969.2	14,923.1	\$5.66

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 6950
with SQL Server 2005
Enterprise x64 Edition™

TPC-H Revision 2.3.0
 Report Date: **Oct 23, 2006**
 Revision Date: **May 17, 2007**

Total System Cost
\$84,387 USD

TPC-H Composite Query per Hour
14,923.1 QphH@100GB

Price/Performance
\$5.66 USD/ QphH@100GB

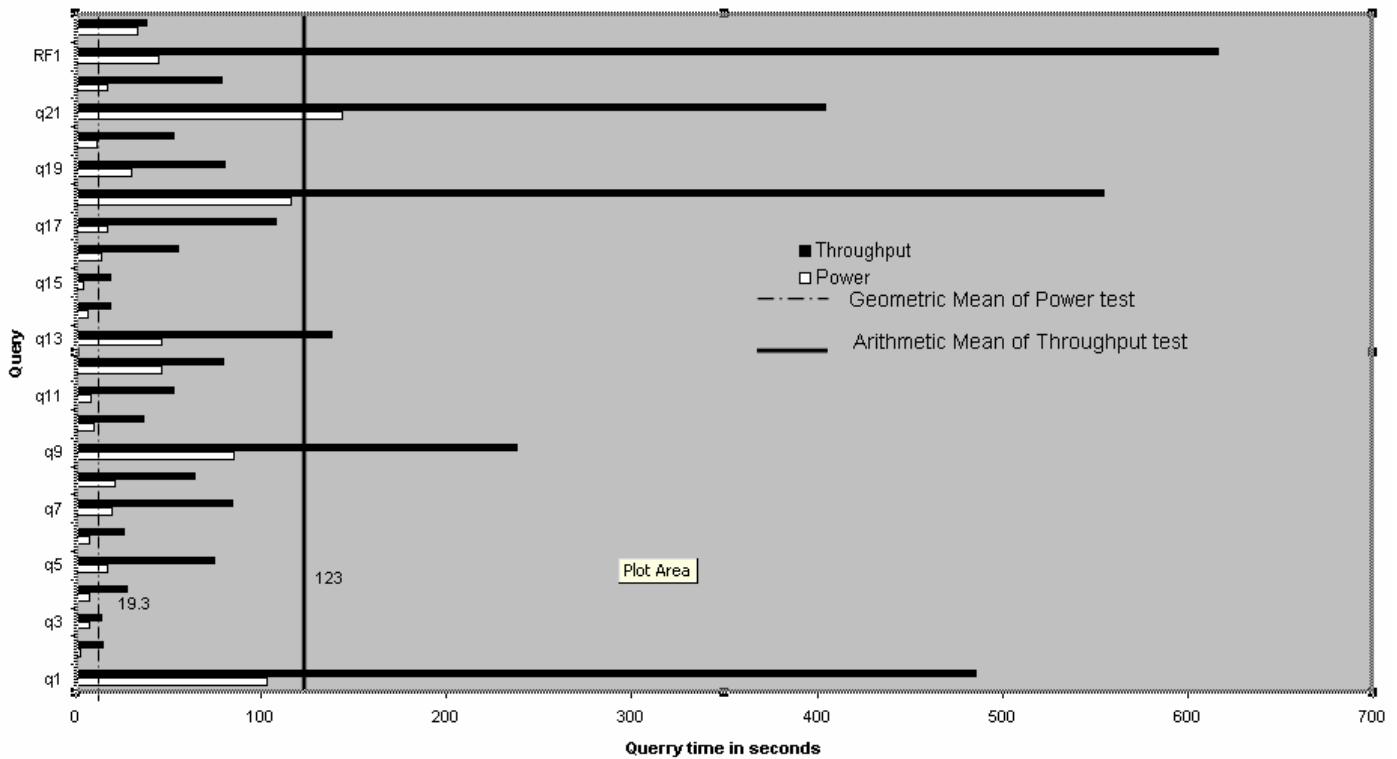
Database Size
100GB

Database Manager
 SQL Server 2005 Enterprise x64 Edition™

Operating System
 Microsoft Windows Server 2003 Enterprise x64 Edition™

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

Availability Date
Dec 4, 2006



Database Load Time
 1:03:04

Total Disk/Database Size
 37.77

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) : 4x AMD Opteron 8220SE DC - 2.8 GHz w/ 2M Cache
Memory: (per node) : 32GB RAM
Disk Drives: 105 – 36GB 15k SAS HDD, & 4 – 73GB 10k SAS HDD
 Copyright 2006 Dell Inc.

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

Dell		PowerEdge PE6950			TPC-H REV 2.3 EXECUTIVE SUMMARY		
		Server			Report Date: 23-Oct-06		
					Revision Date: 17-May-07		
Description	Part Number	Third Party		Unit Price	Qty	Extended Price	3 yr. Maint. Price
Server Hardware		Brand	Pricing				
PE6950,DUAL 8220SE,2X1MB,2.8GZ & 2 Broadcom NICs	222-5737		NIO	\$6,369.00	1	\$6,369.00	\$320.00
QUAD OPTERON 8220SE PROCESSORS	311-6612		NIO	\$3,499.00	1	\$3,499.00	
32GB, DDR2, 667MHZ (16X2GB), 2R	311-6600			\$5,498.00	1	\$5,498.00	
1.44MB,3.5IN,USB,EXT FDD	341-2530			\$39.00	1	\$39.00	
24X CD-ROM, INTERNAL	313-2700			\$30.00	1	\$30.00	
PERC5/i,Integrated	341-3018			\$299.00	1	\$299.00	
PERC5/E SAS RAID, 2X4 EXTERNAL	341-3023			\$799.00	7	\$5,593.00	
73GB,SAS,3.5IN,10K,PE	341-3029			\$299.00	4	\$1,196.00	
E773s 17-inch Color CRT Monitor	320-5091			\$199.00	1	\$199.00	
					Subtotal	\$22,722.00	\$320.00
PowerVault Disk Subsystem							
PV MD1000,RACK,3U,15 BAY,LBZL	222-2299			\$2,680.00	7	\$18,760.00	\$11,536.00
SINGLE ENCL MGT MODULES, SAS/SATA	420-5927			\$345.83	7	\$2,420.81	
36GB,30GBPS,SAS,3.5IN,15K	341-2816			\$249.00	105	\$26,145.00	
RACK-111/24U/Dell	A0213544			\$479.95	1	\$479.95	
					Subtotal	\$47,805.76	\$11,536.00
Server Software							
SQL Server 2005 Enterprise x64 Edition **	810-04793	Microsoft	1	\$8,487.00	1	\$8,487.00	
SQL Server 2005 Client Licence **	359-01911	Microsoft	1	156	25	\$3,900.00	
Windows Server 2003 Enterprise x64 Server **	P72-00274	Microsoft	1	\$2,334.00	1	\$2,334.00	
Visual C++ Standard Edition **	254-00170	Microsoft	1	\$109.00	1	\$109.00	
Visual Basic 2003 .Net Professional	046-00856	Microsoft	1	\$109.00	1	\$109.00	
Professional Support (1 Incident)		Microsoft	1	\$245.00	1		\$245.00
					Subtotal	\$14,939.00	\$245.00
All components from Dell are discounted 16% based on total dollar volume of this configuration.				Other Discounts (16%)		\$13,181.40	
					Total	\$72,285	\$12,101
Notes: * Maint. included in PowerVault MD1000 disk pod					Three-Year Cost of Ownership:		\$84,387 USD
** All Microsoft maintenance is covered by the maintenance costs of Microsoft SQL Server					QphH@100G		14,923.1
Pricing: NIO = These components are Not Immediately Orderable; 1 = Microsoft, all others are Dell							
Pricing may be verified by calling 1-800-BUY-DELL and referencing quote # 362550038 as a complex quote.							
Audited by Lorna Livingtree, Performance Metrics Inc.					\$ / QphH@100G:		\$5.66 USD
Prices used in TPC benchmarks reflect the actual prices a customer would pay for a one-time purchase of the stated components. Individually negotiated discounts are not permitted. Special prices based on assumptions about past or future purchases are not permitted. All discounts reflect standard pricing policies for the listed components. For complete details, see the pricing sections of the TPC benchmark specifications. If you find that the stated prices are not available according to these items, please inform the TPC at pricing@tpc.org .							



DELL
PowerEdge 6950
w/ SQL Server 2005
Enterprise x64 Edition™

TPC-H Revision 2.3.0

Report Date: **Oct 23, 2006**

Revision Date: **May 17, 2007**

Numerical Quantities Summary

Measurement Results:

Database Scale Factor	100
Total Data Storage/Database Size	37.77
Start of Database Load	2006-10-10 10:19:24
End of Database Load	2006-10-10 11:22:41
Database Load Time	1:03:04
Query Streams for Throughput Test	5
TPC-H Power	18,606.0
TPC-H Throughput	11,969.2
TPC-H Composite Query-per-Hour Metric (QpH@100GB)	14,923.1
Total System Price Over 3 Years	\$84,387
TPC-H Price Performance Metric (\$/QpH@100GB)	\$5.66

Measurement Interval:

Measurement Interval in Throughput Test (Ts) = 3,308.5 seconds

Duration of stream execution:

	Seed	Start Date/Time	End Date/Time	Duration
Stream00	1010112241	10/10/06 13:06:54	10/10/06 13:19:09	0:12:15
Stream01	1010112242	10/10/06 13:19:46	10/10/06 14:01:45	0:41:59
Stream02	1010112243	10/10/06 13:19:46	10/10/06 14:06:48	0:47:02
Stream03	1010112244	10/10/06 13:19:46	10/10/06 14:05:37	0:45:51
Stream04	1010112245	10/10/06 13:19:46	10/10/06 14:03:45	0:43:59
Stream05	1010112246	10/10/06 13:19:46	10/10/06 14:06:28	0:46:42
Refresh00		10/10/06 13:06:09	10/10/06 13:06:53	0:00:44
		10/10/06 13:19:10	10/10/06 13:19:44	0:00:33
Refresh01		10/10/06 13:19:46	10/10/06 14:08:16	0:48:31
Refresh02		10/10/06 14:08:23	10/10/06 14:09:58	0:01:36
Refresh03		10/10/06 14:10:04	10/10/06 14:11:39	0:01:35
Refresh04		10/10/06 14:11:45	10/10/06 14:13:17	0:01:32
Refresh05		10/10/06 14:13:22	10/10/06 14:14:54	0:01:32



Numerical Quantities Summary

Timing Intervals in Seconds:

Query	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8
Stream00	103.3	2.6	7.0	7.7	16.9	7.2	19.5	21.3
Stream01	371.0	13.3	17.4	13.8	81.2	26.2	93.8	43.4
Stream02	525.6	16.5	11.2	19.8	59.3	54.8	71.0	73.8
Stream03	505.4	13.9	14.5	55.2	58.5	17.6	74.5	96.2
Stream04	523.2	16.1	10.3	22.1	81.9	16.4	109.9	61.2
Stream05	504.5	12.5	14.6	25.3	92.7	15.0	73.9	47.8
Min Qi	371.0	12.5	10.3	13.8	58.5	15.0	71.0	43.4
Max Qi	525.6	16.5	17.4	55.2	92.7	54.8	109.9	96.2
Avg Qi	485.9	14.5	13.6	27.2	74.7	26.0	84.6	64.5

Query	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16
Stream00	85.3	9.8	7.9	46.3	41.2	6.1	4.1	14.0
Stream01	220.7	46.6	29.4	63.0	139.3	17.4	27.3	51.4
Stream02	246.2	34.7	57.8	59.2	136.0	23.6	16.2	52.3
Stream03	278.1	53.2	30.9	50.2	76.0	20.0	18.5	42.6
Stream04	264.6	29.3	31.1	75.7	117.2	15.6	18.3	66.8
Stream05	181.5	19.7	112.7	151.7	222.9	17.3	8.1	61.1
Min Qi	181.5	19.7	29.4	50.2	76.0	15.6	8.1	42.6
Max Qi	278.1	53.2	112.7	151.7	222.9	23.6	27.3	66.8
Avg Qi	238.2	36.7	52.4	80.0	138.3	18.8	17.7	54.8

Query	Q17	Q18	Q19	Q20	Q21	Q22	RF1	RF2
Stream00	17.0	116.1	30.1	11.1	143.7	16.7	44.3	33.5
Stream01	26.4	619.4	63.2	39.3	459.1	56.9	2871.7	35.2
Stream02	214.2	540.2	117.3	87.8	306.5	98.3	54.7	38.4
Stream03	225.6	503.3	73.6	37.8	404.0	101.1	56.5	36.6
Stream04	28.9	536.0	86.9	40.0	407.2	80.0	48.5	39.8
Stream05	45.4	573.6	60.6	59.1	443.8	58.3	49.1	40.3
Min Qi	26.4	503.3	60.6	37.8	306.5	56.9	48.5	35.2
Max Qi	225.6	619.4	117.3	87.8	459.1	101.1	2871.7	40.3
Avg Qi	108.1	554.5	80.3	52.8	404.1	78.9	616.1	38.1

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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 6950 Server, depicted in the next diagram consists of:

- 4 - AMD Opteron 8220SE DC - 2.8 GHz w/ 2M Cache.
- 32GB RAM.
- 7 - DELL PERC 5/E RAID Controllers, each with 256MB RAM of cache.
- 7 - DELL PowerVault MD1000.
- 105 – 36GB, 3GBPS 15k SAS
- 4 – 73GB, 3GBPS 10k 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.*

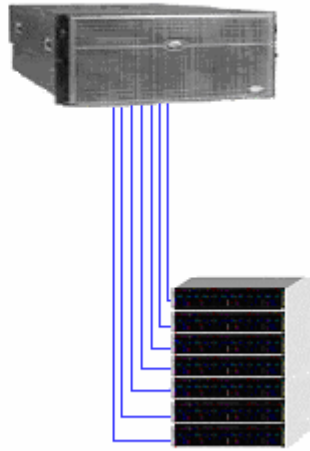
Measured and Priced Configuration

The measured and priced configurations are the same.

PE6950

4xAMD Opteron 8220SE DC - 2.8
GHz w/ 2M Cache
32GB DDR2
7xPERC 5/E Controllers
4x73GB, 3GBPS, 10K SAS

PE6950



7xMD1000

DBMS

SQL Server 2005 Enterprise
x64 Edition

OS

Microsoft Windows Server
2003 Enterprise x64 Edition

Storage

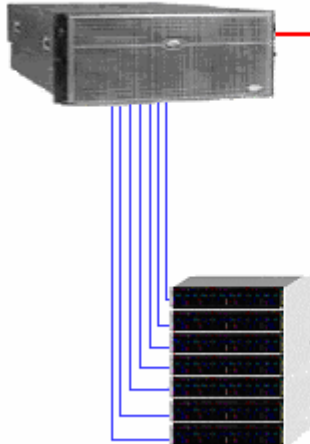
7xMD1000
105x36GB, 3GBPS 15K,
SAS

Measured Configuration

PE6950

4xAMD Opteron 8220SE DC - 2.8
GHz w/ 2M Cache
32GB DDR2
7xPERC 5/E Controllers
4x73GB, 3GBPS, 10K SAS

PE6950



7xMD1000

Client: PE SC 1420

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

DBMS

SQL Server 2005 Enterprise
x64 Edition

OS

Microsoft Windows Server
2003 Enterprise x64 Edition

Storage

7xMD1000
105x36GB, 3GBPS 15K,
SAS

Clause 1: Logical Database Design

Table Definitions

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

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

Physical Organization of Database

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

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

Horizontal Partitioning

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

Horizontal partitioning was not used in this benchmark.

Replication

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

Replication was not used for this benchmark.

Clause 2: Queries and Update Functions

Query Language

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

SQL was the query language used to implement all queries.

Random Number Generation

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

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

Substitution Parameters Generation

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

QGEN version 2.3.0 was used to generate the substitution parameters.

Query Text and Output Data from Database

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

Appendix D contains the query text and query output. The minor query modifications used in this implementation include the following:

Query Substitution Parameters and Seeds Used

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

Appendix E contains the seed and query substitution parameters.

Isolation Level

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

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

Refresh Function Source Code

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

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

Clause 3: Database System Properties

Atomicity

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

Atomicity of Completed Transaction

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

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

Aborted Transaction

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

1. The total price from the ORDER table and the extended price from the LINEITEM table were retrieved for a randomly selected order key.
2. The ACID Transaction was performed using the order key from step 1. The transaction was stopped prior to the commit.
3. The ACID Transaction was rolled back.
4. The total price from the ORDER table and the extended price from the LINEITEM table were retrieved for the same order key, and verified to not have changed.

Consistency

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

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

Consistency Test

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

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

Isolation

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

Read-Write Conflict with Commit

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

1. An ACID transaction was started for a randomly selected O_KEY, L_KEY, and DELTA. The ACID transaction was suspended prior to commit.
2. An ACID query was started for the same O_KEY used in step 1. The ACID query completed and did not see the uncommitted changes made by the ACID transaction.
3. The ACID transaction was committed.

Read-Write Conflict with Rollback

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

1. An ACID transaction was started for a randomly selected O_KEY, L_KEY, and DELTA. The ACID transaction was suspended prior to rollback.
2. An ACID query was started for the same O_KEY used in step 1. The ACID query completed and did not see the uncommitted changes made by the ACID transaction.
3. The ACID transaction was rolled back.

Write-Write Conflict with Commit

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

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

Write-Write Conflict with Rollback

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

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

Concurrent Read and Write Transactions on Different Tables

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

The following steps were performed:

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

Update Transactions during Continuous Read-Only Query Stream

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

The following steps were performed:

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

Durability

The tested system must guarantee durability: the ability to preserve the effects of committed transactions and insure database consistency after recovery from any one of the failures listed in Clause 3.5.2.

Failure of a Durable Medium

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

The database logs were stored on a RAID-10.

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

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

System Crash

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

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

Memory Failure

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

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

Appendix C contains source code for all transactions.

Clause 4: Scaling and Database Population

Initial Cardinality of Tables

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

Initial number of rows

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

Distribution of Tables and Logs Across Media

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

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

- 7 x DELL PERC 5/E Disk Controllers
- 7 x PowerVault MD1000 Disk Enclosures
- 105 x 36GB, 3GBPS 15k rpm, SAS disk drives
- 4 x 73GB, 3GBPS 10k rpm SAS disk drives

7 logical volumes were configured each spanning 15 physical drives across each SAS channel of the controller in a RAID0 formation. The server had 4 73GB SCSI disks onboard for both the OS and database logs.

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

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

Distribution of Storage

Windows 2003 Disk Administration			DELL PERC 5/E Configuration			
Disk 0 1001.24 GB			Controller # 0			
Partition			Slot# 1		Channels	
1	2	3	SAS ID	A		
F: Lineitem_fg RAW 54.5 GB	O: General_fg RAW 26.25 GB	C:\B\O backup NTFS 419.87 GB		0	A0-1	
				1	A0-2	
				2	A0-3	
				3	A0-4	
				4	A0-5	
				5	A0-6	
				6	A0-7	
				8	A0-8	
				9	A0-9	
				10	A0-10	
				11	A0-11	
				12	A0-12	
				13	A0-13	
				14	A0-14	
				15	A0-15	

Windows 2003 Disk Administration			DELL PERC 5/E Configuration			
Disk 1 1001.24 GB			Controller # 0			
Partition			Slot# 1		Channels	
1	2	3	SAS ID	A		
G: Lineitem_fg RAW 54.5 GB	P: General_fg RAW 26.25 GB	C:\B\P backup NTFS 419.87 GB		0	A0-1	
				1	A0-2	
				2	A0-3	
				3	A0-4	
				4	A0-5	
				5	A0-6	
				6	A0-7	
				8	A0-8	
				9	A0-9	
				10	A0-10	
				11	A0-11	
				12	A0-12	
				13	A0-13	
				14	A0-14	
				15	A0-15	

Windows 2003 Disk Administration				DELL PERC 5/E Configuration				
Disk 2 1001.24 GB				Controller # 0				
Partition				Slot# 1	Channels			
1	2	3		SAS ID	A			
H: Lineitem_fg RAW 54.5 GB	Q: General_fg RAW 26.25 GB	Y: RF_files NTFS 2 GB	C:\B\Q backup NTFS 417.87	0	A0-1			
				1	A0-2			
				2	A0-3			
				3	A0-4			
				4	A0-5			
				5	A0-6			
				6	A0-7			
				8	A0-8			
				9	A0-9			
				10	A0-10			
				11	A0-11			
				12	A0-12			
				13	A0-13			
				14	A0-14			
				15	A0-15			

Windows 2003 Disk Administration				DELL PERC 5/E Configuration				
Disk 3 1001.24 GB				Controller # 1				
Partition				Slot# 2	Channels			
1	2	3		SAS ID	A			
I: Lineitem_fg RAW 54.5 GB	R: General_fg RAW 26.25 GB	C:\B\R backup NTFS 419.87 GB		0	A0-1			
				1	A0-2			
				2	A0-3			
				3	A0-4			
				4	A0-5			
				5	A0-6			
				6	A0-7			
				8	A0-8			
				9	A0-9			
				10	A0-10			
				11	A0-11			
				12	A0-12			
				13	A0-13			
				14	A0-14			
				15	A0-15			

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

Windows 2003 Disk Administration			DELL PERC 5/E Configuration			
Disk 4 1001.24 GB			Controller # 1			
Partition			Slot# 2	Channels		
1	2	3	SAS ID	A		
J: Lineitem_fg RAW 54.5 GB	S: General_fg RAW 26.25 GB	C:\B\S backup NTFS 419.87 GB	0	A0-1		
			1	A0-2		
			2	A0-3		
			3	A0-4		
			4	A0-5		
			5	A0-6		
			6	A0-7		
			8	A0-8		
			9	A0-9		
			10	A0-10		
			11	A0-11		
			12	A0-12		
			13	A0-13		
			14	A0-14		
			15	A0-15		

Windows 2003 Disk Administration			DELL PERC 5/E Configuration			
Disk 5 1001.24 GB			Controller # 1			
Partition			Slot# 2	Channels		
1	2	3	SAS ID	A		
K: Lineitem_fg RAW 54.5 GB	T: General_fg RAW 26.25 GB	C:\B\T backup NTFS 419.87 GB	0	A0-1		
			1	A0-2		
			2	A0-3		
			3	A0-4		
			4	A0-5		
			5	A0-6		
			6	A0-7		
			8	A0-8		
			9	A0-9		
			10	A0-10		
			11	A0-11		
			12	A0-12		
			13	A0-13		
			14	A0-14		
			15	A0-15		

Windows 2003 Disk Administration			DELL PERC 5/E Configuration			
Disk 6 1001.24 GB			Controller # 2			
Partition			Slot# 3	Channels		
1	2	3	SAS ID	A		
L: Lineitem_fg RAW 54.5 GB	U: General_fg RAW 26.25 GB	C:\B\U backup NTFS 419.87 GB	0	A0-1		
			1	A0-2		
			2	A0-3		
			3	A0-4		
			4	A0-5		
			5	A0-6		
			6	A0-7		
			8	A0-8		
			9	A0-9		
			10	A0-10		
			11	A0-11		
			12	A0-12		
			13	A0-13		
			14	A0-14		
			15	A0-15		

Windows 2003 Disk Administration			DELL PERC 5/E Configuration			
Disk 7 1001.24 GB			Controller # 2			
Partition			Slot# 3	Channels		
1	2	3	SAS ID	A		
M: Lineitem_fg RAW 54.5 GB	V: General_fg RAW 26.25 GB	C:\B\V backup NTFS 419.87 GB	0	A0-1		
			1	A0-2		
			2	A0-3		
			3	A0-4		
			4	A0-5		
			5	A0-6		
			6	A0-7		
			8	A0-8		
			9	A0-9		
			10	A0-10		
			11	A0-11		
			12	A0-12		
			13	A0-13		
			14	A0-14		
			15	A0-15		

Windows 2003 Disk Administration			DELL PERC 5/E Configuration			
Disk 8 1001.24 GB			Controller # 2			
Partition			Slot# 3	Channels		
1	2	3	SAS ID	A		
N: Lineitem_fg RAW 54.5 GB	W: General_fg RAW 26.25 GB	C:\B\W backup NTFS 419.87 GB	0	A0-1		
			1	A0-2		
			2	A0-3		
			3	A0-4		
			4	A0-5		
			5	A0-6		
			6	A0-7		
			8	A0-8		
			9	A0-9		
			10	A0-10		
			11	A0-11		
			12	A0-12		
			13	A0-13		
			14	A0-14		
			15	A0-15		

Partitioning and Replication

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

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

RAID Implementations

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

RAID 10 was used for logs and OS.

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

DBGEN Version and Modifications

The version number, release number, modification number, and patch level of DBGEN must be disclosed. Any modifications to the DBGEN (see Clause 4.2.1) source code...must be disclosed. In the event that a program other than DBGEN was used to populate the database, it must be disclosed in its entirety.

The supplied DBGEN Version 2.3.0 was used for database population. No modifications were made to DBGEN.

Database Load time

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

Database load time was 1 hour 34 minutes 15 seconds.

Data Storage Ratio

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

Data Storage Ratio

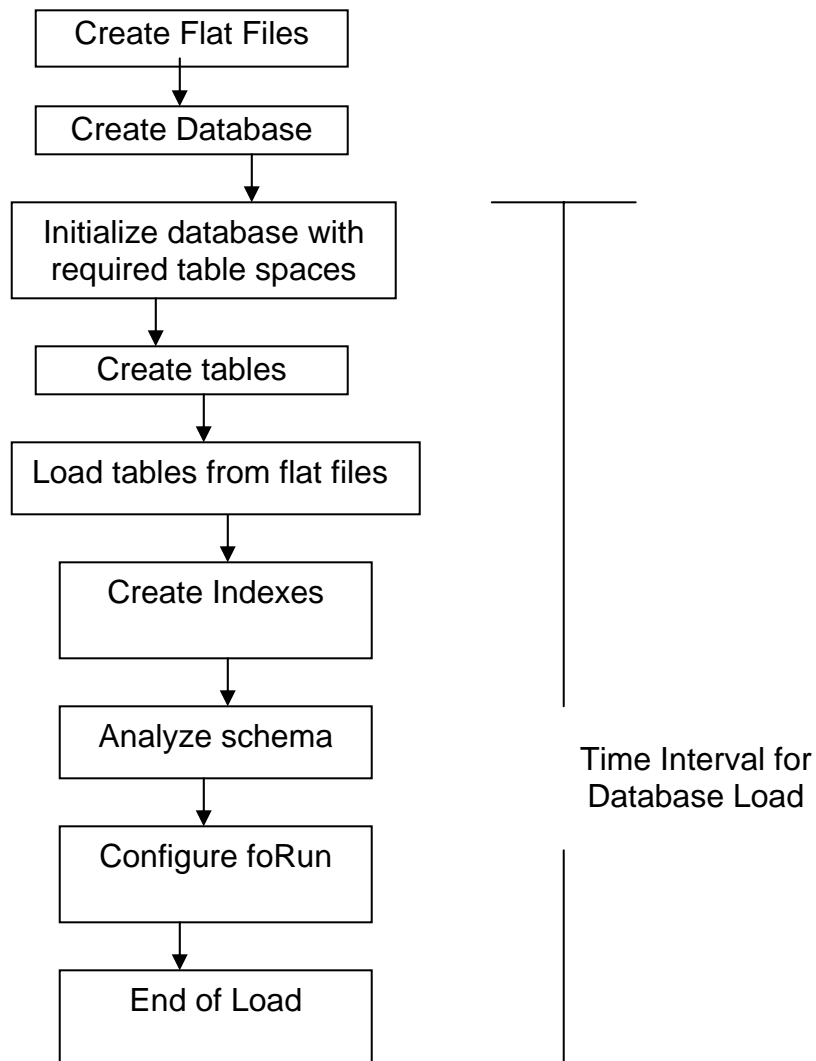
Disk Type	Number of Disks	Space per Disk	Subtotal Disk Space	Total Disk Storage	Data Storage Ratio
36GB 15k	105	33.37GB	3503.85GB		
73GB 10k	4	68.24GB	272.96GB		
				3776.81GB	37.77

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 3,308.5 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	19,395.7	12,179.0	15,369.5
2	18,606.0	11,969.2	14,923.1
Percent Difference	0.96%	0.98%	0.97%

System Activity Between Run1 and Run2

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

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

Clause 6: SUT and Driver Implementation

Driver

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

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

For each power-test run:

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

Implementation Specific Layer (ISL)

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

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

Profile-Directed Optimization

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

Profile-directed optimization was not used.

Clause 7: Pricing

Hardware and Software Used in the Priced System

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

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

Total Three Year Price

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

A detailed price sheet of all the hardware and software used in this configuration, including the 3-year maintenance cost, and total price, is included in the executive summary at the beginning of this document. This purchase qualifies for a 16% discount from Dell 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
			1-800-BUY-DELL	
			1-800-BUY-DELL	

Note 1: All parts are currently orderable.

Clause 8: Auditor-Related Items

Auditor's Report

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

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

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

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

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



October 19, 2006

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

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

Platform: PowerEdge 6950
Database Manager: Microsoft SQL Server 2005 Enterprise x64 Edition
Operating System: Windows Server 2003 Enterprise x64 Edition

CPU's	Memory	Total Disks	Qpph@ 100GB	QthH@100GB	QphH@100GB
4 AMD @ 2.8 Ghz	32 GB	105 @ 36 GB 4 @ 73 GB	18,606.0	11,969.2	14,923.1

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

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

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

Auditor's Notes: None.

Sincerely,

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

Lorna Livingtree
Auditor

Appendix A: Tunable Parameters

Server Configuration Parameters

Microsoft Windows 2003 Server Parameters

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

Microsoft SQL Server 2005 Startup Parameters

Microsoft SQL Server was started with the following command line options

```
sqlservr -c -x -E -T697
```

Microsoft SQL Server 2005 Configuration Parameters

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

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

```

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

```

```

Processor AMD64 Family 15 Model 65 Stepping 2 AuthenticAMD ~2800
Mhz
Processor AMD64 Family 15 Model 65 Stepping 2 AuthenticAMD ~2800
Mhz
Processor AMD64 Family 15 Model 65 Stepping 2 AuthenticAMD ~2800
Mhz
BIOS Version/Date Dell Inc. 0.2.6, 8/9/2006
SMBIOS Version 2.4
Windows Directory C:\WINDOWS
System Directory C:\WINDOWS\system32
Boot Device \Device\HarddiskVolume5
Locale United States
Hardware Abstraction Layer Version = "5.2.3790.1830
(srv03_sp1_rtm.050324-1447)"
User Name Not Available
Time Zone Central Daylight Time
Total Physical Memory 32,766.26 MB
Available Physical Memory 395.64 MB
Total Virtual Memory 33.17 GB
Available Virtual Memory 2.51 GB
Page File Space 2.09 GB
Page File C:\pagefile.sys

```

[Hardware Resources]

[Conflicts/Sharing]

```

Resource Device
IRQ 41 PCI standard PCI-to-PCI bridge
IRQ 41 DELL PERC 5/E Adapter RAID Controller

Memory Address 0xF0000000-0xF1FFFFFFPCI bus
Memory Address 0xF0000000-0xF1FFFFFFMotherboard resources

I/O Port 0x00000000-0x000000CF7 PCI bus
I/O Port 0x00000000-0x000000CF7 Direct memory access controller

IRQ 42 PCI standard PCI-to-PCI bridge
IRQ 42 DELL PERC 5/E Adapter RAID Controller

IRQ 43 PCI standard PCI-to-PCI bridge
IRQ 43 DELL PERC 5/E Adapter RAID Controller

IRQ 32 PCI standard PCI-to-PCI bridge
IRQ 32 DELL PERC 5/E Adapter RAID Controller

```

```

Memory Address 0xDF400000-0xDF4FFFFFF PCI standard PCI-to-
PCI bridge
Memory Address 0xDF400000-0xDF4FFFFFF PCI standard PCI-to-
PCI bridge

Memory Address 0xDF300000-0xDF3FFFFFF PCI standard PCI-to-
PCI bridge
Memory Address 0xDF300000-0xDF3FFFFFF PCI standard PCI-to-
PCI bridge

IRQ 33 PCI standard PCI-to-PCI bridge
IRQ 33 Broadcom BCM5708C NetXtreme II GigE

Memory Address 0xE8000000-0xE80FFFFFF PCI standard PCI-to-
PCI bridge
Memory Address 0xE8000000-0xE80FFFFFF PCI standard PCI-to-
PCI bridge

IRQ 6 Standard OpenHCD USB Host Controller
IRQ 6 Standard OpenHCD USB Host Controller
IRQ 6 Standard Enhanced PCI to USB Host Controller

Memory Address 0xDF600000-0xDF6FFFFFF PCI bus
Memory Address 0xDF600000-0xDF6FFFFFF PCI standard PCI-to-
PCI bridge

```

System Information

System Information report written at: 10/11/06 08:06:48
System Name: PE6950
[System Summary]

```

Item Value
OS Name Microsoft(R) Windows(R) Server 2003 Enterprise x64 Edition
Version 5.2.3790 Service Pack 1 Build 3790
Other OS Description Not Available
OS Manufacturer Microsoft Corporation
System Name PE6950
System Manufacturer Dell Inc.
System Model PowerEdge 6950
System Type x64-based PC
Processor AMD64 Family 15 Model 65 Stepping 2 AuthenticAMD ~2800
Mhz
Processor AMD64 Family 15 Model 65 Stepping 2 AuthenticAMD ~2800
Mhz
Processor AMD64 Family 15 Model 65 Stepping 2 AuthenticAMD ~2800
Mhz
Processor AMD64 Family 15 Model 65 Stepping 2 AuthenticAMD ~2800
Mhz
Processor AMD64 Family 15 Model 65 Stepping 2 AuthenticAMD ~2800
Mhz

```

Memory Address 0xDF600000-0xDFFFFFFF PCI bridge	PCI standard PCI-to-PCI bridge	Memory Address 0xDFA00000-0xDFBFFFFFFF PCI bridge	PCI standard PCI-to-PCI bridge
Memory Address 0xF2000000-0xF3FFFFFF Memory Address 0xF2000000-0xF3FFFFFF Motherboard resources	PCI bus	Memory Address 0xDF500000-0xDF5FFFFFFF PCI bridge	PCI standard PCI-to-PCI bridge
Memory Address 0xEE500000-0xEE6FFFFFFF PCI bridge	PCI standard PCI-to-PCI bridge	Memory Address 0xDF500000-0xDF5FFFFFFF PCI bridge	PCI standard PCI-to-PCI bridge
Memory Address 0xEE500000-0xEE6FFFFFFF PCI bridge	PCI standard PCI-to-PCI bridge	Memory Address 0xDFE00000-0xDFFFFFFF PCI bridge	PCI standard PCI-to-PCI bridge
IRQ 35 PCI standard PCI-to-PCI bridge IRQ 35 DELL PERC 5/I Adapter RAID Controller		Memory Address 0xDFE00000-0xDFFFFFFF PCI bridge	PCI standard PCI-to-PCI bridge
Memory Address 0xEC000000-0xEDFFFFFFF PCI bridge	PCI standard PCI-to-PCI bridge	Memory Address 0xE8200000-0xE82FFFFFFF PCI bridge	PCI standard PCI-to-PCI bridge
Memory Address 0xEC000000-0xEDFFFFFFF PCI bridge	PCI standard PCI-to-PCI bridge	Memory Address 0xE8200000-0xE82FFFFFFF PCI bridge	PCI standard PCI-to-PCI bridge
Memory Address 0xEC000000-0xEDFFFFFFF BCM5708C NetXtreme II GigE	Broadcom	Memory Address 0xE8100000-0xE81FFFFFFF PCI bridge	PCI standard PCI-to-PCI bridge
IRQ 36 PCI standard PCI-to-PCI bridge IRQ 36 DELL PERC 5/E Adapter RAID Controller		Memory Address 0xE8100000-0xE81FFFFFFF PCI bridge	PCI standard PCI-to-PCI bridge
I/O Port 0x0000E000-0x0000EFFF PCI bus I/O Port 0x0000E000-0x0000EFFF Standard OpenHCD USB Host Controller		Memory Address 0xEE100000-0xEE2FFFFFFF PCI bridge	PCI standard PCI-to-PCI bridge
IRQ 37 PCI standard PCI-to-PCI bridge IRQ 37 Broadcom BCM5708C NetXtreme II GigE		Memory Address 0xEE100000-0xEE2FFFFFFF PCI bridge	PCI standard PCI-to-PCI bridge
Memory Address 0xDF200000-0xDF2FFFFFFF PCI bridge	PCI standard PCI-to-PCI bridge	Memory Address 0xEA000000-0xEE6FFFFFFF PCI bus	PCI bus
Memory Address 0xDF200000-0xDF2FFFFFFF PCI bridge	PCI standard PCI-to-PCI bridge	Memory Address 0xEA000000-0xEE6FFFFFFF PCI bridge	PCI standard PCI-to-PCI bridge
Memory Address 0xDF200000-0xDF2FFFFFFF PCI bridge	PCI standard PCI-to-PCI bridge	Memory Address 0xEA000000-0xEE6FFFFFFF PCI bridge	PCI standard PCI-to-PCI bridge
Memory Address 0xDF200000-0xDF2FFFFFFF PCI bridge	PCI standard PCI-to-PCI bridge	Memory Address 0xEA000000-0xEE6FFFFFFF BCM5708C NetXtreme II GigE	Broadcom
IRQ 38 PCI standard PCI-to-PCI bridge IRQ 38 DELL PERC 5/E Adapter RAID Controller			
Memory Address 0xDF100000-0xDF5FFFFFFF PCI bus	PCI bus		
Memory Address 0xDF100000-0xDF5FFFFFFF PCI bridge	PCI standard PCI-to-PCI bridge		
Memory Address 0xDF100000-0xDF5FFFFFFF PCI bridge	PCI standard PCI-to-PCI bridge		
IRQ 39 PCI standard PCI-to-PCI bridge IRQ 39 DELL PERC 5/E Adapter RAID Controller			
Memory Address 0xE0000000-0xE82FFFFFFF PCI bus	PCI bus		
Memory Address 0xE0000000-0xE82FFFFFFF Graphics Adapter	Standard VGA		
Memory Address 0xDF800000-0xDF9FFFFFFF PCI bridge	PCI standard PCI-to-PCI bridge		
Memory Address 0xDF800000-0xDF9FFFFFFF PCI bridge	PCI standard PCI-to-PCI bridge		
Memory Address 0xEE300000-0xEE4FFFFFFF PCI bridge	PCI standard PCI-to-PCI bridge		
Memory Address 0xEE300000-0xEE4FFFFFFF PCI bridge	PCI standard PCI-to-PCI bridge		
Memory Address 0xA0000-0xBFFFFF PCI bus Memory Address 0xA0000-0xBFFFFF Standard VGA Graphics Adapter			
Memory Address 0xDFC00000-0xDFDFFFFFFF PCI bridge	PCI standard PCI-to-PCI bridge		
Memory Address 0xDFC00000-0xDFDFFFFFFF PCI bridge	PCI standard PCI-to-PCI bridge		
Memory Address 0xDFA00000-0xDFBFFFFFFF PCI bridge	PCI standard PCI-to-PCI bridge		
		[DMA]	
		Resource Device Status	
		Channel 4 Direct memory access controller	OK
		Channel 3 Standard floppy disk controller	OK
		[Forced Hardware]	
		Device PNP Device ID	
		[I/O]	
		Resource Device Status	
		0x00000000-0x00000CF7	PCI bus OK
		0x00000000-0x00000CF7	Direct memory access controller OK
		0x00000D00-0x00003FFF	PCI bus OK
		0x0000E000-0x0000EFFF	PCI bus OK
		0x0000E000-0x0000EFFF	Standard OpenHCD USB Host Controller 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 speaker OK
		0x00000040-0x0000005F	System timer OK
		0x00000070-0x0000007F	System CMOS/real time clock OK
		0x000003F0-0x000003F5	Standard floppy disk controller OK
		0x000003F7-0x000003F7	Standard floppy disk controller OK
		0x000003F8-0x000003FF	Communications Port (COM1) OK
		0x000002F8-0x000002FF	Communications Port (COM2) OK
		0x00000800-0x0000087F	System board OK

0x00000880-0x0000089F	System board	OK	0xEA000000-0xEE6FFFFF	Broadcom BCM5708C NetXtreme II GigE
0x00000CD6-0x00000CD7	System board	OK	OK	
0x000000E0-0x000000E3	System board	OK	0xF0000000-0xF1FFFFFF	PCI bus OK
0x000000E4-0x000000E7	System board	OK	0xF0000000-0xF1FFFFFF	Motherboard resources OK
0x0000040B-0x0000040B	System board	OK	0xEE0ED000-0xEE0EDFFF	Standard OpenHCD USB Host Controller
0x000004D6-0x000004D6	System board	OK	OK	
0x000008A0-0x000008BF	System board	OK	0xEE0EE000-0xEE0EEFFF	Standard OpenHCD USB Host Controller
0x000008C0-0x000008CF	System board	OK	OK	
0x000008D0-0x000008DF	System board	OK	0xEE0EF000-0xEE0EFFFF	Standard Enhanced PCI to USB Host
0x000008E0-0x000008E3	System board	OK	Controller OK	
0x000008E4-0x000008E7	System board	OK	0xEE0F0000-0xEE0FFFFF	Standard VGA Graphics Adapter OK
0x00000C00-0x00000CA7	System board	OK	0xEE100000-0xEE2FFFFFF	PCI standard PCI-to-PCI bridge OK
0x00000CA0-0x00000CA7	System board	OK	0xEE100000-0xEE2FFFFFF	PCI standard PCI-to-PCI bridge OK
0x00000CA9-0x00000CAB	System board	OK	0xE8000000-0xE80FFFFFF	PCI standard PCI-to-PCI bridge OK
0x00000CAD-0x00000CAF	System board	OK	0xE8000000-0xE80FFFFFF	PCI standard PCI-to-PCI bridge OK
0x00000F50-0x00000F58	System board	OK	0xE80F0000-0xE80FFFFFF	DELL PERC 5/E Adapter RAID Controller
0x00000060-0x00000060	System board	OK	OK	
0x00000064-0x00000064	System board	OK	0xEE2E0000-0xEE2FFFFFF	DELL PERC 5/E Adapter RAID Controller
0x00000CA8-0x00000CA8	System board	OK	OK	
0x00000CAC-0x00000CAC	System board	OK	0xEC000000-0xEDFFFFFF	PCI standard PCI-to-PCI bridge OK
0x0000E400-0x0000E4FF	Standard OpenHCD USB Host Controller	OK	0xEC000000-0xEDFFFFFF	PCI standard PCI-to-PCI bridge OK
OK			0xEC000000-0xEDFFFFFF	Broadcom BCM5708C NetXtreme II GigE
0x0000E800-0x0000E8FF	Standard Enhanced PCI to USB Host	Controller OK	OK	
0x0000EC00-0x0000ECFF	Standard VGA Graphics Adapter	OK	0xEE300000-0xEE4FFFFFF	PCI standard PCI-to-PCI bridge OK
0x000003B0-0x000003BB	Standard VGA Graphics Adapter	OK	0xEE300000-0xEE4FFFFFF	PCI standard PCI-to-PCI bridge OK
0x000003C0-0x000003DF	Standard VGA Graphics Adapter	OK	0xE8100000-0xE81FFFFFF	PCI standard PCI-to-PCI bridge OK
			0xE8100000-0xE81FFFFFF	PCI standard PCI-to-PCI bridge OK
			0xE81F0000-0xE81FFFFFF	DELL PERC 5/I Adapter RAID Controller
			OK	
			0xEE4E0000-0xEE4FFFFFF	DELL PERC 5/I Adapter RAID Controller
			OK	
			0xEE500000-0xEE6FFFFFF	PCI standard PCI-to-PCI bridge OK
			0xEE500000-0xEE6FFFFFF	PCI standard PCI-to-PCI bridge OK
			0xE8200000-0xE82FFFFFF	PCI standard PCI-to-PCI bridge OK
			0xE8200000-0xE82FFFFFF	PCI standard PCI-to-PCI bridge OK
			0xE82F0000-0xE82FFFFFF	DELL PERC 5/E Adapter RAID Controller
			OK	
			0xEE6E0000-0xEE6FFFFFF	DELL PERC 5/E Adapter RAID Controller
			OK	
			0xDF100000-0xDF5FFFFFF	PCI bus OK
			0xDF100000-0xDF5FFFFFF	PCI standard PCI-to-PCI bridge OK
			0xDF100000-0xDF5FFFFFF	PCI standard PCI-to-PCI bridge OK
			0xDF600000-0xDFFFFFF	PCI bus OK
			0xDF600000-0xDFFFFFF	PCI standard PCI-to-PCI bridge OK
			0xDF600000-0xDFFFFFF	PCI standard PCI-to-PCI bridge OK
			0xF2000000-0xF3FFFFFF	PCI bus OK
			0xF2000000-0xF3FFFFFF	Motherboard resources OK
			0xDF1F0000-0xDF1FFFFFF	DELL PERC 5/E Adapter RAID Controller
			OK	
			0xDF7E0000-0xDF7FFFFFF	DELL PERC 5/E Adapter RAID Controller
			OK	
			0xDF800000-0xDF9FFFFFF	PCI standard PCI-to-PCI bridge OK
			0xDF800000-0xDF9FFFFFF	PCI standard PCI-to-PCI bridge OK
			0xDF200000-0xDF2FFFFFF	PCI standard PCI-to-PCI bridge OK
			0xDF200000-0xDF2FFFFFF	PCI standard PCI-to-PCI bridge OK
			0xDF2F0000-0xDF2FFFFFF	DELL PERC 5/E Adapter RAID Controller
			OK	
			0xDF9E0000-0xDF9FFFFFF	DELL PERC 5/E Adapter RAID Controller
			OK	
			0xDFA00000-0xDFBFFFFFF	PCI standard PCI-to-PCI bridge OK
			0xDFA00000-0xDFBFFFFFF	PCI standard PCI-to-PCI bridge OK
			0xDF300000-0xDF3FFFFFF	PCI standard PCI-to-PCI bridge OK
			0xDF300000-0xDF3FFFFFF	PCI standard PCI-to-PCI bridge OK
			0xDF3F0000-0xDF3FFFFFF	DELL PERC 5/E Adapter RAID Controller
			OK	
			0xDFBE0000-0xDFBFFFFFF	DELL PERC 5/E Adapter RAID Controller
			OK	
			0xDFC00000-0xDFDFFFFFF	PCI standard PCI-to-PCI bridge OK
			0xDFC00000-0xDFDFFFFFF	PCI standard PCI-to-PCI bridge OK
			0xDF400000-0xDF4FFFFFF	PCI standard PCI-to-PCI bridge OK
			0xDF400000-0xDF4FFFFFF	PCI standard PCI-to-PCI bridge OK
			0xDF4F0000-0xDF4FFFFFF	DELL PERC 5/E Adapter RAID Controller
			OK	

[IRQs]

Resource	Device	Status
IRQ 9	Microsoft ACPI-Compliant System	OK
IRQ 13	Numeric data processor	OK
IRQ 0	System timer	OK
IRQ 8	System CMOS/real time clock	OK
IRQ 7	Standard floppy disk controller	OK
IRQ 4	Communications Port (COM1)	OK
IRQ 3	Communications Port (COM2)	OK
IRQ 6	Standard OpenHCD USB Host Controller	OK
IRQ 6	Standard OpenHCD USB Host Controller	OK
IRQ 6	Standard Enhanced PCI to USB Host Controller	OK
IRQ 32	PCI standard PCI-to-PCI bridge	OK
IRQ 32	DELL PERC 5/E Adapter RAID Controller	OK
IRQ 33	PCI standard PCI-to-PCI bridge	OK
IRQ 33	Broadcom BCM5708C NetXtreme II GigE	OK
IRQ 37	PCI standard PCI-to-PCI bridge	OK
IRQ 37	Broadcom BCM5708C NetXtreme II GigE	OK
IRQ 35	PCI standard PCI-to-PCI bridge	OK
IRQ 35	DELL PERC 5/I Adapter RAID Controller	OK
IRQ 36	PCI standard PCI-to-PCI bridge	OK
IRQ 36	DELL PERC 5/E Adapter RAID Controller	OK
IRQ 38	PCI standard PCI-to-PCI bridge	OK
IRQ 38	DELL PERC 5/E Adapter RAID Controller	OK
IRQ 39	PCI standard PCI-to-PCI bridge	OK
IRQ 39	DELL PERC 5/E Adapter RAID Controller	OK
IRQ 43	PCI standard PCI-to-PCI bridge	OK
IRQ 43	DELL PERC 5/E Adapter RAID Controller	OK
IRQ 41	PCI standard PCI-to-PCI bridge	OK
IRQ 41	DELL PERC 5/E Adapter RAID Controller	OK
IRQ 42	PCI standard PCI-to-PCI bridge	OK
IRQ 42	DELL PERC 5/E Adapter RAID Controller	OK

[Memory]

Resource	Device	Status
0xA0000-0xBFFFF	PCI bus	OK
0xA0000-0xBFFFF	Standard VGA Graphics Adapter	OK
0xE0000000-0xE82FFFFFF	PCI bus	OK
0xE0000000-0xE82FFFFFF	Standard VGA Graphics Adapter	OK
0xEA000000-0xEE6FFFFF	PCI bus	OK
0xEA000000-0xEE6FFFFF	PCI standard PCI-to-PCI bridge	OK
0xEA000000-0xEE6FFFFF	PCI standard PCI-to-PCI bridge	OK


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0xDFDE0000-0xDFDFFFFF  DELL PERC 5/E Adapter RAID Controller
                        OK
0xDFE00000-0xDFFFFFFF  PCI standard PCI-to-PCI bridge OK
0xDFE00000-0xDFFFFFFF  PCI standard PCI-to-PCI bridge OK
0xDF500000-0xDF5FFFFF  PCI standard PCI-to-PCI bridge OK
0xDF500000-0xDF5FFFFF  PCI standard PCI-to-PCI bridge OK
0xDF5F0000-0xDF5FFFFF  DELL PERC 5/E Adapter RAID Controller
                        OK
0xDFFE0000-0xDFFFFFFF  DELL PERC 5/E Adapter RAID Controller
                        OK
0xFED00000-0xFED003FF  High precision event timer      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			
(13,824 bytes)	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	13.50 KB		
	3/25/2005 6:00 AM			
c:\windows\system32\tssoft32.acm	DSP GROUP, INC.			
OK	C:\WINDOWS\system32\TSSOFT32.ACM	1.01		
(13.50 KB (13,824 bytes))	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	3/25/2005 6:00 AM		
	3/25/2005 6:00 AM			
c:\windows\system32\msgsm32.acm	Microsoft Corporation			
OK	C:\WINDOWS\system32\MSGSM32.ACM			
(35,328 bytes)	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	34.50 KB		
	3/25/2005 6:00 AM			
c:\windows\system32\imaadp32.acm	Microsoft Corporation			
OK	C:\WINDOWS\system32\IMAADP32.ACM			
(24,576 bytes)	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	24.00 KB		
	3/25/2005 6:00 AM			
c:\windows\system32\msadp32.acm	Microsoft Corporation			
OK	C:\WINDOWS\system32\MSADP32.ACM			
(24,064 bytes)	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	23.50 KB		
	3/25/2005 6:00 AM			

[Video Codecs]

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

[CD-ROM]

Item	Value
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[Sound Device]

Item	Value
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[Display]

Item	Value
Name	Standard VGA Graphics Adapter
PNP Device ID	PCI\VEN_1002&DEV_515E&SUBSYS_01EA1028&REV_02\3&13C0B0C5&0&20
Adapter Type	ATI ES1000, (Standard display types) compatible
Adapter Description	Standard VGA Graphics Adapter
Adapter RAM	16.00 MB (16,777,216 bytes)
Installed Drivers	vga.dll,framebuf.dll,vga256,vga64k
Driver Version	5.2.3790.1830
INF File	display.inf (vga section)
Color Planes	1
Color Table Entries	4294967296
Resolution	1024 x 768 x 1 hertz
Bits/Pixel	32
Memory Address	0xE0000000-0xE82FFFFF
I/O Port	0x0000EC00-0x0000ECFF
Memory Address	0xEE0F0000-0xEE0FFFFF
I/O Port	0x000003B0-0x000003BB
I/O Port	0x000003C0-0x000003DF
Memory Address	0xA0000-0xBFFFF
Driver	c:\windows\system32\drivers\vgapnp.sys (5.2.3790.1830 (srv03_sp1_rtm.050324-1447), 33.00 KB (33,792 bytes), 9/29/2006 8:23 AM)

[Infrared]

Item	Value
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[Input]

[Keyboard]

Item	Value
Description	USB Human Interface Device
Name	Enhanced (101- or 102-key)
Layout	00000409
PNP Device ID	USB\VID_0518&PID_0001&MI_00\7&1C418F1D&0&0000
Number of Function Keys	12
Driver	c:\windows\system32\drivers\hidusb.sys (5.2.3790.1830 (srv03_sp1_rtm.050324-1447), 18.50 KB (18,944 bytes), 3/25/2005 6:00 AM)

[Pointing Device]

Item	Value
Hardware Type	HID-compliant mouse
Number of Buttons	3
Status	OK
PNP Device ID	HID\VID_0518&PID_0001&MI_01&COL01\8&51CEA19&0&000
Power Management Supported	No
Double Click Threshold	6
Handedness	Right Handed Operation
Driver	c:\windows\system32\drivers\mouhid.sys (5.2.3790.1830 (srv03_sp1_rtm.050324-1447), 19.00 KB (19,456 bytes), 3/24/2005 11:21 AM)

[Modem]

Item	Value
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[Network]

[Adapter]

Item Value
Name [00000001] RAS Async Adapter
Adapter Type Not Available
Product Type RAS Async Adapter
Installed Yes
PNP Device ID Not Available
Last Reset 10/10/2006 1:03 PM
Index 1
Service Name AsyncMac
IP Address Not Available
IP Subnet Not Available
Default IP Gateway Not Available
DHCP Enabled No
DHCP Server Not Available
DHCP Lease Expires Not Available
DHCP Lease Obtained Not Available
MAC Address Not Available

Name [00000002] WAN Miniport (L2TP)
Adapter Type Not Available
Product Type WAN Miniport (L2TP)
Installed Yes
PNP Device ID ROOT\MS_L2TPMINIPOINT\0000
Last Reset 10/10/2006 1:03 PM
Index 2
Service Name Rasl2tp
IP Address Not Available
IP Subnet Not Available
Default IP Gateway Not Available
DHCP Enabled No
DHCP Server Not Available
DHCP Lease Expires Not Available
DHCP Lease Obtained Not Available
MAC Address Not Available
Driver c:\windows\system32\drivers\rasl2tp.sys (5.2.3790.1830
(srv03_sp1_rtm.050324-1447), 132.00 KB (135,168 bytes), 3/25/2005 6:00 AM)

Name [00000003] WAN Miniport (PPTP)
Adapter Type Wide Area Network (WAN)
Product Type WAN Miniport (PPTP)
Installed Yes
PNP Device ID ROOT\MS_PPTPMINIPOINT\0000
Last Reset 10/10/2006 1:03 PM
Index 3
Service Name PptpMiniport
IP Address Not Available
IP Subnet Not Available
Default IP Gateway Not Available
DHCP Enabled No
DHCP Server Not Available
DHCP Lease Expires Not Available
DHCP Lease Obtained Not Available
MAC Address 50:50:54:50:30:30
Driver c:\windows\system32\drivers\raspptp.sys (5.2.3790.1830
(srv03_sp1_rtm.050324-1447), 117.50 KB (120,320 bytes), 3/25/2005 6:00 AM)

Name [00000004] WAN Miniport (PPPOE)
Adapter Type Wide Area Network (WAN)
Product Type WAN Miniport (PPPOE)
Installed Yes
PNP Device ID ROOT\MS_PPPOEMINIPOINT\0000
Last Reset 10/10/2006 1:03 PM
Index 4
Service Name RasPppoe
IP Address Not Available
IP Subnet Not Available
Default IP Gateway Not Available
DHCP Enabled No

DHCP Server Not Available
DHCP Lease Expires Not Available
DHCP Lease Obtained Not Available
MAC Address 33:50:6F:45:30:30
Driver c:\windows\system32\drivers\rasppoe.sys (5.2.3790.1830
(srv03_sp1_rtm.050324-1447), 67.50 KB (69,120 bytes), 3/25/2005 6:00 AM)

Name [00000005] Direct Parallel
Adapter Type Not Available
Product Type Direct Parallel
Installed Yes
PNP Device ID ROOT\MS_PTMINIPOINT\0000
Last Reset 10/10/2006 1:03 PM
Index 5
Service Name Raspti
IP Address Not Available
IP Subnet Not Available
Default IP Gateway Not Available
DHCP Enabled No
DHCP Server Not Available
DHCP Lease Expires Not Available
DHCP Lease Obtained Not Available
MAC Address Not Available
Driver c:\windows\system32\drivers\raspti.sys (5.2.3790.1830
(srv03_sp1_rtm.050324-1447), 30.50 KB (31,232 bytes), 3/25/2005 6:00 AM)

Name [00000006] WAN Miniport (IP)
Adapter Type Not Available
Product Type WAN Miniport (IP)
Installed Yes
PNP Device ID ROOT\MS_NDISWANIP\0000
Last Reset 10/10/2006 1:03 PM
Index 6
Service Name NdisWan
IP Address Not Available
IP Subnet Not Available
Default IP Gateway Not Available
DHCP Enabled No
DHCP Server Not Available
DHCP Lease Expires Not Available
DHCP Lease Obtained Not Available
MAC Address Not Available
Driver c:\windows\system32\drivers\ndiswan.sys (5.2.3790.1830
(srv03_sp1_rtm.050324-1447), 157.50 KB (161,280 bytes), 3/25/2005 6:00 AM)

Name [00000007] Broadcom BCM5708C NetXtreme II GigE (NDIS VBD Client)
Adapter Type Not Available
Product Type Broadcom BCM5708C NetXtreme II GigE (NDIS VBD Client)
Installed Yes
PNP Device ID B06BDRV\L2ND&PCI_164C14E4&SUBSYS_01EA1028&REV_12\6&272DC08&0&20050700
Last Reset 10/10/2006 1:03 PM
Index 7
Service Name l2nd
IP Address Not Available
IP Subnet Not Available
Default IP Gateway Not Available
DHCP Enabled Yes
DHCP Server Not Available
DHCP Lease Expires Not Available
DHCP Lease Obtained Not Available
MAC Address Not Available
Driver c:\windows\system32\drivers\bxnd52a.sys (2.6.14.0 built by: WinDDK, 78.00 KB (79,872 bytes), 4/3/2006 1:53 PM)

Name [00000008] Broadcom BCM5708C NetXtreme II GigE (NDIS VBD Client)
Adapter Type Ethernet 802.3

Product Type Broadcom BCM5708C NetXtreme II GigE (NDIS VBD Client)
 Installed Yes
 PNP Device ID B06BDRV\L2ND&PCI_164C14E4&SUBSYS_01EA1028&REV_12\6&51D5913&0&20050500
 Last Reset 10/10/2006 1:03 PM
 Index 8
 Service Name l2nd
 IP Address 192.2.2.69
 IP Subnet 255.255.255.0
 Default IP Gateway Not Available
 DHCP Enabled No
 DHCP Server Not Available
 DHCP Lease Expires Not Available
 DHCP Lease Obtained Not Available
 MAC Address 00:13:72:2D:93:3B
 Driver c:\windows\system32\drivers\bxnd52a.sys (2.6.14.0 built by: WinDDK, 78.00 KB (79,872 bytes), 4/3/2006 1:53 PM)

[Protocol]

Item	Value
Name	MSAFD Tcpip [TCP/IP]
Connectionless Service	No
Guarantees Delivery	Yes
Guarantees Sequencing	Yes
Maximum Address Size	16 bytes
Maximum Message Size	0 bytes
Message Oriented	No
Minimum Address Size	16 bytes
Pseudo Stream Oriented	No
Supports Broadcasting	No
Supports Connect Data	No
Supports Disconnect Data	No
Supports Encryption	No
Supports Expedited Data	Yes
Supports Graceful Closing	Yes
Supports Guaranteed Bandwidth	No
Supports Multicasting	No

Item	Value
Name	MSAFD Tcpip [UDP/IP]
Connectionless Service	Yes
Guarantees Delivery	No
Guarantees Sequencing	No
Maximum Address Size	16 bytes
Maximum Message Size	63.93 KB (65,467 bytes)
Message Oriented	Yes
Minimum Address Size	16 bytes
Pseudo Stream Oriented	No
Supports Broadcasting	Yes
Supports Connect Data	No
Supports Disconnect Data	No
Supports Encryption	No
Supports Expedited Data	No
Supports Graceful Closing	No
Supports Guaranteed Bandwidth	No
Supports Multicasting	Yes

Item	Value
Name	RSVP UDP Service Provider
Connectionless Service	Yes
Guarantees Delivery	No
Guarantees Sequencing	No
Maximum Address Size	16 bytes
Maximum Message Size	63.93 KB (65,467 bytes)
Message Oriented	Yes
Minimum Address Size	16 bytes
Pseudo Stream Oriented	No
Supports Broadcasting	Yes
Supports Connect Data	No
Supports Disconnect Data	No
Supports Encryption	Yes
Supports Expedited Data	No

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

[WinSock]

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

[Ports]

[Serial]

Item	Value
Name	Communications Port (COM1)
Status	OK
PNP Device ID	ACPI\PNP0501\1
Maximum Input Buffer Size	0
Maximum Output Buffer Size	No
Settable Baud Rate	Yes
Settable Data Bits	Yes
Settable Flow Control	Yes
Settable Parity	Yes
Settable Parity Check	Yes
Settable Stop Bits	Yes
Settable RLSD	Yes
Supports RLSD	Yes
Supports 16 Bit Mode	No
Supports Special Characters	No
Baud Rate	9600
Bits/Byte	8
Stop Bits	1
Parity	None
Busy	No
Abort Read/Write on Error	No
Binary Mode Enabled	Yes
Continue XMit on XOff	No
CTS Outflow Control	No
Discard NULL Bytes	No
DSR Outflow Control	0
DSR Sensitivity	0
DTR Flow Control Type	Enable
EOF Character	0
Error Replace Character	0
Error Replacement Enabled	No
Event Character	0
Parity Check Enabled	No
RTS Flow Control Type	Enable
XOff Character	19
XOffXMit Threshold	512
XOn Character	17

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

Name Communications Port (COM2)
 Status OK

PNP Device ID ACPI\PNP0501\2

Maximum Input Buffer Size 0

Maximum Output Buffer Size No

Settable Baud Rate Yes

Settable Data Bits Yes

Settable Flow Control Yes

Settable Parity Yes

Settable Parity Check Yes

Settable Stop Bits Yes

Settable 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 (5.2.3790.1830
 (srv03_sp1_rtm.050324-1447), 118.50 KB (121,344 bytes), 3/25/2005 6:00
 AM)

[Parallel]

Item Value

[Storage]

[Drives]

Item Value

Drive C:

Description Local Fixed Disk

Compressed No

File System NTFS

Size 40.00 GB (42,952,376,320 bytes)

Free Space 30.40 GB (32,645,160,960 bytes)

Volume Name

Volume Serial Number 7CEBA7A7

Drive E:

Description Local Fixed Disk

Compressed Not Available

File System Not Available

Size Not Available

Free Space Not Available

Volume Name Not Available

Volume Serial Number Not Available

Drive F:

Description Local Fixed Disk

Compressed Not Available

File System Not Available

Size Not Available

Free Space Not Available

Volume Name Not Available

Volume Serial Number Not Available

Drive G:

Description Local Fixed Disk

Compressed Not Available

File System Not Available

Size Not Available

Free Space Not Available

Volume Name Not Available

Volume Serial Number Not Available

Drive H:

Description Local Fixed Disk

Compressed Not Available

File System Not Available

Size Not Available

Free Space Not Available

Volume Name Not Available

Volume Serial Number Not Available

Drive I:

Description Local Fixed Disk

Compressed Not Available

File System Not Available

Size Not Available

Free Space Not Available

Volume Name Not Available

Volume Serial Number Not Available

Drive J:

Description Local Fixed Disk

Compressed Not Available

File System Not Available

Size Not Available

Free Space Not Available

Volume Name Not Available

Volume Serial Number Not Available

Drive K:

Description Local Fixed Disk

Compressed Not Available

File System Not Available

Size Not Available

Free Space Not Available

Volume Name Not Available

Volume Serial Number Not Available

Drive L:

Description Local Fixed Disk

Compressed Not Available

File System Not Available

Size Not Available

Free Space Not Available

Volume Name Not Available

Volume Serial Number Not Available

[Disks]

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

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

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

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

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

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

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

Drive Y:
 Description Local Fixed Disk
 Compressed No
 File System NTFS
 Size 2.01 GB (2,155,020,288 bytes)
 Free Space 259.56 MB (272,171,008 bytes)
 Volume Name
 Volume Serial Number C83C77EE

Item Value
 Description Disk drive
 Manufacturer (Standard disk drives)
 Model DELL PERC 5/E Adapter SCSI Disk Device
 Bytes/Sector 512
 Media Loaded Yes
 Media Type Fixed hard disk
 Partitions 3
 SCSI Bus 1
 SCSI Logical Unit 0
 SCSI Port 3
 SCSI Target ID 0
 Sectors/Track 63
 Size 500.62 GB (537,538,498,560 bytes)
 Total Cylinders 65,352
 Total Sectors 1,049,879,880
 Total Tracks 16,664,760
 Tracks/Cylinder 255
 Partition Disk #3, Partition #0
 Partition Size 54.50 GB (58,522,834,944 bytes)
 Partition Starting Offset 32,256 bytes
 Partition Disk #3, Partition #1
 Partition Size 26.25 GB (28,188,034,560 bytes)
 Partition Starting Offset 58,522,867,200 bytes
 Partition Disk #3, Partition #2
 Partition Size 419.87 GB (450,827,596,800 bytes)
 Partition Starting Offset 86,710,901,760 bytes

Description Disk drive
 Manufacturer (Standard disk drives)
 Model DELL PERC 5/E Adapter SCSI Disk Device
 Bytes/Sector 512
 Media Loaded Yes
 Media Type Fixed hard disk
 Partitions 3
 SCSI Bus 1
 SCSI Logical Unit 0
 SCSI Port 5
 SCSI Target ID 0
 Sectors/Track 63
 Size 500.62 GB (537,538,498,560 bytes)
 Total Cylinders 65,352
 Total Sectors 1,049,879,880
 Total Tracks 16,664,760
 Tracks/Cylinder 255
 Partition Disk #5, Partition #0
 Partition Size 54.50 GB (58,522,834,944 bytes)
 Partition Starting Offset 32,256 bytes
 Partition Disk #5, Partition #1
 Partition Size 26.25 GB (28,188,034,560 bytes)
 Partition Starting Offset 58,522,867,200 bytes
 Partition Disk #5, Partition #2
 Partition Size 419.87 GB (450,827,596,800 bytes)
 Partition Starting Offset 86,710,901,760 bytes

Description Disk drive
 Manufacturer (Standard disk drives)
 Model DELL PERC 5/E Adapter SCSI Disk Device
 Bytes/Sector 512
 Media Loaded Yes
 Media Type Fixed hard disk
 Partitions 3
 SCSI Bus 1
 SCSI Logical Unit 0
 SCSI Port 7
 SCSI Target ID 0
 Sectors/Track 63
 Size 500.62 GB (537,538,498,560 bytes)
 Total Cylinders 65,352
 Total Sectors 1,049,879,880
 Total Tracks 16,664,760

Tracks/Cylinder 255
 Partition Disk #7, Partition #0
 Partition Size 54.50 GB (58,522,834,944 bytes)
 Partition Starting Offset 32,256 bytes
 Partition Disk #7, Partition #1
 Partition Size 26.25 GB (28,188,034,560 bytes)
 Partition Starting Offset 58,522,867,200 bytes
 Partition Disk #7, Partition #2
 Partition Size 417.86 GB (448,672,573,440 bytes)
 Partition Starting Offset 88,865,925,120 bytes

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

SCSI Logical Unit 0
 SCSI Port 6
 SCSI Target ID 0
 Sectors/Track 63
 Size 500.62 GB (537,538,498,560 bytes)
 Total Cylinders 65,352
 Total Sectors 1,049,879,880
 Total Tracks 16,664,760
 Tracks/Cylinder 255
 Partition Disk #6, Partition #0
 Partition Size 54.50 GB (58,522,834,944 bytes)
 Partition Starting Offset 32,256 bytes
 Partition Disk #6, Partition #1
 Partition Size 26.25 GB (28,188,034,560 bytes)
 Partition Starting Offset 58,522,867,200 bytes
 Partition Disk #6, Partition #2
 Partition Size 419.87 GB (450,827,596,800 bytes)
 Partition Starting Offset 86,710,901,760 bytes

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

SCSI Logical Unit 0
 SCSI Port 4
 SCSI Target ID 0
 Sectors/Track 63
 Size 500.62 GB (537,538,498,560 bytes)
 Total Cylinders 65,352
 Total Sectors 1,049,879,880
 Total Tracks 16,664,760
 Tracks/Cylinder 255
 Partition Disk #4, Partition #0
 Partition Size 54.50 GB (58,522,834,944 bytes)
 Partition Starting Offset 32,256 bytes
 Partition Disk #4, Partition #1
 Partition Size 26.25 GB (28,188,034,560 bytes)
 Partition Starting Offset 58,522,867,200 bytes
 Partition Disk #4, Partition #2
 Partition Size 419.87 GB (450,827,596,800 bytes)
 Partition Starting Offset 86,710,901,760 bytes

Description Disk drive
 Manufacturer (Standard disk drives)
 Model DELL PERC 5/E Adapter SCSI Disk Device
 Bytes/Sector 512
 Media Loaded Yes
 Media Type Fixed hard disk
 Partitions 4
 SCSI Bus 1

SCSI Logical Unit 0
 SCSI Port 0
 SCSI Target ID 0
 Sectors/Track 63
 Size 500.62 GB (537,538,498,560 bytes)
 Total Cylinders 65,352
 Total Sectors 1,049,879,880
 Total Tracks 16,664,760
 Tracks/Cylinder 255
 Partition Disk #0, Partition #0
 Partition Size 54.50 GB (58,522,834,944 bytes)
 Partition Starting Offset 32,256 bytes
 Partition Disk #0, Partition #1
 Partition Size 26.25 GB (28,188,034,560 bytes)
 Partition Starting Offset 58,522,867,200 bytes
 Partition Disk #0, Partition #2
 Partition Size 2.01 GB (2,155,023,360 bytes)
 Partition Starting Offset 86,710,901,760 bytes
 Partition Disk #0, Partition #3
 Partition Size 417.86 GB (448,672,573,440 bytes)
 Partition Starting Offset 88,865,925,120 bytes

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

SCSI Logical Unit 0
 SCSI Port 1
 SCSI Target ID 0
 Sectors/Track 63
 Size 500.62 GB (537,538,498,560 bytes)
 Total Cylinders 65,352
 Total Sectors 1,049,879,880
 Total Tracks 16,664,760
 Tracks/Cylinder 255
 Partition Disk #1, Partition #0
 Partition Size 54.50 GB (58,522,834,944 bytes)
 Partition Starting Offset 32,256 bytes
 Partition Disk #1, Partition #1
 Partition Size 26.25 GB (28,188,034,560 bytes)
 Partition Starting Offset 58,522,867,200 bytes
 Partition Disk #1, Partition #2
 Partition Size 419.87 GB (450,827,596,800 bytes)
 Partition Starting Offset 86,710,901,760 bytes

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

SCSI Logical Unit 0
 SCSI Port 2
 SCSI Target ID 0
 Sectors/Track 63
 Size 135.50 GB (145,488,752,640 bytes)
 Total Cylinders 17,688
 Total Sectors 284,157,720
 Total Tracks 4,510,440
 Tracks/Cylinder 255

Partition Disk #2, Partition #0
 Partition Size 40.00 GB (42,952,379,904 bytes)
 Partition Starting Offset 32,256 bytes
 Partition Disk #2, Partition #1
 Partition Size 60.00 GB (64,428,618,240 bytes)
 Partition Starting Offset 42,952,412,160 bytes

[SCSI]

Item Value
 Name DELL PERC 5/E Adapter RAID Controller
 Manufacturer DELL
 Status OK
 PNP Device ID
 PCI\VEN_1028&DEV_0015&SUBSYS_1F011028&REV_00\5&
 69DEDD&0&700038
 Memory Address 0xE80F0000-0xE80FFFFF
 Memory Address 0xEE2E0000-0xEE2FFFFF
 IRQ Channel IRQ 32
 Driver c:\windows\system32\drivers\percscas.sys (1.20.0.64 built by:
 WinDDK, 26.50 KB (27,136 bytes), 9/29/2006 7:58 AM)

Name DELL PERC 5/I Adapter RAID Controller
 Manufacturer DELL
 Status OK
 PNP Device ID
 PCI\VEN_1028&DEV_0015&SUBSYS_1F021028&REV_00\5&
 1AB1F6F6&0&700050
 Memory Address 0xE81F0000-0xE81FFFFF
 Memory Address 0xEE4E0000-0xEE4FFFFF
 IRQ Channel IRQ 35
 Driver c:\windows\system32\drivers\percscas.sys (1.20.0.64 built by:
 WinDDK, 26.50 KB (27,136 bytes), 9/29/2006 7:58 AM)

Name DELL PERC 5/E Adapter RAID Controller
 Manufacturer DELL
 Status OK
 PNP Device ID
 PCI\VEN_1028&DEV_0015&SUBSYS_1F011028&REV_00\5&
 2224ECD9&0&700058
 Memory Address 0xE82F0000-0xE82FFFFF
 Memory Address 0xEE6E0000-0xEE6FFFFF
 IRQ Channel IRQ 36
 Driver c:\windows\system32\drivers\percscas.sys (1.20.0.64 built by:
 WinDDK, 26.50 KB (27,136 bytes), 9/29/2006 7:58 AM)

Name DELL PERC 5/E Adapter RAID Controller
 Manufacturer DELL
 Status OK
 PNP Device ID
 PCI\VEN_1028&DEV_0015&SUBSYS_1F011028&REV_00\5&
 1A8E8FE7&0&700038
 Memory Address 0xDF1F0000-0xDF1FFFFF
 Memory Address 0xDF7E0000-0xDF7FFFFF
 IRQ Channel IRQ 38
 Driver c:\windows\system32\drivers\percscas.sys (1.20.0.64 built by:
 WinDDK, 26.50 KB (27,136 bytes), 9/29/2006 7:58 AM)

Name DELL PERC 5/E Adapter RAID Controller
 Manufacturer DELL
 Status OK
 PNP Device ID
 PCI\VEN_1028&DEV_0015&SUBSYS_1F011028&REV_00\5&
 29470E52&0&700040
 Memory Address 0xDF2F0000-0xDF2FFFFF
 Memory Address 0xDF9E0000-0xDF9FFFFF
 IRQ Channel IRQ 39
 Driver c:\windows\system32\drivers\percscas.sys (1.20.0.64 built by:
 WinDDK, 26.50 KB (27,136 bytes), 9/29/2006 7:58 AM)

Name DELL PERC 5/E Adapter RAID Controller
 Manufacturer DELL
 Status OK
 PNP Device ID
 PCI\VEN_1028&DEV_0015&SUBSYS_1F011028&REV_00\5&
 2999E6BC&0&700048
 Memory Address 0xDF3F0000-0xDF3FFFFF
 Memory Address 0xDFBE0000-0xDFBFFFFF
 IRQ Channel IRQ 43

Driver c:\windows\system32\drivers\percscas.sys (1.20.0.64 built by:
 WinDDK, 26.50 KB (27,136 bytes), 9/29/2006 7:58 AM)

Name DELL PERC 5/E Adapter RAID Controller
 Manufacturer DELL
 Status OK
 PNP Device ID
 PCI\VEN_1028&DEV_0015&SUBSYS_1F011028&REV_00\5&
 1307B1EE&0&700050
 Memory Address 0xDF4F0000-0xDF4FFFFF
 Memory Address 0xDFDE0000-0xDFDFFFFF
 IRQ Channel IRQ 41
 Driver c:\windows\system32\drivers\percscas.sys (1.20.0.64 built by:
 WinDDK, 26.50 KB (27,136 bytes), 9/29/2006 7:58 AM)

Name DELL PERC 5/E Adapter RAID Controller
 Manufacturer DELL
 Status OK
 PNP Device ID
 PCI\VEN_1028&DEV_0015&SUBSYS_1F011028&REV_00\5&
 6689200&0&700058
 Memory Address 0xDF5F0000-0xDF5FFFFF
 Memory Address 0xDFFE0000-0xDFEFFFFF
 IRQ Channel IRQ 42
 Driver c:\windows\system32\drivers\percscas.sys (1.20.0.64 built by:
 WinDDK, 26.50 KB (27,136 bytes), 9/29/2006 7:58 AM)

[IDE]

Item Value

[Printing]

Name Driver Port Name Server Name

[Problem Devices]

Device PNP Device ID Error Code
 Broadcom BCM5708C NetXtreme II GigE (NDIS VBD Client)
 B06BDRV\L2ND&PCI_164C14E4&SUBSYS_01EA1028&REV
 _12\6&272DC08&0&20050700 This device is disabled.

[USB]

Device PNP Device ID
 Standard OpenHCD USB Host Controller
 PCI\VEN_1166&DEV_0223&SUBSYS_01EA1028&REV_01\3&
 13C0B0C5&0&18
 Standard OpenHCD USB Host Controller
 PCI\VEN_1166&DEV_0223&SUBSYS_01EA1028&REV_01\3&
 13C0B0C5&0&19
 Standard Enhanced PCI to USB Host Controller
 PCI\VEN_1166&DEV_0223&SUBSYS_01EA1028&REV_01\3&
 13C0B0C5&0&1A

[Software Environment]

[System Drivers]

Name	Description	File	Type	Started	Start Mode
	State	Status	Error Control	Accept	Pause
	Accept Stop				
abiosdsk	Not Available		Kernel Driver		No
	Disabled	Stopped	OK	Ignore	No
acpi	Microsoft ACPI Driver				
	c:\windows\system32\drivers\acpi.sys		Kernel Driver		
	Yes	Boot	Running	OK	Normal
	Yes				No
acpiec	ACPIEC				
Driver	c:\windows\system32\drivers\acpiec.sys		Kernel		
	No	Disabled	Stopped	OK	Normal
	No				No

adpu160m	adpu160m	Not Available	Kernel Driver	No	dmboot	dmboot	c:\windows\system32\drivers\dmboot.sys	Kernel Driver	No
	Disabled	Stopped	OK	Normal	Driver	No	Disabled	Stopped	OK
adpu320	adpu320	Not Available	Kernel Driver	No		No			
	Disabled	Stopped	OK	Normal	dmio	Logical Disk Manager Driver			
afd	AFD	c:\windows\system32\drivers\afd.sys	Kernel Driver	No		c:\windows\system32\drivers\dmio.sys	Kernel Driver	No	
Driver	Yes	System	Running	OK	Yes	Boot	Running	OK	Normal
	Yes				Yes				
aic78u2	aic78u2	Not Available	Kernel Driver	No	dmload	dmload	c:\windows\system32\drivers\dmload.sys	Kernel Driver	No
	Disabled	Stopped	OK	Normal	Driver	Yes	Boot	Running	OK
aic78xx	aic78xx	Not Available	Kernel Driver	No		Yes			
	Disabled	Stopped	OK	Normal	dpti2o	dpti2o	Not Available	Kernel Driver	No
aliide	AliIde	Not Available	Kernel Driver	No		Disabled	Stopped	OK	Normal
	Disabled	Stopped	OK	Normal	elxstor	elxstor	Not Available	Kernel Driver	No
amdide	AmdIde	Not Available	Kernel Driver	No		Disabled	Stopped	OK	Normal
	Disabled	Stopped	OK	Normal	fastfat	Fastfat	c:\windows\system32\drivers\fastfat.sys	File System Driver	No
arc	arc	Not Available	Kernel Driver	No		No	Disabled	Stopped	OK
	Disabled	Stopped	OK	Normal	fdc	Floppy Disk Controller Driver			
asynccmac	RAS Asynchronous Media Driver					c:\windows\system32\drivers\fdc.sys	Kernel Driver	No	
	No	Manual	Stopped	OK	Yes	Manual	Running	OK	Normal
	No				Yes				
ataapi	Standard IDE/ESDI Hard Disk Controller				fips	Fips	c:\windows\system32\drivers\fips.sys	Kernel Driver	No
	c:\windows\system32\drivers\ataapi.sys	Kernel Driver	No		Driver	Yes	System	Running	OK
	Yes	Boot	Running	OK	Yes				
	Yes				flpydisk	Floppy Disk Driver			
atdisk	Atdisk	Not Available	Kernel Driver	No		Kernel Driver	No	Manual	Stopped
	Disabled	Stopped	OK	Ignore	Normal	No	No		OK
atmarpc	ATM ARP Client Protocol				fltmgr	FltMgr	c:\windows\system32\drivers\fltmgr.sys	File System Driver	No
	c:\windows\system32\drivers\atmarpc.sys	Kernel Driver	No		System Driver	Yes	Boot	Running	OK
	No	Manual	Stopped	OK	No	Yes			Normal
	No				ftdisk	Volume Manager Driver			
audstub	Audio Stub Driver	c:\windows\system32\drivers\audstub.sys	Kernel Driver	Yes		c:\windows\system32\drivers\ftdisk.sys	Kernel Driver	Yes	Boot
	Kernel Driver	Yes	Manual	Running	OK	Yes	Normal	Running	OK
	Normal	No	Yes		Yes				
b06bdrv	Broadcom NetXtreme II VBD				gpc	Generic Packet Classifier			
	c:\windows\system32\drivers\bxvbda.sys	Kernel Driver	Yes	Boot	Running	OK	Normal	No	
	Yes				Yes	Manual	Running	OK	Kernel Driver
	Yes				Yes				Normal
beep	Beep	c:\windows\system32\drivers\beep.sys	Kernel Driver	Yes	hidusb	Microsoft HID Class Driver			
Driver	Yes	System	Running	OK		c:\windows\system32\drivers\hidusb.sys	Kernel Driver	Yes	Manual
	Yes				Yes	Running	OK	Ignore	No
	Yes				Yes				
cdac15ba	CdaC15BA	c:\windows\system32\drivers\cdac15ba.sys	Kernel Driver	Yes	hpciss	hpciss	Not Available	Kernel Driver	No
	Kernel Driver	Yes	Auto	Running	OK	Disabled	Stopped	OK	Normal
	Normal	No	Yes		http	HTTP	c:\windows\system32\drivers\http.sys	Kernel Driver	No
cdad10ba	CdaD10BA	c:\windows\system32\drivers\cdad10ba.sys	Kernel Driver	Yes	Driver	Yes	Manual	Running	OK
	Kernel Driver	Yes	Auto	Running	OK	Yes			Normal
	Normal	No	Yes		i2omgmt	i2omgmt	Not Available	Kernel Driver	No
cdfs	Cdfs	c:\windows\system32\drivers\cdfs.sys	File System Driver	No		System	Stopped	OK	Normal
	No	Disabled	Stopped	OK	Normal				No
	No				i8042prt	i8042prt	c:\windows\system32\drivers\i8042prt.sys	Kernel Driver	No
cdrom	CD-ROM Driver	c:\windows\system32\drivers\cdrom.sys	Kernel Driver	No	Driver	No	System	Stopped	OK
	Kernel Driver	No	System	Stopped	OK	No			Ignore
	Normal	No	No		iirsp	iirsp	Not Available	Kernel Driver	No
changer	Changer	Not Available	Kernel Driver	No		Disabled	Stopped	OK	Normal
	System	Stopped	OK	Ignore	Normal	No			No
clusdisk	Cluster Disk Driver	c:\windows\system32\drivers\clusdisk.sys	Kernel Driver	No	imapi	CD-Burning Filter Driver			
	Kernel Driver	No	Disabled	Stopped	OK		c:\windows\system32\drivers\imapi.sys	Kernel Driver	No
	Normal	No	No		No	System	Stopped	OK	Normal
cmdide	CmdIde	Not Available	Kernel Driver	No	intelide	IntelIde	Not Available	Kernel Driver	No
	Disabled	Stopped	OK	Normal		Disabled	Stopped	OK	Normal
cpqcissm	cpqcissm	Not Available	Kernel Driver	No	ip6fw	IPv6 Windows Firewall Driver			
	Disabled	Stopped	OK	Normal		c:\windows\system32\drivers\ip6fw.sys	Kernel Driver	No	
crdisk	CRC Disk Filter Driver	c:\windows\system32\drivers\crdisk.sys	Kernel Driver	Yes		No	Manual	Stopped	OK
	Kernel Driver	Yes	Boot	Running	OK	No			Normal
	Yes				ipfilterdriver	IP Traffic Filter Driver			
	Yes					c:\windows\system32\drivers\ipfltdrv.sys	Kernel Driver	No	Manual
dfsdriver	DfsDriver	c:\windows\system32\drivers\dfs.sys	File System Driver	Yes		Stopped	OK	Normal	No
	System Driver	Yes	Boot	Running	OK	No			
	No	Yes			ipinip	IP in IP Tunnel Driver			
disk	Disk Driver	c:\windows\system32\drivers\disk.sys	Kernel Driver	Yes		c:\windows\system32\drivers\ipinip.sys	Kernel Driver	No	Manual
	Kernel Driver	Yes	Boot	Running	OK	Normal	No	No	Stopped
	Normal	No	Yes		ipnat	IP Network Address Translator			
						c:\windows\system32\drivers\ipnat.sys	Kernel Driver		

	No	Manual	Stopped	OK	Normal	No		No	Manual	Stopped	OK	Normal	No
	No							No					
ipsec	IPSEC driver		c:\windows\system32\drivers\ipsec.sys					ndiswan	Remote Access NDIS WAN Driver				
	Kernel Driver	Yes	System	Running	OK				c:\windows\system32\drivers\ndiswan.sys	Kernel Driver			
	Normal	No	Yes						Yes	Manual	Running	OK	Normal
isapnp	PnP ISA/EISA Bus Driver								Yes				
			c:\windows\system32\drivers\isapnp.sys		Kernel Driver			ndproxy	NDIS Proxy		c:\windows\system32\drivers\ndproxy.sys		
	Yes	Boot	Running	OK	Critical	No			Kernel Driver	Yes	Manual	Running	OK
	Yes								Normal	No	Yes		
kbdclass	Keyboard Class Driver							netbios	NetBIOS Interface		c:\windows\system32\drivers\netbios.sys		
			c:\windows\system32\drivers\kbdclass.sys		Kernel Driver				File System Driver	Yes	System	Running	OK
	Yes	System	Running	OK	Normal	No			Normal	No	Yes		
	Yes							netbt	NetBios over Tcpip		c:\windows\system32\drivers\netbt.sys		
kbdhid	Keyboard HID Driver		c:\windows\system32\drivers\kbdhid.sys		Kernel Driver				Kernel Driver	Yes	System	Running	OK
	Kernel Driver	Yes	System	Running	OK				Normal	No	Yes		
	Ignore	No	Yes					nfrd960	nfrd960	Not Available		Kernel Driver	No
ksecdd	KSecDD		c:\windows\system32\drivers\ksecdd.sys		Kernel				Disabled	Stopped	OK	Normal	No
Driver	Yes	Boot	Running	OK	Normal	No		npfs	Npfs		c:\windows\system32\drivers\npfs.sys		File
	Yes								System Driver	Yes	System	Running	OK
ksthunk	Kernel Streaming WOW64 Thunk Service								No	Yes			Normal
			c:\windows\system32\drivers\ksthunk.sys		Kernel Driver			ntfs	Ntfs		c:\windows\system32\drivers\ntfs.sys		File
	Yes	Manual	Running	OK	Normal	No			System Driver	Yes	Disabled	Running	OK
	Yes								No	Yes			Normal
l2nd	Broadcom NetXtreme II BXND							null	Null		c:\windows\system32\drivers\null.sys		Kernel
			c:\windows\system32\drivers\bxnd52a.sys		Kernel Driver			Driver	Yes	System	Running	OK	Normal
	Yes	Manual	Running	OK	Normal	No			Yes				No
	Yes							parport	Parport		c:\windows\system32\drivers\parport.sys		Kernel
lp6nds35	lp6nds35	Not Available			Kernel Driver	No		Driver	No	Manual	Stopped	OK	Ignore
	Disabled	Stopped	OK		Normal	No			No				No
mnmd	mnmd		c:\windows\system32\drivers\mnmd.sys		Kernel			partmgr	Partition Manager		c:\windows\system32\drivers\partmgr.sys		
Driver	Yes	System	Running	OK	Ignore	No			Kernel Driver	Yes	Boot	Running	OK
	Yes								Normal	No	Yes		
modem	Modem		c:\windows\system32\drivers\modem.sys		Kernel			pci	PCI Bus Driver		c:\windows\system32\drivers\pci.sys		
Driver	No	Manual	Stopped	OK	Ignore	No			Kernel Driver	Yes	Boot	Running	OK
	No								Critical	No	Yes		
mouclass	Mouse Class Driver		c:\windows\system32\drivers\mouclass.sys					pciide	PCIIde		c:\windows\system32\drivers\pciide.sys		Kernel
	Kernel Driver	Yes	System	Running	OK			Driver	Yes	Boot	Running	OK	Normal
	Normal	No	Yes						Yes				No
mouhid	Mouse HID Driver		c:\windows\system32\drivers\mouhid.sys					pcmcia	Pcmcia		c:\windows\system32\drivers\pcmcia.sys		Kernel
	Kernel Driver	Yes	Manual	Running	OK			Driver	No	Disabled	Stopped	OK	Normal
	Ignore	No	Yes						No				No
mountmgr	Mount Point Manager		c:\windows\system32\drivers\mountmgr.sys					pdcomp	PDCOMP	Not Available		Kernel Driver	No
	Kernel Driver	Yes	Boot	Running	OK				Manual	Stopped	OK	Ignore	No
	Normal	No	Yes					pdframe	PDFFRAME			Kernel Driver	
mraid35x	mraid35x	Not Available			Kernel Driver	No			No	Manual	Stopped	OK	Ignore
	Disabled	Stopped	OK		Normal	No			No				No
mrxdav	WebDav Client Redirector							pdreli	PDRELI	Not Available		Kernel Driver	No
			c:\windows\system32\drivers\mrxdav.sys		File System Driver				Manual	Stopped	OK	Ignore	No
	No	Manual	Stopped	OK	Normal	No		pdiframe	PDRFRAME			Kernel Driver	
	No								No	Manual	Stopped	OK	Ignore
mrxsmb	MRXSMB		c:\windows\system32\drivers\mrxsmb.sys		File			percscas	percscas		c:\windows\system32\drivers\percscas.sys		Kernel
System Driver	Yes	System	Running	OK	Normal			Driver	Yes	Boot	Running	OK	Normal
	No	Yes							Yes				No
msfs	Msfs		c:\windows\system32\drivers\msfs.sys		File			pptpminiport	WAN Miniport (PPTP)				
System Driver	Yes	System	Running	OK	Normal						c:\windows\system32\drivers\raspptp.sys		Kernel Driver
	No	Yes							Yes	Manual	Running	OK	Normal
mssmbios	Microsoft System Management BIOS Driver								Yes				No
			c:\windows\system32\drivers\mssmbios.sys		Kernel Driver			processor	Processor Driver		c:\windows\system32\drivers\processr.sys		
	Yes	Manual	Running	OK	Normal	No			Kernel Driver	Yes	Manual	Running	OK
	Yes								Normal	No	Yes		
mup	Mup		c:\windows\system32\drivers\mup.sys		File			ptilink	Direct Parallel Link Driver				
System Driver	Yes	Boot	Running	OK	Normal						c:\windows\system32\drivers\ptilink.sys		Kernel Driver
	No	Yes							Yes	Manual	Running	OK	Normal
ndis	NDIS System Driver		c:\windows\system32\drivers\ndis.sys						Yes				No
	Kernel Driver	Yes	Boot	Running	OK			ql2300	ql2300	Not Available		Kernel Driver	No
	Normal	No	Yes						Disabled	Stopped	OK	Normal	No
ndistapi	Remote Access NDIS TAPI Driver							rasacd	Remote Access Auto Connection Driver				
			c:\windows\system32\drivers\ndistapi.sys		Kernel Driver						c:\windows\system32\drivers\rasacd.sys		Kernel Driver
	Yes	Manual	Running	OK	Normal	No			Yes	System	Running	OK	Normal
	Yes								Yes				No
ndisuio	NDIS Usermode I/O Protocol							rasl2tp	WAN Miniport (L2TP)				
			c:\windows\system32\drivers\ndisuio.sys		Kernel Driver						c:\windows\system32\drivers\rasl2tp.sys		Kernel Driver

	Yes	Manual	Running	OK	Normal	No	ultra	ultra	Not Available	Kernel Driver	No	
	Yes							Disabled	Stopped	OK	Normal	
raspppoe	Remote Access PPPOE Driver						update	Microcode Update Driver				
	c:\windows\system32\drivers\raspppoe.sys							c:\windows\system32\drivers\update.sys				
	Yes	Manual	Running	OK	Normal	No		Yes	Manual	Running	OK	
	Yes							Yes				
raspti	Direct Parallel		c:\windows\system32\drivers\raspti.sys				usbccgp	Microsoft USB Generic Parent Driver				
	Kernel Driver	Yes	Manual	Running	OK			c:\windows\system32\drivers\usbccgp.sys				
	Normal	No	Yes					Yes	Manual	Running	OK	
rdbss	Rdbss		c:\windows\system32\drivers\rdbss.sys		File			Yes				
System Driver	Yes	System	Running	OK	Normal		usbhci	Microsoft USB 2.0 Enhanced Host Controller Miniport Driver				
	No	Yes						c:\windows\system32\drivers\usbhci.sys				
rdpcdd	RDPCDD		c:\windows\system32\drivers\rdpcdd.sys		Kernel			Yes	Manual	Running	OK	
Driver	Yes	System	Running	OK	Ignore	No		Yes				
	Yes						usbhub	Microsoft USB Standard Hub Driver				
rdpdr	Terminal Server Device Redirector Driver							c:\windows\system32\drivers\usbhub.sys				
	c:\windows\system32\drivers\rdpdr.sys							Kernel Driver				
	Yes	Manual	Running	OK	Normal	No		Yes	Manual	Running	OK	
	Yes						usbohci	Microsoft USB Open Host Controller Miniport Driver				
rdpwd	RDPWD		c:\windows\system32\drivers\rdpwd.sys		Kernel			c:\windows\system32\drivers\usbohci.sys				
Driver	Yes	Manual	Running	OK	Ignore	No		Yes	Manual	Running	OK	
	Yes							Yes				
redbook	Digital CD Audio Playback Filter Driver						usbstor	USB Mass Storage Driver				
	c:\windows\system32\drivers\redbook.sys							c:\windows\system32\drivers\usbstor.sys				
	No	System	Stopped	OK	Normal	No		No	Manual	Stopped	OK	
	No							No				
secdrv	Security Driver		c:\windows\system32\drivers\secdrv.sys				vga	vga				
	Kernel Driver	Yes	Auto	Running	OK		Driver	Yes	Manual	Running	OK	
	Normal	No	Yes					Yes				
serenum	Serenum Filter Driver						vgasave	VGA Display Controller.				
	Kernel Driver	Yes	Manual	Running	OK			c:\windows\system32\drivers\vga.sys				
	Normal	No	Yes					No	System	Stopped	OK	
serial	Serial port driver		c:\windows\system32\drivers\serial.sys					No				
	Kernel Driver	Yes	System	Running	OK		viaide	ViaIde		Not Available		
	Ignore	No	Yes					Disabled	Stopped	OK	Kernel Driver	
sfloppy	Sfloppy		c:\windows\system32\drivers\sfloppy.sys		Kernel			Normal	No	No	No	
Driver	No	System	Stopped	OK	Ignore	No	volsnap	Storage volumes				
	No							Kernel Driver	Yes	Boot	Running	
								Normal	No	Yes	OK	
simbad	Simbad		Not Available		Kernel Driver	No	wanarp	Remote Access IP ARP Driver				
	Disabled	Stopped	OK	Normal	No	No		c:\windows\system32\drivers\wanarp.sys				
srv	Srv		c:\windows\system32\drivers\srv.sys		File			Yes	Manual	Running	OK	
System Driver	No	Manual	Stopped	OK	Normal			Yes				
	No	No					wdica	WDICA		Not Available		
swenum	Software Bus Driver		c:\windows\system32\drivers\swenum.sys					Manual	Stopped	OK	Kernel Driver	
	Kernel Driver	Yes	Manual	Running	OK			Ignore	No	No	No	
	Normal	No	Yes				wlbs	Network Load Balancing				
symc8xx	symc8xx		Not Available		Kernel Driver	No		c:\windows\system32\drivers\wlbs.sys				
	Disabled	Stopped	OK	Normal	No	No		No	Manual	Stopped	OK	
symmpi	symmpi		Not Available		Kernel Driver	No		No				
	Disabled	Stopped	OK	Normal	No	No						
sym_hi	sym_hi		Not Available		Kernel Driver	No						
	Disabled	Stopped	OK	Normal	No	No						
sym_u3	sym_u3		Not Available		Kernel Driver	No						
	Disabled	Stopped	OK	Normal	No	No						
tcpip	TCP/IP Protocol Driver							[Signed Drivers]				
	c:\windows\system32\drivers\tcpip.sys							Device Name				
	Yes	System	Running	OK	Normal	No		Signed		Device Class		
	Yes							Driver Date		Driver Version		
tdpipe	TDPIPE		c:\windows\system32\drivers\tdpipe.sys		Kernel			Manufacturer		INF Name Driver		
Driver	No	Manual	Stopped	OK	Ignore	No		Name		Device ID		
	No							Microsoft		System Management BIOS Driver		
tdtcp	TDTCP		c:\windows\system32\drivers\tdtcp.sys		Kernel			5.2.3790.1830		10/1/2002 (Standard system devices)		
Driver	Yes	Manual	Running	OK	Ignore	No		machine.inf		Not Available		
	Yes							ROOT\SYSTEM\0002				
termdd	Terminal Device Driver							Microcode Update Device				
	c:\windows\system32\drivers\termdd.sys							No				
	Yes	System	Running	OK	Normal	No		10/1/2002 (Standard system devices)				
	Yes							Not Available				
toside	TosIde		Not Available		Kernel Driver	No		Plug and Play Software Device Enumerator				
	Disabled	Stopped	OK	Normal	No	No		5.2.3790.1830		10/1/2002 (Standard system devices)		
udfs	Udfs		c:\windows\system32\drivers\udfs.sys		File			machine.inf		Not Available		
System Driver	No	Disabled	Stopped	OK	Normal			ROOT\SYSTEM\0000				
	No	No						Terminal Server Mouse Driver		No		
								10/1/2002 (Standard system devices)		machine.inf		
								Not Available		ROOT\RDP_MOU\0000		
								Terminal Server Keyboard Driver		No		
								5.2.3790.1830		10/1/2002 (Standard system devices)		
								machine.inf		Not Available		
								ROOT\RDP_KBD\0000				

Terminal Server Device Redirector	No	SYSTEM			NDProxy	Not Available	LEGACYDRIVER	Not Available
5.2.3790.1830	10/1/2002 (Standard system devices)					Not Available	Not Available	Not Available
machine.inf	Not Available	ROOT\RDPDR\0000				Not Available	ROOT\LEGACY_NDPROXY\0000	
Direct Parallel	No	NET	5.2.3790.1830	10/1/2002	NDIS Usermode I/O Protocol	Not Available	LEGACYDRIVER	Not Available
Microsoft netrasa.inf	Not Available					Not Available	Not Available	Not Available
ROOT\MS_PTMINIPORT\0000						Not Available	Not Available	Not Available
WAN Miniport (PPTP)	No	NET	5.2.3790.1830		Remote Access NDIS TAPI Driver	Not Available		
10/1/2002 Microsoft netrasa.inf	Not Available					LEGACYDRIVER	Not Available	Not Available
ROOT\MS_PPTPMINIPORT\0000						Not Available	Not Available	Not Available
WAN Miniport (PPPOE)	No	NET	5.2.3790.1830		Remote Access NDIS TAPI Driver	Not Available		
10/1/2002 Microsoft netrasa.inf	Not Available					LEGACYDRIVER	Not Available	Not Available
ROOT\MS_PPPOEMINIPORT\0000						Not Available	Not Available	Not Available
WAN Miniport (IP)	No	NET	5.2.3790.1830	10/1/2002	NDIS System Driver	Not Available	LEGACYDRIVER	Not Available
Microsoft netrasa.inf	Not Available					Not Available	Not Available	Not Available
ROOT\MS_NDISWANIP\0000						Not Available	Not Available	Not Available
WAN Miniport (L2TP)	No	NET	5.2.3790.1830		mountmgr	Not Available	LEGACYDRIVER	Not Available
10/1/2002 Microsoft netrasa.inf	Not Available					Not Available	Not Available	Not Available
ROOT\MS_L2TPMINIPORT\0000						Not Available	ROOT\LEGACY_MOUNTMGR\0000	
Video Codecs	No	MEDIA	5.2.3790.1830	10/1/2002	mmdd	Not Available	LEGACYDRIVER	Not Available
(Standard system devices)						Not Available	Not Available	Not Available
wave.inf	Not Available					Not Available	ROOT\LEGACY_MN added	Not Available
ROOT\MEDIA\MS_MMVID						Not Available	LEGACYDRIVER	Not Available
Legacy Video Capture Devices	No	MEDIA	5.2.3790.1830		ksecdd	Not Available	LEGACYDRIVER	Not Available
10/1/2002 (Standard system devices)						Not Available	Not Available	Not Available
wave.inf	Not Available					Not Available	ROOT\LEGACY_KSECDD\0000	
ROOT\MEDIA\MS_MMVCD						Not Available	LEGACYDRIVER	Not Available
Media Control Devices	No	MEDIA	5.2.3790.1830		IPSEC driver	Not Available	LEGACYDRIVER	Not Available
10/1/2002 (Standard system devices)						Not Available	Not Available	Not Available
wave.inf	Not Available					Not Available	ROOT\LEGACY_IPSEC\0000	
ROOT\MEDIA\MS_MMMCI						Not Available	LEGACYDRIVER	Not Available
Legacy Audio Drivers	No	MEDIA	5.2.3790.1830	10/1/2002	IP Network Address Translator	Not Available	LEGACYDRIVER	Not Available
(Standard system devices)						Not Available	Not Available	Not Available
wave.inf	Not Available					Not Available	Not Available	Not Available
ROOT\MEDIA\MS_MMDRV						Not Available	ROOT\LEGACY_IPNAT\0000	
Audio Codecs	No	MEDIA	5.2.3790.1830	10/1/2002	HTTP	Not Available	LEGACYDRIVER	Not Available
(Standard system devices)						Not Available	Not Available	Not Available
wave.inf	Not Available					Not Available	ROOT\LEGACY_HTTP\0000	
ROOT\MEDIA\MS_MMACM						Not Available	LEGACYDRIVER	Not Available
Remote Access IP ARP Driver	Not Available				Generic Packet Classifier	Not Available	LEGACYDRIVER	Not Available
LEGACYDRIVER	Not Available					Not Available	Not Available	Not Available
Not Available	Not Available					Not Available	Not Available	Not Available
Not Available	Not Available					Not Available	Not Available	Not Available
ROOT\LEGACY_WANARP\0000						Not Available	LEGACYDRIVER	Not Available
volsnap	Not Available	LEGACYDRIVER	Not Available		Fips	Not Available	LEGACYDRIVER	Not Available
LEGACYDRIVER	Not Available					Not Available	Not Available	Not Available
Not Available	Not Available					Not Available	Not Available	Not Available
Not Available	Not Available					Not Available	ROOT\LEGACY_FIPS\0000	
ROOT\LEGACY_VOLSNAP\0000						Not Available	LEGACYDRIVER	Not Available
TDTCP	Not Available	LEGACYDRIVER	Not Available		dmload	Not Available	LEGACYDRIVER	Not Available
LEGACYDRIVER	Not Available					Not Available	Not Available	Not Available
Not Available	Not Available					Not Available	Not Available	Not Available
Not Available	Not Available					Not Available	ROOT\LEGACY_DMLOAD\0000	
ROOT\LEGACY_TDTCP\0000						Not Available	LEGACYDRIVER	Not Available
TCP/IP Protocol Driver	Not Available	LEGACYDRIVER	Not Available		dmboot	Not Available	LEGACYDRIVER	Not Available
LEGACYDRIVER	Not Available					Not Available	Not Available	Not Available
Not Available	Not Available					Not Available	Not Available	Not Available
Not Available	Not Available					Not Available	ROOT\LEGACY_DMBOOT\0000	
ROOT\LEGACY_TCPIP\0000						Not Available	LEGACYDRIVER	Not Available
Security Driver	Not Available	LEGACYDRIVER	Not Available		CRC Disk Filter Driver	Not Available	LEGACYDRIVER	Not Available
LEGACYDRIVER	Not Available					Not Available	Not Available	Not Available
Not Available	Not Available					Not Available	Not Available	Not Available
Not Available	Not Available					Not Available	Not Available	Not Available
ROOT\LEGACY_SECDRV\0000						Not Available	LEGACYDRIVER	Not Available
RDPWD	Not Available	LEGACYDRIVER	Not Available		CdaD10BA	Not Available	LEGACYDRIVER	Not Available
LEGACYDRIVER	Not Available					Not Available	Not Available	Not Available
Not Available	Not Available					Not Available	Not Available	Not Available
Not Available	Not Available					Not Available	ROOT\LEGACY_CDAD10BA\0000	
ROOT\LEGACY_RDPWD\0000						Not Available	LEGACYDRIVER	Not Available
RDPDCC	Not Available	LEGACYDRIVER	Not Available		CdaC15BA	Not Available	LEGACYDRIVER	Not Available
LEGACYDRIVER	Not Available					Not Available	Not Available	Not Available
Not Available	Not Available					Not Available	Not Available	Not Available
Not Available	Not Available					Not Available	ROOT\LEGACY_CDAC15BA\0000	
ROOT\LEGACY_RDPDCC\0000						Not Available	LEGACYDRIVER	Not Available
Remote Access Auto Connection Driver	Not Available				Beep	Not Available	LEGACYDRIVER	Not Available
LEGACYDRIVER	Not Available					Not Available	Not Available	Not Available
Not Available	Not Available					Not Available	Not Available	Not Available
Not Available	Not Available					Not Available	ROOT\LEGACY_BEEP\0000	
ROOT\LEGACY_RASACD\0000						Not Available	LEGACYDRIVER	Not Available
PCIId	Not Available	LEGACYDRIVER	Not Available		Standard IDE/ESDI Hard Disk Controller	Not Available		
LEGACYDRIVER	Not Available					LEGACYDRIVER	Not Available	Not Available
Not Available	Not Available					Not Available	Not Available	Not Available
Not Available	Not Available					Not Available	Not Available	Not Available
ROOT\LEGACY_PCIIID\0000						Not Available	LEGACYDRIVER	Not Available
Partition Manager	Not Available	LEGACYDRIVER	Not Available		AFD	Not Available	LEGACYDRIVER	Not Available
LEGACYDRIVER	Not Available					Not Available	Not Available	Not Available
Not Available	Not Available					Not Available	Not Available	Not Available
Not Available	Not Available					Not Available	ROOT\LEGACY_AFD\0000	
ROOT\LEGACY_PARTMGR\0000						Not Available	LEGACYDRIVER	Not Available
Null	Not Available	LEGACYDRIVER	Not Available		Generic volume	No	VOLUME	5.2.3790.1830
LEGACYDRIVER	Not Available					Microsoft	volume.inf	Not Available
Not Available	Not Available					SOFTWARE\	VOLUME\1&30A96598&0&SIGNATUREEE7642F75	
Not Available	Not Available					OFFSET14305F5C00	LENGTH68F76B3400	
ROOT\LEGACY_NULL\0000						Generic volume	No	VOLUME
NetBios over Tcpip	Not Available	LEGACYDRIVER	Not Available				5.2.3790.1830	10/1/2002
LEGACYDRIVER	Not Available					Microsoft	volume.inf	Not Available
Not Available	Not Available							
Not Available	Not Available							
ROOT\LEGACY_NETBT\0000								

STORAGE\VOLUME\1&30A96598&0&SIGNATUREE7642F75
 OFFSETDA03C1600LENGTH690234600
 Generic volume No VOLUME 5.2.3790.1830 10/1/2002
 Microsoft volume.inf Not Available
 STORAGE\VOLUME\1&30A96598&0&SIGNATUREE7642F75
 OFFSET7E00LENGTHDA03B9800
 Generic volume No VOLUME 5.2.3790.1830 10/1/2002
 Microsoft volume.inf Not Available
 STORAGE\VOLUME\1&30A96598&0&SIGNATUREE7642F77
 OFFSET14305F5C00LENGTH68F76B3400
 Generic volume No VOLUME 5.2.3790.1830 10/1/2002
 Microsoft volume.inf Not Available
 STORAGE\VOLUME\1&30A96598&0&SIGNATUREE7642F77
 OFFSETDA03C1600LENGTH690234600
 Generic volume No VOLUME 5.2.3790.1830 10/1/2002
 Microsoft volume.inf Not Available
 STORAGE\VOLUME\1&30A96598&0&SIGNATUREE7642F77
 OFFSET7E00LENGTHDA03B9800
 Generic volume No VOLUME 5.2.3790.1830 10/1/2002
 Microsoft volume.inf Not Available
 STORAGE\VOLUME\1&30A96598&0&SIGNATUREE7642F7B
 OFFSET14305F5C00LENGTH68F76B3400
 Generic volume No VOLUME 5.2.3790.1830 10/1/2002
 Microsoft volume.inf Not Available
 STORAGE\VOLUME\1&30A96598&0&SIGNATUREE7642F7B
 OFFSETDA03C1600LENGTH690234600
 Generic volume No VOLUME 5.2.3790.1830 10/1/2002
 Microsoft volume.inf Not Available
 STORAGE\VOLUME\1&30A96598&0&SIGNATUREE7642F7B
 OFFSET7E00LENGTHDA03B9800
 Generic volume No VOLUME 5.2.3790.1830 10/1/2002
 Microsoft volume.inf Not Available
 STORAGE\VOLUME\1&30A96598&0&SIGNATUREE7642F7F
 OFFSET14B0D26800LENGTH6876F82800
 Generic volume No VOLUME 5.2.3790.1830 10/1/2002
 Microsoft volume.inf Not Available
 STORAGE\VOLUME\1&30A96598&0&SIGNATUREE7642F7F
 OFFSETDA03C1600LENGTH690234600
 Generic volume No VOLUME 5.2.3790.1830 10/1/2002
 Microsoft volume.inf Not Available
 STORAGE\VOLUME\1&30A96598&0&SIGNATUREE7642F7F
 OFFSET7E00LENGTHDA03B9800
 Generic volume No VOLUME 5.2.3790.1830 10/1/2002
 Microsoft volume.inf Not Available
 STORAGE\VOLUME\1&30A96598&0&SIGNATUREE7642F79
 OFFSET14305F5C00LENGTH68F76B3400
 Generic volume No VOLUME 5.2.3790.1830 10/1/2002
 Microsoft volume.inf Not Available
 STORAGE\VOLUME\1&30A96598&0&SIGNATUREE7642F79
 OFFSETDA03C1600LENGTH690234600
 Generic volume No VOLUME 5.2.3790.1830 10/1/2002
 Microsoft volume.inf Not Available
 STORAGE\VOLUME\1&30A96598&0&SIGNATUREE7642F79
 OFFSET7E00LENGTHDA03B9800
 Generic volume No VOLUME 5.2.3790.1830 10/1/2002
 Microsoft volume.inf Not Available
 STORAGE\VOLUME\1&30A96598&0&SIGNATUREE7642F79
 OFFSETA0029CC00LENGTHF003EB200
 Generic volume No VOLUME 5.2.3790.1830 10/1/2002
 Microsoft volume.inf Not Available

STORAGE\VOLUME\1&30A96598&0&SIGNATUREB575B575
 OFFSET7E00LENGTHA00294E00
 Generic volume No VOLUME 5.2.3790.1830 10/1/2002
 Microsoft volume.inf Not Available
 STORAGE\VOLUME\1&30A96598&0&SIGNATUREE7642F74
 OFFSET14B0D26800LENGTH6876F82800
 Generic volume No VOLUME 5.2.3790.1830 10/1/2002
 Microsoft volume.inf Not Available
 STORAGE\VOLUME\1&30A96598&0&SIGNATUREE7642F74
 OFFSET14305F5C00LENGTH80730C00
 Generic volume No VOLUME 5.2.3790.1830 10/1/2002
 Microsoft volume.inf Not Available
 STORAGE\VOLUME\1&30A96598&0&SIGNATUREE7642F74
 OFFSETDA03C1600LENGTH690234600
 Generic volume No VOLUME 5.2.3790.1830 10/1/2002
 Microsoft volume.inf Not Available
 STORAGE\VOLUME\1&30A96598&0&SIGNATUREE7642F74
 OFFSET7E00LENGTHDA03B9800
 Volume Manager No SYSTEM 5.2.3790.1830 10/1/2002
 (Standard system devices) machine.inf Not
 Available ROOT\FTDISK\0000
 Logical Disk ManagerNo SYSTEM 5.2.3790.1830 10/1/2002
 (Standard system devices) machine.inf Not
 Available ROOT\DMIO\0000
 ACPI Fixed Feature Button No SYSTEM 5.2.3790.1830
 10/1/2002 (Standard system devices) machine.inf
 Not Available ACPI\FIXEDBUTTON\2&DABA3FF&0
 High precision event timer No SYSTEM 5.2.3790.1830
 10/1/2002 (Standard system devices) machine.inf
 Not Available ACPI\PNP0103\0
 Motherboard resources No SYSTEM 5.2.3790.1830
 10/1/2002 (Standard system devices) machine.inf
 Not Available ACPI\PNP0C02\1
 PCI standard PCI-to-PCI bridge No SYSTEM 5.2.3790.1830
 10/1/2002 (Standard system devices) machine.inf
 Not Available
 PCI\VEN_8086&DEV_0372&SUBSYS_00000000&REV_00\4&
 87C8319&0&0258
 RAID Virtual Device No SYSTEM 5.2.3790.1830 10/1/2002
 American Megatrends, Inc. scsidev.inf Not Available
 SCSI\OTHER&VEN__RAID&PROD__DUMMYDEVICE&RE
 V_0001\6&E197292&0&1400
 Disk drive No DISKDRIVE 5.2.3790.1830 10/1/2002
 (Standard disk drives) disk.inf Not Available
 SCSI\DISK&VEN_DELL&PROD_PERC_5/E_ADAPTER&REV
 _1.00\6&E197292&0&100
 DELL PERC 5/E Adapter RAID Controller No SCSIADAPTER
 1.20.0.64 12/9/2005 DELL oem1.inf Not Available
 PCI\VEN_1028&DEV_0015&SUBSYS_1F011028&REV_00\5&
 6689200&0&700058
 PCI standard PCI-to-PCI bridge No SYSTEM 5.2.3790.1830
 10/1/2002 (Standard system devices) machine.inf
 Not Available
 PCI\VEN_8086&DEV_0370&SUBSYS_00000000&REV_00\4&
 87C8319&0&0058
 PCI standard PCI-to-PCI bridge No SYSTEM 5.2.3790.1830
 10/1/2002 (Standard system devices) machine.inf
 Not Available
 PCI\VEN_1166&DEV_0144&SUBSYS_00000000&REV_A2\3&
 1E390A02&0&58
 PCI standard PCI-to-PCI bridge No SYSTEM 5.2.3790.1830
 10/1/2002 (Standard system devices) machine.inf
 Not Available
 PCI\VEN_8086&DEV_0372&SUBSYS_00000000&REV_00\4&
 125D4C0A&0&0250
 RAID Virtual Device No SYSTEM 5.2.3790.1830 10/1/2002
 American Megatrends, Inc. scsidev.inf Not Available
 SCSI\OTHER&VEN__RAID&PROD__DUMMYDEVICE&RE
 V_0001\6&17C0C939&0&1400
 Disk drive No DISKDRIVE 5.2.3790.1830 10/1/2002
 (Standard disk drives) disk.inf Not Available
 SCSI\DISK&VEN_DELL&PROD_PERC_5/E_ADAPTER&REV
 _1.00\6&17C0C939&0&100

DELL PERC 5/E Adapter RAID Controller	No	SCSIADAPTER		
1.20.0.64	12/9/2005	DELL oem1.inf	Not Available	
PCI\VEN_1028&DEV_0015&SUBSYS_1F011028&REV_00\5&1307B1EE&0&700050				
PCI standard PCI-to-PCI bridge	No	SYSTEM	5.2.3790.1830	
10/1/2002 (Standard system devices)		machine.inf		
Not Available				
PCI\VEN_8086&DEV_0370&SUBSYS_00000000&REV_00\4&125D4C0A&0&0050				
PCI standard PCI-to-PCI bridge	No	SYSTEM	5.2.3790.1830	
10/1/2002 (Standard system devices)		machine.inf		
Not Available				
PCI\VEN_1166&DEV_0142&SUBSYS_00000000&REV_A2\3&1E39A02&0&50				
PCI standard PCI-to-PCI bridge	No	SYSTEM	5.2.3790.1830	
10/1/2002 (Standard system devices)		machine.inf		
Not Available				
PCI\VEN_8086&DEV_0372&SUBSYS_00000000&REV_00\4&34889F00&0&0248				
RAID Virtual Device	No	SYSTEM	5.2.3790.1830	10/1/2002
American Megatrends, Inc.		scsidev.inf	Not Available	
SCSI\OTHER&VEN__RAID&PROD__DUMMYDEVICE&REV_0001\6&1A2CFC4D&0&1400				
Disk drive	No	DISKDRIVE	5.2.3790.1830	10/1/2002
(Standard disk drives)		disk.inf	Not Available	
SCSI\DISK&VEN_DELL&PROD_PERC_5/E_ADAPTER&REV_1.00\6&1A2CFC4D&0&100				
DELL PERC 5/E Adapter RAID Controller	No	SCSIADAPTER		
1.20.0.64	12/9/2005	DELL oem1.inf	Not Available	
PCI\VEN_1028&DEV_0015&SUBSYS_1F011028&REV_00\5&2999E6BC&0&700048				
PCI standard PCI-to-PCI bridge	No	SYSTEM	5.2.3790.1830	
10/1/2002 (Standard system devices)		machine.inf		
Not Available				
PCI\VEN_8086&DEV_0370&SUBSYS_00000000&REV_00\4&34889F00&0&0048				
PCI standard PCI-to-PCI bridge	No	SYSTEM	5.2.3790.1830	
10/1/2002 (Standard system devices)		machine.inf		
Not Available				
PCI\VEN_1166&DEV_0144&SUBSYS_00000000&REV_A2\3&1E39A02&0&48				
PCI standard PCI-to-PCI bridge	No	SYSTEM	5.2.3790.1830	
10/1/2002 (Standard system devices)		machine.inf		
Not Available				
PCI\VEN_8086&DEV_0372&SUBSYS_00000000&REV_00\4&2CE9DEA&0&0240				
RAID Virtual Device	No	SYSTEM	5.2.3790.1830	10/1/2002
American Megatrends, Inc.		scsidev.inf	Not Available	
SCSI\OTHER&VEN__RAID&PROD__DUMMYDEVICE&REV_0001\6&2751A29C&0&1400				
Disk drive	No	DISKDRIVE	5.2.3790.1830	10/1/2002
(Standard disk drives)		disk.inf	Not Available	
SCSI\DISK&VEN_DELL&PROD_PERC_5/E_ADAPTER&REV_1.00\6&2751A29C&0&100				
DELL PERC 5/E Adapter RAID Controller	No	SCSIADAPTER		
1.20.0.64	12/9/2005	DELL oem1.inf	Not Available	
PCI\VEN_1028&DEV_0015&SUBSYS_1F011028&REV_00\5&29470E52&0&700040				
PCI standard PCI-to-PCI bridge	No	SYSTEM	5.2.3790.1830	
10/1/2002 (Standard system devices)		machine.inf		
Not Available				
PCI\VEN_8086&DEV_0370&SUBSYS_00000000&REV_00\4&2CE9DEA&0&0040				
PCI standard PCI-to-PCI bridge	No	SYSTEM	5.2.3790.1830	
10/1/2002 (Standard system devices)		machine.inf		
Not Available				
PCI\VEN_1166&DEV_0142&SUBSYS_00000000&REV_A2\3&1E39A02&0&40				
PCI standard PCI-to-PCI bridge	No	SYSTEM	5.2.3790.1830	
10/1/2002 (Standard system devices)		machine.inf		
Not Available				
PCI\VEN_8086&DEV_0372&SUBSYS_00000000&REV_00\4&1EB55056&0&0238				
DELL PERC RAID Virtual Device	No	SYSTEM	1.20.0.64	
12/9/2005	DELL oem0.inf	Not Available		
SCSI\OTHER&VEN__RAID&PROD__DUMMYDEVICE&REV_0001\6&38657EDF&0&1400				
Disk drive	No	DISKDRIVE	5.2.3790.1830	10/1/2002
(Standard disk drives)		disk.inf	Not Available	
SCSI\DISK&VEN_DELL&PROD_PERC_5/E_ADAPTER&REV_1.00\6&38657EDF&0&100				
DELL PERC 5/E Adapter RAID Controller	No	SCSIADAPTER		
1.20.0.64	12/9/2005	DELL oem1.inf	Not Available	
PCI\VEN_1028&DEV_0015&SUBSYS_1F011028&REV_00\5&1A8E8FE7&0&700038				
PCI standard PCI-to-PCI bridge	No	SYSTEM	5.2.3790.1830	
10/1/2002 (Standard system devices)		machine.inf		
Not Available				
PCI\VEN_8086&DEV_0370&SUBSYS_00000000&REV_00\4&1EB55056&0&0038				
PCI standard PCI-to-PCI bridge	No	SYSTEM	5.2.3790.1830	
10/1/2002 (Standard system devices)		machine.inf		
Not Available				
PCI\VEN_1166&DEV_0140&SUBSYS_00000000&REV_A2\3&1E39A02&0&38				
PCI bus	No	SYSTEM	5.2.3790.1830	10/1/2002 (Standard system devices)
		machine.inf		Not Available
ACPI\PNP0A03\99				
AMD Miscellaneous Configuration	No	SYSTEM	5.2.3790.1830	10/1/2002
	AMD	machine.inf		
Not Available				
PCI\VEN_1022&DEV_1103&SUBSYS_00000000&REV_00\3&13C0B0C5&0&DB				
AMD DRAM and HyperTransport(tm) Trace Mode Configuration	No	SYSTEM	5.2.3790.1830	10/1/2002
	AMD	machine.inf		
Not Available				
PCI\VEN_1022&DEV_1102&SUBSYS_00000000&REV_00\3&13C0B0C5&0&DA				
AMD Address Map Configuration	No	SYSTEM	5.2.3790.1830	10/1/2002
	AMD	machine.inf		
Not Available				
PCI\VEN_1022&DEV_1101&SUBSYS_00000000&REV_00\3&13C0B0C5&0&D9				
AMD HyperTransport(tm) Configuration	No	SYSTEM	5.2.3790.1830	10/1/2002
	AMD	machine.inf		
Not Available				
PCI\VEN_1022&DEV_1100&SUBSYS_00000000&REV_00\3&13C0B0C5&0&D8				
AMD Miscellaneous Configuration	No	SYSTEM	5.2.3790.1830	10/1/2002
	AMD	machine.inf		
Not Available				
PCI\VEN_1022&DEV_1103&SUBSYS_00000000&REV_00\3&13C0B0C5&0&D3				
AMD DRAM and HyperTransport(tm) Trace Mode Configuration	No	SYSTEM	5.2.3790.1830	10/1/2002
	AMD	machine.inf		
Not Available				
PCI\VEN_1022&DEV_1102&SUBSYS_00000000&REV_00\3&13C0B0C5&0&D2				
AMD Address Map Configuration	No	SYSTEM	5.2.3790.1830	10/1/2002
	AMD	machine.inf		
Not Available				
PCI\VEN_1022&DEV_1101&SUBSYS_00000000&REV_00\3&13C0B0C5&0&D1				
AMD HyperTransport(tm) Configuration	No	SYSTEM	5.2.3790.1830	10/1/2002
	AMD	machine.inf		
Not Available				
PCI\VEN_1022&DEV_1100&SUBSYS_00000000&REV_00\3&13C0B0C5&0&D0				
AMD Miscellaneous Configuration	No	SYSTEM	5.2.3790.1830	10/1/2002
	AMD	machine.inf		
Not Available				
PCI\VEN_1022&DEV_1103&SUBSYS_00000000&REV_00\3&13C0B0C5&0&CB				
AMD DRAM and HyperTransport(tm) Trace Mode Configuration	No	SYSTEM	5.2.3790.1830	10/1/2002
	AMD	machine.inf		
Not Available				

PCI\VEN_1022&DEV_1102&SUBSYS_00000000&REV_00\3&13C0B0C5&0&CA					DELL PERC 5/I Adapter RAID Controller	No	SCSIADAPTER		
AMD Address Map Configuration	No	SYSTEM			1.20.0.64	12/9/2005	DELL	oem1.inf	Not Available
5.2.3790.1830	10/1/2002	AMD	machine.inf		PCI\VEN_1028&DEV_0015&SUBSYS_1F021028&REV_00\5&1AB1F6F6&0&700050				
Not Available					PCI standard PCI-to-PCI bridge	No	SYSTEM	5.2.3790.1830	
PCI\VEN_1022&DEV_1101&SUBSYS_00000000&REV_00\3&13C0B0C5&0&C9					10/1/2002 (Standard system devices)			machine.inf	
AMD HyperTransport(tm) Configuration	No	SYSTEM			Not Available				
5.2.3790.1830	10/1/2002	AMD	machine.inf		PCI\VEN_8086&DEV_0370&SUBSYS_00000000&REV_00\4&335208C7&0&0050				
Not Available					PCI standard PCI-to-PCI bridge	No	SYSTEM	5.2.3790.1830	
PCI\VEN_1022&DEV_1100&SUBSYS_00000000&REV_00\3&13C0B0C5&0&C8					10/1/2002 (Standard system devices)			machine.inf	
AMD Miscellaneous Configuration	No	SYSTEM			Not Available				
5.2.3790.1830	10/1/2002	AMD	machine.inf		PCI\VEN_1166&DEV_0142&SUBSYS_00000000&REV_A2\3&13C0B0C5&0&50				
Not Available					Broadcom BCM5708C NetXtreme II GigE (NDIS VBD Client)	No	NET	2.6.14.0	4/3/2006
PCI\VEN_1022&DEV_1103&SUBSYS_00000000&REV_00\3&13C0B0C5&0&C3					oem3.inf	Not Available			Broadcom Corporation
AMD DRAM and HyperTransport(tm) Trace Mode Configuration	No	SYSTEM			B06BDRV\L2ND&PCI_164C14E4&SUBSYS_01EA1028&REV_12\6&272DC08&0&20050700				
SYSTEM	5.2.3790.1830	10/1/2002	AMD	machine.inf	Broadcom BCM5708C NetXtreme II GigE	No	SYSTEM	2.6.17.0	
Not Available					4/21/2006	Broadcom Corporation	oem5.inf	Not	Available
PCI\VEN_1022&DEV_1102&SUBSYS_00000000&REV_00\3&13C0B0C5&0&C2					PCI\VEN_14E4&DEV_164C&SUBSYS_01EA1028&REV_12\5&10CC02FD&0&000048				
AMD Address Map Configuration	No	SYSTEM			PCI standard PCI-to-PCI bridge	No	SYSTEM	5.2.3790.1830	
5.2.3790.1830	10/1/2002	AMD	machine.inf		10/1/2002 (Standard system devices)			machine.inf	
Not Available					Not Available				
PCI\VEN_1022&DEV_1101&SUBSYS_00000000&REV_00\3&13C0B0C5&0&C1					PCI\VEN_1166&DEV_0103&SUBSYS_00000000&REV_C3\4&1126B5D1&0&0048				
AMD HyperTransport(tm) Configuration	No	SYSTEM			PCI standard PCI-to-PCI bridge	No	SYSTEM	5.2.3790.1830	
5.2.3790.1830	10/1/2002	AMD	machine.inf		10/1/2002 (Standard system devices)			machine.inf	
Not Available					Not Available				
PCI\VEN_1022&DEV_1100&SUBSYS_00000000&REV_00\3&13C0B0C5&0&C0					PCI\VEN_1166&DEV_0144&SUBSYS_00000000&REV_A2\3&13C0B0C5&0&48				
PCI standard PCI-to-PCI bridge	No	SYSTEM	5.2.3790.1830		Broadcom BCM5708C NetXtreme II GigE (NDIS VBD Client)	No	NET	2.6.14.0	4/3/2006
10/1/2002 (Standard system devices)			machine.inf		oem3.inf	Not Available			Broadcom Corporation
Not Available					B06BDRV\L2ND&PCI_164C14E4&SUBSYS_01EA1028&REV_12\6&51D5913&0&20050500				
PCI\VEN_8086&DEV_0372&SUBSYS_00000000&REV_00\4&19807B1&0&0258					Broadcom BCM5708C NetXtreme II GigE	No	SYSTEM	2.6.17.0	
RAID Virtual Device	No	SYSTEM	5.2.3790.1830	10/1/2002	4/21/2006	Broadcom Corporation	oem5.inf	Not	Available
American Megatrends, Inc.	scsidev.inf	Not Available			PCI\VEN_14E4&DEV_164C&SUBSYS_01EA1028&REV_12\5&1EAABEA2&0&000040				
SCSI\OTHER&VEN___RAID&PROD__DUMMYDEVICE&REV_0001\6&6E875DA&0&1400					PCI standard PCI-to-PCI bridge	No	SYSTEM	5.2.3790.1830	
Disk drive No	DISKDRIVE	5.2.3790.1830	10/1/2002		10/1/2002 (Standard system devices)			machine.inf	
(Standard disk drives)	disk.inf	Not Available			Not Available				
SCSI\DISK&VEN_DELL&PROD_PERC_5/E_ADAPTER&REV_1.00\6&6E875DA&0&100					PCI\VEN_1166&DEV_0103&SUBSYS_00000000&REV_C3\4&745ECE0&0&0040				
DELL PERC 5/E Adapter RAID Controller	No	SCSIADAPTER			PCI standard PCI-to-PCI bridge	No	SYSTEM	5.2.3790.1830	
1.20.0.64	12/9/2005	DELL	oem1.inf	Not Available	10/1/2002 (Standard system devices)			machine.inf	
PCI\VEN_1028&DEV_0015&SUBSYS_1F011028&REV_00\5&2224ECD9&0&700058					Not Available				
PCI standard PCI-to-PCI bridge	No	SYSTEM	5.2.3790.1830		PCI\VEN_1166&DEV_0142&SUBSYS_00000000&REV_A2\3&13C0B0C5&0&40				
10/1/2002 (Standard system devices)			machine.inf		PCI standard PCI-to-PCI bridge	No	SYSTEM	5.2.3790.1830	
Not Available					10/1/2002 (Standard system devices)			machine.inf	
PCI\VEN_8086&DEV_0370&SUBSYS_00000000&REV_00\4&19807B1&0&0058					Not Available				
PCI standard PCI-to-PCI bridge	No	SYSTEM	5.2.3790.1830		PCI\VEN_1166&DEV_0144&SUBSYS_00000000&REV_A2\3&13C0B0C5&0&58				
10/1/2002 (Standard system devices)			machine.inf		PCI standard PCI-to-PCI bridge	No	SYSTEM	5.2.3790.1830	
Not Available					10/1/2002 (Standard system devices)			machine.inf	
PCI\VEN_1166&DEV_0144&SUBSYS_00000000&REV_A2\3&13C0B0C5&0&58					Not Available				
PCI standard PCI-to-PCI bridge	No	SYSTEM	5.2.3790.1830		PCI\VEN_8086&DEV_0372&SUBSYS_00000000&REV_00\4&26FA047B&0&0238				
10/1/2002 (Standard system devices)			machine.inf		DELL PERC RAID Virtual Device	No	SYSTEM	1.20.0.64	
Not Available					12/9/2005	DELL	oem0.inf	Not Available	
PCI\VEN_8086&DEV_0372&SUBSYS_00000000&REV_00\4&335208C7&0&0250					SCSI\OTHER&VEN___RAID&PROD__DUMMYDEVICE&REV_0001\6&A37944&0&1400				
DELL PERC RAID Virtual Device	No	SYSTEM	1.20.0.64		Disk drive No	DISKDRIVE	5.2.3790.1830	10/1/2002	
12/9/2005	DELL	oem0.inf	Not Available		(Standard disk drives)	disk.inf	Not Available		
SCSI\OTHER&VEN___RAID&PROD__DUMMYDEVICE&REV_0001\6&3247D859&0&1400					SCSI\DISK&VEN_DELL&PROD_PERC_5/E_ADAPTER&REV_1.00\6&A37944&0&100				
Disk drive No	DISKDRIVE	5.2.3790.1830	10/1/2002		DELL PERC 5/E Adapter RAID Controller	No	SCSIADAPTER		
(Standard disk drives)	disk.inf	Not Available			1.20.0.64	12/9/2005	DELL	oem1.inf	Not Available
SCSI\DISK&VEN_DELL&PROD_PERC_5/I_ADAPTER&REV_1.00\6&3247D859&0&100					PCI\VEN_1028&DEV_0015&SUBSYS_1F011028&REV_00\5&69DEDD&0&700038				
					PCI standard PCI-to-PCI bridge	No	SYSTEM	5.2.3790.1830	
					10/1/2002 (Standard system devices)			machine.inf	

Not Available
 PCI\VEN_8086&DEV_0370&SUBSYS_00000000&REV_00\4&26FA047B&0&0038
 PCI standard PCI-to-PCI bridge No SYSTEM 5.2.3790.1830
 10/1/2002 (Standard system devices) machine.inf
 Not Available
 PCI\VEN_1166&DEV_0140&SUBSYS_00000000&REV_A2\3&13C0B0C5&0&38
 Default Monitor No MONITOR 5.2.3790.1830
 10/1/2002 (Standard monitor types) monitor.inf
 Not Available
 DISPLAY\DEFAULT_MONITOR\4&2C27D292&0&12345678&00&04
 Standard VGA Graphics Adapter No DISPLAY 5.2.3790.1830
 10/1/2002 (Standard display types) display.inf Not Available
 PCI\VEN_1002&DEV_515E&SUBSYS_01EA1028&REV_02\3&13C0B0C5&0&20
 Generic USB Hub No USB 5.2.3790.1830 10/1/2002
 (Generic USB Hub) usb.inf Not Available
 USB\VID_04B4&PID_6560\6&2A8060C0&0&1
 Generic USB Hub No USB 5.2.3790.1830 10/1/2002
 (Generic USB Hub) usb.inf Not Available
 USB\VID_413C&PID_A001\5&94CC308&0&4
 HID-compliant consumer control device No HIDCLASS
 5.2.3790.1830 10/1/2002 Microsoft hidserv.inf Not Available
 HID\VID_0518&PID_0001&MI_01&COL03\8&51CEA19&0&002
 HID-compliant device No HIDCLASS 5.2.3790.1830
 10/1/2002 (Standard system devices) input.inf Not Available
 HID\VID_0518&PID_0001&MI_01&COL02\8&51CEA19&0&001
 HID-compliant mouse No MOUSE 5.2.3790.1830 10/1/2002
 Microsoft msmouse.inf Not Available
 HID\VID_0518&PID_0001&MI_01&COL01\8&51CEA19&0&000
 USB Human Interface Device No HIDCLASS
 5.2.3790.1830 10/1/2002 (Standard system devices) input.inf Not Available
 USB\VID_0518&PID_0001&MI_01\7&1C418F1D&0&0001
 HID Keyboard Device No KEYBOARD
 5.2.3790.1830 10/1/2002 (Standard keyboards) keyboard.inf Not Available
 HID\VID_0518&PID_0001&MI_00\8&1CE0765E&0&0000
 USB Human Interface Device No HIDCLASS
 5.2.3790.1830 10/1/2002 (Standard system devices) input.inf Not Available
 USB\VID_0518&PID_0001&MI_00\7&1C418F1D&0&0000
 USB Composite Device No USB 5.2.3790.1830
 10/1/2002 (Standard USB Host Controller) usb.inf Not Available
 USB\VID_0518&PID_0001\6&3249B3D3&0&1
 Generic USB Hub No USB 5.2.3790.1830 10/1/2002
 (Generic USB Hub) usb.inf Not Available
 USB\VID_04B4&PID_6560\5&94CC308&0&3
 USB Root Hub No USB 5.2.3790.1830 10/1/2002
 (Standard USB Host Controller) usbport.inf Not Available
 USB\ROOT_HUB20\4&2F0E5074&0
 Standard Enhanced PCI to USB Host Controller No USB
 5.2.3790.1830 10/1/2002 (Standard USB Host Controller) usbport.inf Not Available
 PCI\VEN_1166&DEV_0223&SUBSYS_01EA1028&REV_01\3&13C0B0C5&0&1A
 USB Root Hub No USB 5.2.3790.1830 10/1/2002
 (Standard USB Host Controller) usbport.inf Not Available
 USB\ROOT_HUB\4&3B242A64&0
 Standard OpenHCD USB Host Controller No USB
 5.2.3790.1830 10/1/2002 (Standard USB Host Controller) usbport.inf Not Available
 PCI\VEN_1166&DEV_0223&SUBSYS_01EA1028&REV_01\3&13C0B0C5&0&19

USB Root Hub No USB 5.2.3790.1830 10/1/2002
 (Standard USB Host Controller) usbport.inf Not Available
 USB\ROOT_HUB\4&286A79BF&0
 Standard OpenHCD USB Host Controller No USB
 5.2.3790.1830 10/1/2002 (Standard USB Host Controller) usbport.inf Not Available
 PCI\VEN_1166&DEV_0223&SUBSYS_01EA1028&REV_01\3&13C0B0C5&0&18
 PCI standard ISA bridge No SYSTEM 5.2.3790.1830
 10/1/2002 (Standard system devices) machine.inf Not Available
 PCI\VEN_1166&DEV_0234&SUBSYS_00000000&REV_00\3&13C0B0C5&0&12
 Motherboard resources No SYSTEM 5.2.3790.1830
 10/1/2002 (Standard system devices) machine.inf Not Available
 ACPI\PNP0C02\0
 System board No SYSTEM 5.2.3790.1830 10/1/2002
 (Standard system devices) machine.inf Not Available
 ACPI\IP0001\5
 System board No SYSTEM 5.2.3790.1830 10/1/2002
 (Standard system devices) machine.inf Not Available
 ACPI\PNP0C01\0
 Communications Port No PORTS 5.2.3790.1830 10/1/2002
 (Standard port types) mspports.inf Not Available
 ACPI\PNP0501\2
 Communications Port No PORTS 5.2.3790.1830 10/1/2002
 (Standard port types) mspports.inf Not Available
 ACPI\PNP0501\1
 Standard floppy disk controller No FDC 5.2.3790.1830
 10/1/2002 (Standard floppy disk controllers) fdm.inf Not Available
 ACPI\PNP0700\4&4446BA&0
 System CMOS/real time clock No SYSTEM 5.2.3790.1830
 10/1/2002 (Standard system devices) machine.inf Not Available
 ACPI\PNP0B00\4&4446BA&0
 System timer No SYSTEM 5.2.3790.1830 10/1/2002
 (Standard system devices) machine.inf Not Available
 ACPI\PNP0100\4&4446BA&0
 System speaker No SYSTEM 5.2.3790.1830 10/1/2002
 (Standard system devices) machine.inf Not Available
 ACPI\PNP0800\4&4446BA&0
 Programmable interrupt controller No SYSTEM
 5.2.3790.1830 10/1/2002 (Standard system devices) machine.inf Not Available
 ACPI\PNP0000\4&4446BA&0
 Numeric data processor No SYSTEM 5.2.3790.1830
 10/1/2002 (Standard system devices) machine.inf Not Available
 ACPI\PNP0C04\4&4446BA&0
 Direct memory access controller No SYSTEM 5.2.3790.1830
 10/1/2002 (Standard system devices) machine.inf Not Available
 ACPI\PNP0200\4&4446BA&0
 PCI standard host CPU bridge No SYSTEM 5.2.3790.1830
 10/1/2002 (Standard system devices) machine.inf Not Available
 PCI\VEN_1166&DEV_0205&SUBSYS_00000000&REV_00\3&13C0B0C5&0&10
 PCI standard PCI-to-PCI bridge No SYSTEM 5.2.3790.1830
 10/1/2002 (Standard system devices) machine.inf Not Available
 PCI\VEN_1166&DEV_0104&SUBSYS_00000000&REV_C0\4&386B597B&0&6808
 PCI standard PCI-to-PCI bridge No SYSTEM 5.2.3790.1830
 10/1/2002 (Standard system devices) machine.inf Not Available
 PCI\VEN_1166&DEV_0036&SUBSYS_00000000&REV_00\3&13C0B0C5&0&08
 PCI bus No SYSTEM 5.2.3790.1830 10/1/2002 (Standard system devices) machine.inf Not Available
 ACPI\PNP0A03\1
 Processor No PROCESSOR 5.2.3790.1830 10/1/2002
 (Standard processor types) cpu.inf Not Available
 ACPI\AUTHENTICAMD_-_AMD64_FAMILY_15_MODEL_65\7

```

Processor No PROCESSOR 5.2.3790.1830 10/1/2002
(Standard processor types) cpu.inf Not Available
ACPI\AUTHENTICAMD_-
_AMD64_FAMILY_15_MODEL_65_6
Processor No PROCESSOR 5.2.3790.1830 10/1/2002
(Standard processor types) cpu.inf Not Available
ACPI\AUTHENTICAMD_-
_AMD64_FAMILY_15_MODEL_65_5
Processor No PROCESSOR 5.2.3790.1830 10/1/2002
(Standard processor types) cpu.inf Not Available
ACPI\AUTHENTICAMD_-
_AMD64_FAMILY_15_MODEL_65_4
Processor No PROCESSOR 5.2.3790.1830 10/1/2002
(Standard processor types) cpu.inf Not Available
ACPI\AUTHENTICAMD_-
_AMD64_FAMILY_15_MODEL_65_3
Processor No PROCESSOR 5.2.3790.1830 10/1/2002
(Standard processor types) cpu.inf Not Available
ACPI\AUTHENTICAMD_-
_AMD64_FAMILY_15_MODEL_65_2
Processor No PROCESSOR 5.2.3790.1830 10/1/2002
(Standard processor types) cpu.inf Not Available
ACPI\AUTHENTICAMD_-
_AMD64_FAMILY_15_MODEL_65_1
Processor No PROCESSOR 5.2.3790.1830 10/1/2002
(Standard processor types) cpu.inf Not Available
ACPI\AUTHENTICAMD_-
_AMD64_FAMILY_15_MODEL_65_0
Microsoft ACPI-Compliant System No SYSTEM
5.2.3790.1830 10/1/2002 Microsoft acpi.inf Not
Available ACPI_HAL\PNP0C08\0
ACPI Multiprocessor x64-based PC No COMPUTER
5.2.3790.1830 10/1/2002 (Standard computers) hal.inf
Not Available ROOT\ACPI_HAL\0000
Not Available Not Available Not Available Not
Available Not Available Not Available Not Available
Not Available Not Available HTREE\ROOT\0

```

[Environment Variables]

```

Variable Value User Name
ClusterLog C:\WINDOWS\Cluster\cluster.log
<SYSTEM>
ComSpec %SystemRoot%\system32\cmd.exe <SYSTEM>
FP_NO_HOST_CHECK NO <SYSTEM>
NUMBER_OF_PROCESSORS 8 <SYSTEM>
OS Windows_NT <SYSTEM>
Path
%SystemRoot%\system32;%SystemRoot%;%SystemRoot%\Syste
m32\Wbem;C:\Program Files (x86)\Microsoft SQL
Server\80\Tools\Binn\;C:\Program Files\Microsoft SQL
Server\90\Tools\bin\;C:\Program Files (x86)\Microsoft SQL
Server\90\Tools\bin\;C:\Program Files (x86)\Microsoft SQL
Server\90\DTS\Binn\;C:\Program Files (x86)\Microsoft SQL
Server\90\Tools\Binn\VSShell\Common7\IDE\;C:\Program Files\Microsoft
SQL Server\MSSQL.1\MSSQL\Binn.; <SYSTEM>
PATHEXT
.COM;.EXE;.BAT;.CMD;.VBS;.VBE;.JS;.JSE;.WSF;.WSH
<SYSTEM>
PROCESSOR_ARCHITECTURE AMD64 <SYSTEM>
PROCESSOR_IDENTIFIER AMD64 Family 15 Model 65 Stepping 2,
AuthenticAMD <SYSTEM>
PROCESSOR_LEVEL 15 <SYSTEM>
PROCESSOR_REVISION 4102 <SYSTEM>
TEMP %SystemRoot%\TEMP <SYSTEM>
TMP %SystemRoot%\TEMP <SYSTEM>
windir %SystemRoot% <SYSTEM>
TEMP %USERPROFILE%\Local Settings\Temp NT
AUTHORITY\SYSTEM
TMP %USERPROFILE%\Local Settings\Temp NT
AUTHORITY\SYSTEM
TEMP %USERPROFILE%\Local Settings\Temp NT
AUTHORITY\NETWORK SERVICE

```

```

TMP %USERPROFILE%\Local Settings\Temp NT
AUTHORITY\NETWORK SERVICE
TEMP %USERPROFILE%\Local Settings\Temp
PE6950\Administrator
TMP %USERPROFILE%\Local Settings\Temp
PE6950\Administrator

```

[Print Jobs]

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

[Network Connections]

Local Name	Remote Name	Type	Status	User Name
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[Running Tasks]

Name	Path	Process ID	Priority	Min Working Set	Max
Working Set	Start Time	Version	Size	File Date	
system idle process	Not Available	Not Available	0	0	Not
Available	Not Available	Not Available	Not Available	Not Available	
system	Not Available	4	8	0	1413120
Not Available	Not Available	Not Available	Not Available	Not Available	
smss.exe	Not Available	416	11	204800	1413120
10/10/2006 1:03 PM	Not Available	Not Available	Not Available	Not Available	
csrss.exe	Not Available	488	13	Not Available	Not Available
Not Available	Not Available	10/10/2006 1:03 PM	Not Available	Not Available	
winlogon.exe	c:\windows\system32\winlogon.exe			528	
13	204800	1413120	10/10/2006 1:03 PM	901.00 KB	
5.2.3790.1830 (srv03_sp1_rtm.050324-1447)					
(922,624 bytes)	3/25/2005 6:00 AM				
services.exe	c:\windows\system32\services.exe			596	
9	204800	1413120	10/10/2006 1:03 PM	216.50 KB	
5.2.3790.1830 (srv03_sp1_rtm.050324-1447)					
(221,696 bytes)	3/25/2005 6:00 AM				
lsass.exe	c:\windows\system32\lsass.exe	608	9	204800	
1413120	10/10/2006 1:03 PM	5.2.3790.1830			
(srv03_sp1_rtm.050324-1447)	14.00 KB (14,336 bytes)			3/25/2005	
6:00 AM					
svchost.exe	c:\windows\system32\svchost.exe			788	
8	204800	1413120	10/10/2006 1:03 PM	24.50 KB	
5.2.3790.1830 (srv03_sp1_rtm.050324-1447)					
(25,088 bytes)	3/25/2005 6:00 AM				
svchost.exe	Not Available	868	8	Not	
Available	Not Available	10/10/2006 1:03 PM	Not Available	Not Available	
svchost.exe	c:\windows\system32\svchost.exe			924	
8	204800	1413120	10/10/2006 1:03 PM	24.50 KB	
5.2.3790.1830 (srv03_sp1_rtm.050324-1447)					
(25,088 bytes)	3/25/2005 6:00 AM				
msdtc.exe	Not Available	248	8	Not Available	
Not Available	Not Available	10/10/2006 1:04 PM	Not Available	Not Available	
inetinfo.exe	c:\windows\system32\inetrv\inetinfo.exe			620	
8	204800	1413120	10/10/2006 1:04 PM	17.50 KB	
6.0.3790.1830 (srv03_sp1_rtm.050324-1447)					
(17,920 bytes)	9/29/2006 2:15 PM				
svchost.exe	c:\windows\system32\svchost.exe			1052	
8	204800	1413120	10/10/2006 1:04 PM	24.50 KB	
5.2.3790.1830 (srv03_sp1_rtm.050324-1447)					
(25,088 bytes)	3/25/2005 6:00 AM				
svchost.exe	c:\windows\system32\svchost.exe			1288	
8	204800	1413120	10/10/2006 1:04 PM	24.50 KB	
5.2.3790.1830 (srv03_sp1_rtm.050324-1447)					
(25,088 bytes)	3/25/2005 6:00 AM				

csrss.exe	Not Available	1624	13	Not Available	msvcr7	7.0.3790.1830 (srv03_sp1_rtm.050324-1447)	508.00 KB
	Not Available	10/10/2006 1:05 PM	Not Available		(520,192 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	Not Available	Not Available	Not Available		c:\windows\system32\msvcr7.dll		
winlogon.exe	c:\windows\system32\winlogon.exe	1652			user32	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	1.04 MB
13	204800	1413120	10/10/2006 1:05 PM	204800	(1,085,952 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
5.2.3790.1830 (srv03_sp1_rtm.050324-1447)					c:\windows\system32\user32.dll		
(922,624 bytes)			3/25/2005 6:00 AM		gdi32	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	592.00 KB
rdpclip.exec	c:\windows\system32\rdpclip.exe	1884	8	204800	(606,208 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
1413120	10/10/2006 1:05 PM	5.2.3790.1830			c:\windows\system32\gdi32.dll		
(srv03_sp1_rtm.050324-1447)			99.00 KB (101,376 bytes)		nddeapi	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	25.00 KB
1:29 PM					(25,600 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
explorer.exe	c:\windows\explorer.exe	1972	8		c:\windows\system32\nddeapi.dll		
204800	1413120	10/10/2006 1:05 PM	6.00.3790.1830		profmap	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	36.00 KB
(srv03_sp1_rtm.050324-1447)		1.30 MB (1,364,480 bytes)			(36,864 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
6:00 AM					c:\windows\system32\profmap.dll		
cmd.exe	c:\windows\system32\cmd.exe	1160	8	204800	netapi32	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	589.00 KB
1413120	10/10/2006 1:05 PM	5.2.3790.1830			(603,136 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
(srv03_sp1_rtm.050324-1447)		538.50 KB (551,424 bytes)			c:\windows\system32\netapi32.dll		
6:00 AM					userenv	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	1.02 MB
sqlservr.exe	c:\program files\microsoft sql				(1,069,056 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
server\mssql.1\mssql\bin\sqlservr.exe		1172	13	204800	c:\windows\system32\userenv.dll		
1413120	10/10/2006 1:05 PM	2005.090.2047.00	37.44 MB		psapi	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	29.00 KB
(39,263,520 bytes)		4/14/2006 11:59 AM			(29,696 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
wmiprvse.exe	Not Available	140	8	Not Available	c:\windows\system32\psapi.dll		
Available	Not Available	10/10/2006 1:05 PM	Not Available		regapi	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	108.50 KB
Not Available	Not Available	Not Available			(111,104 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
logon.scr	Not Available	1536	4	Not Available	c:\windows\system32\regapi.dll		
Not Available	Not Available	10/10/2006 1:14 PM	Not Available		secur32	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	120.00 KB
Not Available	Not Available	Not Available			(122,880 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
cmd.exe	c:\windows\system32\cmd.exe	1120	8	204800	c:\windows\system32\secur32.dll		
1413120	10/11/2006 7:13 AM	5.2.3790.1830			setupapi	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	1.45 MB
(srv03_sp1_rtm.050324-1447)		538.50 KB (551,424 bytes)			(1,523,200 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
6:00 AM					c:\windows\system32\setupapi.dll		
stepmaster.exe	c:\program files (x86)\stepmaster\stepmaster.exe				version	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	28.00 KB
2032	8	204800	1413120	10/11/2006 7:24 AM	(28,672 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
2.05.0005	1.92 MB (2,015,285 bytes)		10/2/2006 9:57 AM		c:\windows\system32\version.dll		
helpctr.exe	c:\windows\pchealth\helpctr\binaries\helpctr.exe				winsta	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	89.00 KB
8	204800	1413120	10/11/2006 8:06 AM	3336	(91,136 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
5.2.3790.1830 (srv03_sp1_rtm.050324-1447)					c:\windows\system32\winsta.dll		
(1,363,456 bytes)			9/29/2006 1:31 PM		ws2_32	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	176.50 KB
wmiprvse.exe	Not Available	3516	8	Not Available	(180,736 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
Available	Not Available	10/11/2006 8:06 AM	Not Available		c:\windows\system32\ws2_32.dll		
Not Available	Not Available	Not Available			ws2help	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	30.50 KB
helpsvc.exe	c:\windows\pchealth\helpctr\binaries\helpsvc.exe				(31,232 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
3572	8	204800	1413120	10/11/2006 8:06 AM	c:\windows\system32\ws2help.dll		
5.2.3790.1830 (srv03_sp1_rtm.050324-1447)				1.52 MB	msgina	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	1.14 MB
(1,591,296 bytes)			9/29/2006 1:31 PM		(1,193,472 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
[Loaded Modules]					c:\windows\system32\msgina.dll		
Name	Version	Size	File Date	Manufacturer	Path		
winlogon	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	901.00 KB			shsvcs	6.00.3790.1830 (srv03_sp1_rtm.050324-1447)	193.50 KB
(922,624 bytes)	3/25/2005 6:00 AM Microsoft Corporation				(198,144 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\winlogon.exe				c:\windows\system32\shsvcs.dll		
ntdll	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	1.20 MB			shlwapi	6.00.3790.1830 (srv03_sp1_rtm.050324-1447)	606.50 KB
(1,257,472 bytes)	3/25/2005 6:00 AM Microsoft Corporation				(621,056 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\ntdll.dll				c:\windows\system32\shlwapi.dll		
kernel32	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	1.43 MB			sfc	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	6.00 KB
(1,500,160 bytes)	3/25/2005 6:00 AM Microsoft Corporation				(6,144 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\kernel32.dll				c:\windows\system32\sfc.dll		
advapi32	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	1.00 MB			sfc_os	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	183.50 KB
(1,051,136 bytes)	3/25/2005 6:00 AM Microsoft Corporation				(187,904 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\advapi32.dll				c:\windows\system32\sfc_os.dll		
rpert4	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	1.63 MB			wintrust	5.131.3790.1830 (srv03_sp1_rtm.050324-1447)	297.50 KB
(1,714,176 bytes)	3/25/2005 6:00 AM Microsoft Corporation				(304,640 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\rpert4.dll				c:\windows\system32\wintrust.dll		
crypt32	5.131.3790.1830 (srv03_sp1_rtm.050324-1447)	1.36 MB			imagehlp	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	57.50 KB
(1,428,992 bytes)	3/25/2005 6:00 AM Microsoft Corporation				(58,880 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\crypt32.dll				c:\windows\system32\imagehlp.dll		
msasn1	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	152.50 KB			ole32	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	2.43 MB
(156,160 bytes)	3/25/2005 6:00 AM Microsoft Corporation				(2,543,616 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\msasn1.dll				c:\windows\system32\ole32.dll		
					comctl32	6.0 (srv03_sp1_rtm.050324-1447)	1.51 MB (1,584,128 bytes)
					(156,160 bytes)	9/29/2006 8:10 AM Microsoft Corporation	
					c:\windows\winsxs\amd64_microsoft.windows.common-controls_6595b64144ccf1df_6.0.3790.1830_x-ww_aced72af\comctl32.dll		

winscard	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	230.00 KB	dnsapi	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	297.50 KB
(235,520 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(304,640 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\winscard.dll			c:\windows\system32\dnsapi.dll	
wtsapi32	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	29.00 KB	services	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	216.50 KB
(29,696 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(221,696 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\wtsapi32.dll			c:\windows\system32\services.exe	
sxs	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	1.91 MB	ncobjapi	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	80.00 KB
(2,003,968 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(81,920 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\sxs.dll			c:\windows\system32\ncobjapi.dll	
winmm	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	303.50 KB	scserv	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	594.50 KB
(310,784 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(608,768 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\winmm.dll			c:\windows\system32\scserv.dll	
shell32	6.00.3790.1830 (srv03_sp1_rtm.050324-1447)	10.01 MB	authz	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	167.00 KB
(10,492,416 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(171,008 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\shell32.dll			c:\windows\system32\authz.dll	
rsaenh	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	241.96 KB	umpnprmgr	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	205.00 KB
(247,768 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(209,920 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\rsaenh.dll			c:\windows\system32\umpnprmgr.dll	
wldap32	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	390.00 KB	eventlog	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	127.00 KB
(399,360 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(130,048 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\wldap32.dll			c:\windows\system32\eventlog.dll	
csddl	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	151.50 KB	lsass	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	14.00 KB
(155,136 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(14,336 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\csddl.dll			c:\windows\system32\lsass.exe	
dimsntfy	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	28.00 KB	lsasrv	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	1.50 MB
(28,672 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(1,568,256 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\dimsntfy.dll			c:\windows\system32\lsasrv.dll	
wlnotify	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	148.00 KB	samlib	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	69.00 KB
(151,552 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(70,656 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\wlnotify.dll			c:\windows\system32\samlib.dll	
mpr	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	115.00 KB	samsrv	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	1.01 MB
(117,760 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(1,059,328 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\mpr.dll			c:\windows\system32\samsrv.dll	
oleaut32	5.2.3790.1830	1.06 MB (1,116,160 bytes)	cryptdll	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	47.00 KB
6:00 AM Microsoft Corporation			(48,128 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\oleaut32.dll			c:\windows\system32\cryptdll.dll	
winspool	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	247.00 KB	msprivs	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	47.50 KB
(252,928 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(48,640 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\winspool.drv			c:\windows\system32\msprivs.dll	
comctl32	5.82 (srv03_sp1_rtm.050324-1447)	934.50 KB (956,928 bytes)	kerberos	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	698.00 KB
9/29/2006 8:10 AM Microsoft Corporation			(714,752 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\winsxs\amd64_microsoft.windows.common-controls_6595b64144ccf1df_5.82.3790.1830_x-ww_4d792d2a\comctl32.dll			c:\windows\system32\kerberos.dll	
uxtheme	6.00.3790.1830 (srv03_sp1_rtm.050324-1447)	494.50 KB	msv1_0	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	253.00 KB
(506,368 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(259,072 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\uxtheme.dll			c:\windows\system32\msv1_0.dll	
clbcatq	2001.12.4720.1830 (srv03_sp1_rtm.050324-1447)	865.00 KB	iphlpapi	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	177.00 KB
(885,760 bytes)	9/29/2006 1:29 PM Microsoft Corporation		(181,248 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\clbcatq.dll			c:\windows\system32\iphlpapi.dll	
comres	2001.12.4720.1830 (srv03_sp1_rtm.050324-1447)	779.50 KB	netlogon	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	666.00 KB
(798,208 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(681,984 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\comres.dll			c:\windows\system32\netlogon.dll	
wbemprox	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	38.00 KB	w32time	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	400.50 KB
(38,912 bytes)	9/29/2006 1:29 PM Microsoft Corporation		(410,112 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\wbem\wbemprox.dll			c:\windows\system32\w32time.dll	
wbemcomn	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	524.00 KB (536,576 bytes)	schannel	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	248.00 KB
3/25/2005 6:00 AM Microsoft Corporation			(253,952 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\wbem\wbemcomn.dll			c:\windows\system32\schannel.dll	
xpsp2res	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	2.77 MB	wdigest	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	130.50 KB
(2,899,456 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(133,632 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\xpsp2res.dll			c:\windows\system32\wdigest.dll	
wbemsvc	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	58.00 KB	rassfm	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	36.00 KB
(59,392 bytes)	9/29/2006 1:29 PM Microsoft Corporation		(36,864 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\wbem\wbemsvc.dll			c:\windows\system32\rassfm.dll	
fastprox	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	866.50 KB	kdcsvc	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	409.00 KB
(887,296 bytes)	9/29/2006 1:29 PM Microsoft Corporation		(418,816 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\wbem\fastprox.dll			c:\windows\system32\kdcsvc.dll	
msvcp60	7.0.3790.1830 (srv03_sp1_rtm.050324-1447)	919.50 KB	ntlsa	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	2.81 MB
(941,568 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(2,948,096 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\msvcp60.dll			c:\windows\system32\ntlsa.dll	
ntdsapi	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	127.50 KB	esent	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	2.26 MB
(130,560 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(2,366,976 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\ntdsapi.dll			c:\windows\system32\esent.dll	

ntdsatq	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	51.00 KB	esscli	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	626.50 KB
(52,224 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(641,536 bytes)	9/29/2006 1:29 PM Microsoft Corporation	
	c:\windows\system32\ntdsatq.dll			c:\windows\system32\wbem\esscli.dll	
msock	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	478.00 KB	wmiutils	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	171.00 KB
(489,472 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(175,104 bytes)	9/29/2006 1:29 PM Microsoft Corporation	
	c:\windows\system32\msock.dll			c:\windows\system32\wbem\wmiutils.dll	
scecli	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	308.00 KB	repdrvfs	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	353.50 KB
(315,392 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(361,984 bytes)	9/29/2006 1:29 PM Microsoft Corporation	
	c:\windows\system32\scecli.dll			c:\windows\system32\wbem\repdrvfs.dll	
ws03res	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	794.00 KB	wmiprvsd	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	743.00 KB
(813,056 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(760,832 bytes)	9/29/2006 1:29 PM Microsoft Corporation	
	c:\windows\system32\ws03res.dll			c:\windows\system32\wbem\wmiprvsd.dll	
w3ssl	6.0.3790.1830 (srv03_sp1_rtm.050324-1447)	21.00 KB	wbemess	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	532.50 KB
(21,504 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(545,280 bytes)	9/29/2006 1:29 PM Microsoft Corporation	
	c:\windows\system32\w3ssl.dll			c:\windows\system32\wbem\wbemess.dll	
strmfilt	6.0.3790.1830 (srv03_sp1_rtm.050324-1447)	131.50 KB	netman	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	457.00 KB
(134,656 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(467,968 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\strmfilt.dll			c:\windows\system32\netman.dll	
httpapi	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	36.50 KB	mprapi	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	154.50 KB
(37,376 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(158,208 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\httpapi.dll			c:\windows\system32\mprapi.dll	
hnetcfg	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	561.00 KB	activeds	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	348.50 KB
(574,464 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(356,864 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\hnetcfg.dll			c:\windows\system32\activeds.dll	
wshtcpip	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	29.00 KB	adslsdp	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	240.50 KB
(29,696 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(246,272 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\wshtcpip.dll			c:\windows\system32\adslsdp.dll	
dssenh	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	226.96 KB	credui	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	202.00 KB
(232,408 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(206,848 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\dssenh.dll			c:\windows\system32\credui.dll	
svchost	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	24.50 KB	rtutils	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	66.00 KB
(25,088 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(67,584 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\svchost.exe			c:\windows\system32\rtutils.dll	
rpcss	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	672.00 KB	netshell	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	2.32 MB
(688,128 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(2,437,120 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\rpcss.dll			c:\windows\system32\netshell.dll	
ntmarta	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	222.50 KB	clusapi	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	127.00 KB
(227,840 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(130,048 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\ntmarta.dll			c:\windows\system32\clusapi.dll	
wkssvc	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	221.00 KB	rasapi32	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	410.00 KB
(226,304 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(419,840 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\wkssvc.dll			c:\windows\system32\rasapi32.dll	
wiarpc	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	57.00 KB	rasman	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	95.50 KB
(58,368 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(97,792 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\wiarpc.dll			c:\windows\system32\rasman.dll	
aelupsvc	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	31.50 KB	tapi32	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	332.50 KB
(32,256 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(340,480 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\aelupsvc.dll			c:\windows\system32\tapi32.dll	
apphelp	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	241.00 KB	wininet	6.0.3790.1830 (srv03_sp1_rtm.050324-1447)	1.13 MB
(246,784 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(1,186,304 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\apphelp.dll			c:\windows\system32\wininet.dll	
es	2001.12.4720.1830 (srv03_sp1_rtm.050324-1447)	357.00 KB	wzcsapi	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	49.00 KB
(365,568 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(50,176 bytes)	3/24/2005 11:35 AM Microsoft Corporation	
	c:\windows\system32\es.dll			c:\windows\system32\wzcsapi.dll	
sens	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	63.50 KB	wzcsvc	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	492.00 KB
(65,024 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(503,808 bytes)	3/24/2005 11:35 AM Microsoft Corporation	
	c:\windows\system32\sens.dll			c:\windows\system32\wzcsvc.dll	
wmisvc	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	227.00 KB	wmi	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	5.50 KB
(232,448 bytes)	9/29/2006 1:29 PM Microsoft Corporation		(5,632 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\wbem\wmisvc.dll			c:\windows\system32\wmi.dll	
vssapi	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	1.26 MB	dhcpcsvc	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	219.00 KB
(1,320,960 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(224,256 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\vssapi.dll			c:\windows\system32\dhcpcsvc.dll	
atl	3.05.2284 96.50 KB (98,816 bytes)	3/25/2005 6:00 AM Microsoft Corporation	rasdlg	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	859.50 KB
	c:\windows\system32\atl.dll		(880,128 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
comsvcs	2001.12.4720.1830 (srv03_sp1_rtm.050324-1447)	2.06 MB	rasadhlp	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	12.00 KB
(2,156,544 bytes)	9/29/2006 1:29 PM Microsoft Corporation		(12,288 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\comsvcs.dll			c:\windows\system32\rasadhlp.dll	
wbemcore	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	1.24 MB	ncprov	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	73.00 KB
(1,299,968 bytes)	9/29/2006 1:29 PM Microsoft Corporation		(74,752 bytes)	9/29/2006 1:29 PM Microsoft Corporation	
	c:\windows\system32\wbem\wbemcore.dll			c:\windows\system32\wbem\ncprov.dll	

pchsvc	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	76.00 KB	rdpsnd	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	25.00 KB
(77,824 bytes)	9/29/2006 1:31 PM Microsoft Corporation		(25,600 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\pchealth\helpctr\binaries\pchsvc.dll			c:\windows\system32\rdpsnd.dll	
wbemcons	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	65.50 KB	scredir	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	38.50 KB
(67,072 bytes)	9/29/2006 1:29 PM Microsoft Corporation		(39,424 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\wbem\wbemcons.dll			c:\windows\system32\scredir.dll	
inetinfo	6.0.3790.1830 (srv03_sp1_rtm.050324-1447)	17.50 KB	csui	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	441.00 KB
(17,920 bytes)	9/29/2006 2:15 PM Microsoft Corporation		(451,584 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\inetinfo\inetinfo.exe			c:\windows\system32\csui.dll	
iisutil	6.0.3790.1830 (srv03_sp1_rtm.050324-1447)	316.50 KB	msacm32	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	31.00 KB
(324,096 bytes)	9/29/2006 2:15 PM Microsoft Corporation		(31,744 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\inetinfo\iisutil.dll			c:\windows\system32\msacm32.drv	
rpcref	6.0.3790.1830 (srv03_sp1_rtm.050324-1447)	4.50 KB	msacm32	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	112.00 KB
(4,608 bytes)	9/29/2006 2:15 PM Microsoft Corporation		(114,688 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\inetinfo\rpcref.dll			c:\windows\system32\msacm32.dll	
iisrtr	6.0.3790.1830 (srv03_sp1_rtm.050324-1447)	225.00 KB	imaadp32	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	24.00 KB
(230,400 bytes)	9/29/2006 2:16 PM Microsoft Corporation		(24,576 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\iisrtr.dll			c:\windows\system32\imaadp32.acm	
iisadmin	6.0.3790.1830 (srv03_sp1_rtm.050324-1447)	30.00 KB	msadp32	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	23.50 KB
(30,720 bytes)	9/29/2006 2:15 PM Microsoft Corporation		(24,064 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\inetinfo\iisadmin.dll			c:\windows\system32\msadp32.acm	
coadmin	6.0.3790.1830 (srv03_sp1_rtm.050324-1447)	100.50 KB	msg711	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	13.50 KB
(102,912 bytes)	9/29/2006 2:16 PM Microsoft Corporation		(13,824 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\inetinfo\coadmin.dll			c:\windows\system32\msg711.acm	
admwprox	6.0.3790.1830 (srv03_sp1_rtm.050324-1447)	66.00 KB	msgsm32	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	34.50 KB
(67,584 bytes)	9/29/2006 2:16 PM Microsoft Corporation		(35,328 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\admwprox.dll			c:\windows\system32\msgsm32.acm	
iisfcg	6.0.3790.1830 (srv03_sp1_rtm.050324-1447)	1.24 MB	tssoft32	1.01 13.50 KB (13,824 bytes)	3/25/2005 6:00 AM
(1,298,432 bytes)	9/29/2006 2:15 PM Microsoft Corporation		DSP GROUP, INC.	c:\windows\system32\tssoft32.acm	
	c:\windows\system32\inetinfo\iisfcg.dll				
metadata	6.0.3790.1830 (srv03_sp1_rtm.050324-1447)	342.00 KB	tsd32	1.03 24.50 KB (25,088 bytes)	3/25/2005 6:00 AM
(350,208 bytes)	9/29/2006 2:15 PM Microsoft Corporation		DSP GROUP, INC.	c:\windows\system32\tsd32.dll	
	c:\windows\system32\inetinfo\metadata.dll				
msxml3	8.70.1104.0 2.04 MB (2,141,184 bytes)	3/25/2005	rdpclip	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	99.00 KB
6:00 AM	Microsoft Corporation		(101,376 bytes)	9/29/2006 1:29 PM Microsoft Corporation	
	c:\windows\system32\msxml3.dll			c:\windows\system32\rdpclip.exe	
svcxext	6.0.3790.1830 (srv03_sp1_rtm.050324-1447)	60.50 KB	wsock32	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	24.50 KB
(61,952 bytes)	9/29/2006 2:15 PM Microsoft Corporation		(25,088 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\inetinfo\svcxext.dll			c:\windows\system32\wsock32.dll	
security	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	6.00 KB	urlmon	6.00.3790.1830 (srv03_sp1_rtm.050324-1447)	1.02 MB
(6,144 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(1,074,176 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\security.dll			c:\windows\system32\urlmon.dll	
iismap	6.0.3790.1830 (srv03_sp1_rtm.050324-1447)	97.00 KB	explorer	6.00.3790.1830 (srv03_sp1_rtm.050324-1447)	1.30 MB
(99,328 bytes)	9/29/2006 2:16 PM Microsoft Corporation		(1,364,480 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\iismap.dll			c:\windows\explorer.exe	
wamreg	6.0.3790.1830 (srv03_sp1_rtm.050324-1447)	78.50 KB	browseui	6.00.3790.1830 (srv03_sp1_rtm.050324-1447)	1.53 MB
(80,384 bytes)	9/29/2006 2:16 PM Microsoft Corporation		(1,601,536 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\inetinfo\wamreg.dll			c:\windows\system32\browseui.dll	
iisw3adm	6.0.3790.1830 (srv03_sp1_rtm.050324-1447)	305.00 KB	shdocvw	6.00.3790.1830 (srv03_sp1_rtm.050324-1447)	2.30 MB
(312,320 bytes)	9/29/2006 2:16 PM Microsoft Corporation		(2,416,128 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\inetinfo\iisw3adm.dll			c:\windows\system32\shdocvw.dll	
w3cache	6.0.3790.1830 (srv03_sp1_rtm.050324-1447)	27.50 KB	cryptui	5.131.3790.1830 (srv03_sp1_rtm.050324-1447)	705.50 KB
(28,160 bytes)	9/29/2006 2:16 PM Microsoft Corporation		(722,432 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\inetinfo\w3cache.dll			c:\windows\system32\cryptui.dll	
w3tp	6.0.3790.1830 (srv03_sp1_rtm.050324-1447)	16.00 KB	themeui	6.00.3790.1830 (srv03_sp1_rtm.050324-1447)	530.50 KB
(16,384 bytes)	9/29/2006 2:16 PM Microsoft Corporation		(543,232 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\inetinfo\w3tp.dll			c:\windows\system32\themeui.dll	
lonsint	6.0.3790.1830 (srv03_sp1_rtm.050324-1447)	17.50 KB	msimg32	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	6.50 KB
(17,920 bytes)	9/29/2006 2:15 PM Microsoft Corporation		(6,656 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\inetinfo\lonsint.dll			c:\windows\system32\msimg32.dll	
termsrv	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	354.50 KB	linkinfo	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	30.00 KB
(363,008 bytes)	9/29/2006 1:29 PM Microsoft Corporation		(30,720 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\termsrv.dll			c:\windows\system32\linkinfo.dll	
icaapi	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	27.50 KB	ntshrui	6.00.3790.1830 (srv03_sp1_rtm.050324-1447)	184.00 KB
(28,160 bytes)	9/29/2006 1:29 PM Microsoft Corporation		(188,416 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\icaapi.dll			c:\windows\system32\ntshrui.dll	
mstlsapi	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	187.00 KB	webcheck	6.00.3790.1830 (srv03_sp1_rtm.050324-1447)	439.00 KB
(191,488 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(449,536 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\mstlsapi.dll			c:\windows\system32\webcheck.dll	
rdpwsx	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	170.13 KB	stobject	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	142.50 KB
(174,216 bytes)	9/29/2006 1:29 PM Microsoft Corporation		(145,920 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\rdpwsx.dll			c:\windows\system32\stobject.dll	
			batmeter	6.00.3790.1830 (srv03_sp1_rtm.050324-1447)	41.50 KB
			(42,496 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
				c:\windows\system32\batmeter.dll	

powrprof	6.00.3790.1830 (srv03_sp1_rtm.050324-1447)	32.50 KB	sqlservr	2005.090.2047.00	37.44 MB (39,263,520 bytes)	4/14/2006
(33,280 bytes)	3/25/2005 6:00 AM Microsoft Corporation		11:59 AM Microsoft Corporation			c:\program files\microsoft sql
	c:\windows\system32\powrprof.dll		server\mssql.1\mssql\bin\sqlservr.exe			
drprov	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	24.00 KB	msvcp80	8.00.50727.42	1.05 MB (1,097,728 bytes)	9/22/2005
(24,576 bytes)	3/25/2005 6:00 AM Microsoft Corporation		11:28 PM Microsoft Corporation			
	c:\windows\system32\drprov.dll		c:\windows\winsxs\amd64_microsoft.vc80.crt_1fc8b3b9a1e18e3b			
ntlanman	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	71.50 KB	opends60	2005.090.1399.00	22.21 KB (22,744 bytes)	
(73,216 bytes)	3/25/2005 6:00 AM Microsoft Corporation		10/14/2005 2:31 PM Microsoft Corporation			c:\program
	c:\windows\system32\ntlanman.dll		files\microsoft sql server\mssql.1\mssql\bin\opends60.dll			
netui0	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	130.00 KB	instapi	2005.090.1399.00	40.71 KB (41,688 bytes)	
(133,120 bytes)	3/25/2005 6:00 AM Microsoft Corporation		10/14/2005 2:23 PM Microsoft Corporation			c:\program
	c:\windows\system32\netui0.dll		files\microsoft sql server\90\shared\instapi.dll			
netui1	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	338.50 KB	sqllevn70	2005.090.2047.00	1.58 MB (1,652,512 bytes)	4/14/2006
(346,624 bytes)	3/25/2005 6:00 AM Microsoft Corporation		11:53 AM Microsoft Corporation			c:\program files\microsoft sql
	c:\windows\system32\netui1.dll		server\mssql.1\mssql\bin\resources\1033\sqllevn70.rll			
davclnt	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	38.00 KB	sqllos	2005.090.1399.00	15.71 KB (16,088 bytes)	
(38,912 bytes)	3/25/2005 6:00 AM Microsoft Corporation		10/14/2005 2:35 PM Microsoft Corporation			c:\program
	c:\windows\system32\davclnt.dll		files\microsoft sql server\mssql.1\mssql\bin\sqllos.dll			
browselc	6.00.3790.1830 (srv03_sp1_rtm.050324-1447)	63.00 KB	xolehlp	2001.12.4720.1830 (srv03_sp1_rtm.050324-1447)	10.50 KB	
(64,512 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(10,752 bytes)	9/29/2006 1:29 PM Microsoft Corporation		
	c:\windows\system32\browselc.dll		c:\windows\system32\xolehlp.dll			
shdoclc	6.00.3790.1830 (srv03_sp1_rtm.050324-1447)	589.50 KB	msdtcprx	2001.12.4720.1830 (srv03_sp1_rtm.050324-1447)	805.50 KB	
(603,648 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(824,832 bytes)	9/29/2006 1:29 PM Microsoft Corporation		
	c:\windows\system32\shdoclc.dll		c:\windows\system32\msdtcprx.dll			
sensapi	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	10.50 KB	mtxclu	2001.12.4720.1830 (srv03_sp1_rtm.050324-1447)	141.50 KB	
(10,752 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(144,896 bytes)	3/25/2005 6:00 AM Microsoft Corporation		
	c:\windows\system32\sensapi.dll		c:\windows\system32\mtxclu.dll			
winnr	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	30.00 KB	resutils	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	98.50 KB	
(30,720 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(100,864 bytes)	3/25/2005 6:00 AM Microsoft Corporation		
	c:\windows\system32\winnr.dll		c:\windows\system32\resutils.dll			
jscrip	5.6.0.8827 974.50 KB (997,888 bytes)	3/25/2005 6:00 AM	sqlncli	2005.090.2047.00	2.72 MB (2,854,744 bytes)	4/14/2006
	Microsoft Corporation		11:59 AM Microsoft Corporation			c:\windows\system32\sqlncli.dll
dfshim	2.0.50727.42 (RTM.050727-4200)	95.00 KB (97,280	comdlg32	6.00.3790.1830 (srv03_sp1_rtm.050324-1447)	446.50 KB	
bytes)	9/22/2005 11:52 PM Microsoft Corporation		(457,216 bytes)	3/25/2005 6:00 AM Microsoft Corporation		
	c:\windows\system32\dfshim.dll		c:\windows\system32\comdlg32.dll			
mscoree	2.0.50727.42 (RTM.050727-4200)	441.00 KB (451,584	sqlnclir	2005.090.1399.00	201.21 KB (206,040 bytes)	
bytes)	9/22/2005 11:37 PM Microsoft Corporation		10/14/2005 2:31 PM Microsoft Corporation			
	c:\windows\system32\mscoree.dll		c:\windows\system32\sqlnclir.rll			
mlang	6.00.3790.1830 (srv03_sp1_rtm.050324-1447)	686.00 KB	StepMaster	2.05.0005	1.92 MB (2,015,285 bytes)	10/2/2006
(702,464 bytes)	3/25/2005 6:00 AM Microsoft Corporation		9:57 AM Microsoft Corporation			c:\program files
	c:\windows\system32\mlang.dll		(x86)\stepmaster\stepmaster.exe			
shfusion	2.0.50727.42 (RTM.050727-4200)	105.50 KB (108,032	wow64	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	245.00 KB	
bytes)	9/22/2005 11:36 PM Microsoft Corporation		(250,880 bytes)	3/25/2005 6:00 AM Microsoft Corporation		
	c:\windows\microsoft.net\framework64\v2.0.50727\shfusion.dll		c:\windows\system32\wow64.dll			
msvcr80	8.00.50727.42	803.50 KB (822,784 bytes)	wow64win	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	280.00 KB	
11:26 PM Microsoft Corporation			(286,720 bytes)	3/25/2005 6:00 AM Microsoft Corporation		
	c:\windows\winsxs\amd64_microsoft.vc80.crt_1fc8b3b9a1e18e3b		c:\windows\system32\wow64win.dll			
_8.0.50727.42_x-ww_3fea50ad\msvcr80.dll			wow64cpu	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	18.50 KB	
fusion	2.0.50727.42 (RTM.050727-4200)	11.00 KB (11,264	(18,944 bytes)	3/25/2005 6:00 AM Microsoft Corporation		
bytes)	9/22/2005 11:37 PM Microsoft Corporation		c:\windows\system32\wow64cpu.dll			
	c:\windows\microsoft.net\framework64\v2.0.50727\fusion.dll		helpctr	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	1.30 MB	
culture	2.0.50727.42 (RTM.050727-4200)	22.00 KB (22,528	(1,363,456 bytes)	9/29/2006 1:31 PM Microsoft Corporation		
bytes)	9/22/2005 11:41 PM Microsoft Corporation		c:\windows\pchealth\helpctr\binaries\helpctr.exe			
	c:\windows\microsoft.net\framework64\v2.0.50727\culture.dll		hcappres	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	7.50 KB	
shfusres	2.0.50727.42 (RTM.050727-4200)	85.00 KB (87,040	(7,680 bytes)	9/29/2006 1:31 PM Microsoft Corporation		
bytes)	9/22/2005 11:36 PM Microsoft Corporation		c:\windows\pchealth\helpctr\binaries\hcappres.dll			
	c:\windows\microsoft.net\framework64\v2.0.50727\shfusres.dll		itss	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	208.00 KB	
mydocs	6.00.3790.1830 (srv03_sp1_rtm.050324-1447)	101.00 KB	(212,992 bytes)	3/25/2005 6:00 AM Microsoft Corporation		
(103,424 bytes)	3/25/2005 6:00 AM Microsoft Corporation		c:\windows\system32\itss.dll			
	c:\windows\system32\mydocs.dll		pchshell	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	155.00 KB	
actxprxy	6.00.3790.1830 (srv03_sp1_rtm.050324-1447)	220.50 KB	(158,720 bytes)	9/29/2006 1:31 PM Microsoft Corporation		
(225,792 bytes)	3/25/2005 6:00 AM Microsoft Corporation		c:\windows\pchealth\helpctr\binaries\pchshell.dll			
	c:\windows\system32\actxprxy.dll		mshtml	6.00.3790.1830 (srv03_sp1_rtm.050324-1447)	5.65 MB	
zipfldr	6.00.3790.1830 (srv03_sp1_rtm.050324-1447)	449.50 KB	(5,928,448 bytes)	3/25/2005 6:00 AM Microsoft Corporation		
(460,288 bytes)	3/25/2005 6:00 AM Microsoft Corporation		c:\windows\system32\mshtml.dll			
	c:\windows\system32\zipfldr.dll		msls31	3.10.349.0 357.00 KB (365,568 bytes)	3/25/2005 6:00 AM	
sendmail	6.00.3790.1830 (srv03_sp1_rtm.050324-1447)	64.00 KB	Microsoft Corporation			c:\windows\system32\msls31.dll
(65,536 bytes)	3/25/2005 6:00 AM Microsoft Corporation					
	c:\windows\system32\sendmail.dll		msimf	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	380.50 KB	
cmd	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	538.50 KB	(389,632 bytes)	3/25/2005 6:00 AM Microsoft Corporation		
(551,424 bytes)	3/25/2005 6:00 AM Microsoft Corporation		c:\windows\system32\msimf.dll			
	c:\windows\system32\cmd.exe					

```

msctf 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 617.50 KB
(632,320 bytes) 3/25/2005 6:00 AM Microsoft Corporation
c:\windows\system32\msctf.dll
imm32 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 208.00 KB
(212,992 bytes) 3/25/2005 6:00 AM Microsoft Corporation
c:\windows\system32\imm32.dll
mshtml 6.00.3790.1830 (srv03_sp1_rtm.050324-1447) 905.50 KB
(927,232 bytes) 3/25/2005 6:00 AM Microsoft Corporation
c:\windows\system32\mshtml.dll
vbscript 5.6.0.8827 646.50 KB (662,016 bytes) 3/25/2005 6:00 AM
Microsoft Corporation c:\windows\system32\vbscript.dll
msinfo 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 636.00 KB
(651,264 bytes) 9/29/2006 1:31 PM Microsoft Corporation
c:\windows\pchealth\helpctr\binaries\msinfo.dll
mfc42u 6.50.9146.0 1.39 MB (1,462,272 bytes) 3/25/2005
6:00 AM Microsoft Corporation c:\windows\system32\mfc42u.dll
riched32 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 7.00 KB
(7,168 bytes) 3/25/2005 6:00 AM Microsoft Corporation
c:\windows\system32\riched32.dll
riched20 5.31.23.1224 1.10 MB (1,157,120 bytes) 3/25/2005
6:00 AM Microsoft Corporation
c:\windows\system32\riched20.dll
helpsvc 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 1.52 MB
(1,591,296 bytes) 9/29/2006 1:31 PM Microsoft Corporation
c:\windows\pchealth\helpctr\binaries\helpsvc.exe

```

[Services]

Display Name	Name	State	Start Mode	Service Type
Path	Error Control	Start Name	Tag ID	
Application Experience Lookup Service	Auto	Share Process	AeLookupSvc	Running
c:\windows\system32\svchost.exe -k netsvcs Normal LocalSystem 0				
Alerter	Alerter	Stopped	Disabled	Share Process
c:\windows\system32\svchost.exe -k localservice Normal NT AUTHORITY\LocalService 0				
Application Layer Gateway Service	ALG	Stopped	Manual	Own Process
c:\windows\system32\alg.exe Normal NT AUTHORITY\LocalService 0				
Application Management Process	AppMgmt	Stopped	Manual	Share
c:\windows\system32\svchost.exe -k netsvcs Normal LocalSystem 0				
ASP.NET State Service	aspnet_state	Stopped	Manual	Own Process
c:\windows\microsoft.net\framework64\v2.0.50727\aspnet_state.exe Normal NT AUTHORITY\NetworkService 0				
Windows Audio	AudioSrv	Stopped	Disabled	Share Process
c:\windows\system32\svchost.exe -k netsvcs Normal LocalSystem 0				
Background Intelligent Transfer Service	BITS	Stopped	Manual	Share Process
c:\windows\system32\svchost.exe -k netsvcs Normal LocalSystem 0				
Computer Browser	Browser	Stopped	Manual	Share Process
c:\windows\system32\svchost.exe -k netsvcs Normal LocalSystem 0				
Indexing Service	CiSvc	Stopped	Disabled	Share Process
c:\windows\system32\cisvc.exe Normal LocalSystem 0				
ClipBook	ClipSrv	Stopped	Disabled	Own Process
c:\windows\system32\clipsrv.exe Normal LocalSystem 0				
.NET Runtime Optimization Service v2.0.50727_X86	clr_optimization_v2.0.50727_32	Stopped	Manual	Own
c:\windows\microsoft.net\framework\v2.0.50727\mscorsvw.exe Ignore LocalSystem 0				
.NET Runtime Optimization Service v2.0.50727_x64	clr_optimization_v2.0.50727_64	Stopped	Manual	Own
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 Stopped Manual Share
Process c:\windows\system32\svchost.exe -k netsvcs Normal
LocalSystem 0
DCOM Server Process Launcher DcomLaunch Running Auto
Share Process c:\windows\system32\svchost.exe -k
dcomlaunch Normal LocalSystem 0
Distributed File System Dfs Stopped Manual Own
Process c:\windows\system32\dfssvc.exe Normal LocalSystem
0
DHCP Client Dhcp Stopped Manual Share Process
c:\windows\system32\svchost.exe -k networkservice Normal
NT AUTHORITY\NetworkService 0
Logical Disk Manager Administrative Service dmadmin Stopped
Manual Share Process
c:\windows\system32\dmadmin.exe /com Normal
LocalSystem 0
Logical Disk Managerdmsrvr Stopped Manual Share Process
c:\windows\system32\svchost.exe -k netsvcs Normal
LocalSystem 0
DNS Client Dnscache Stopped Manual Share Process
c:\windows\system32\svchost.exe -k networkservice Normal
NT AUTHORITY\NetworkService 0
Error Reporting Service ERSvc Stopped Manual Share
Process c:\windows\system32\svchost.exe -k winerr Ignore
LocalSystem 0
Event Log Eventlog Running Auto Share Process
c:\windows\system32\services.exe Normal
LocalSystem 0
COM+ Event System EventSystem Running Auto Share
Process c:\windows\system32\svchost.exe -k netsvcs Normal
LocalSystem 0
Help and Support helpsvc Running Manual Share Process
c:\windows\system32\svchost.exe -k netsvcs Normal
LocalSystem 0
HID Input Service HidServ Stopped Manual Share Process
c:\windows\system32\svchost.exe -k netsvcs Normal
LocalSystem 0
HTTP SSLHTTPFilter Running Manual Share Process
c:\windows\system32\lsass.exe Normal LocalSystem
0
IAS Jet Database Access IASJet Stopped Manual Share
Process c:\windows\syswow64\svchost.exe -k iasjet Normal
LocalSystem 0
IIS Admin Service IISADMIN Running Auto Share
Process c:\windows\system32\inetrv\inetinfo.exe Normal
LocalSystem 0
IMAPI CD-Burning COM Service ImapiService Stopped
Disabled Own Process c:\windows\system32\imapi.exe
Normal LocalSystem 0
Intersite Messaging IsmServ Stopped Disabled Own Process
c:\windows\system32\ismserv.exe Normal
LocalSystem 0
Kerberos Key Distribution Center kdc Stopped Disabled
Share Process c:\windows\system32\lsass.exe Normal
LocalSystem 0
Server lanmanserver Stopped Manual Share Process
c:\windows\system32\svchost.exe -k netsvcs Normal
LocalSystem 0
Workstation lanmanworkstation Running Auto Share
Process c:\windows\system32\svchost.exe -k netsvcs Normal
LocalSystem 0
License Logging LicenseService Stopped Disabled Own
Process c:\windows\system32\llsrv.exe Normal NT
AUTHORITY\NetworkService 0
TCP/IP NetBIOS Helper LmHosts Stopped Manual Share
Process c:\windows\system32\svchost.exe -k localservice
NT AUTHORITY\LocalService 0
Messenger Messenger Stopped Share Process
c:\windows\system32\svchost.exe -k netsvcs Normal
LocalSystem 0

```

NetMeeting Remote Desktop Sharing	mnmsvc	Stopped	Disabled			Remote Procedure Call (RPC) Process	RpcSs	Running	Auto	Share
Own Process	c:\windows\system32\mnmsvc.exe					Process	c:\windows\system32\svchost.exe -k rpcss		Normal	NT
Distributed Transaction Coordinator	MSDTC	Running	Auto			AUTHORITY\NetworkService	0			
Own Process	c:\windows\system32\msdtc.exe	Normal				Resultant Set of Policy Provider Process	c:\windows\system32\rsopprov.exe	Stopped	Manual	Share
NT AUTHORITY\NetworkService	0					LocalSystem	0		Normal	
Windows Installer	MSIServer	Stopped	Manual	Share	Process	Special Administration Console Helper	sacsvr	Stopped	Manual	
Own Process	c:\windows\system32\msiexec.exe /v	Normal				Share Process	c:\windows\system32\svchost.exe -k netsvcs			
LocalSystem	0					Normal	LocalSystem	0		
SQL Server (MSSQLSERVER)	MSSQLSERVER	Stopped	Manual			Security Accounts Manager Process	SamSs	Running	Auto	Share
Own Process	"c:\program files\microsoft sql server\mssql.1\mssql\bin\sqlservr.exe" -smssqlserver	Normal				Process	c:\windows\system32\lsass.exe	Normal	LocalSystem	
LocalSystem	0					0				
SQL Server Active Directory Helper	MSSQLServerADHelper	Stopped	Disabled	Share	Process	Smart Card	SCardSvr	Stopped	Manual	Share
Own Process	"c:\program files\microsoft sql server\90\shared\sqladhlp90.exe"	Normal				Process	c:\windows\system32\scardsvr.exe		Ignore	NT
AUTHORITY\NetworkService	0					AUTHORITY\LocalService	0			
Network DDE	NetDDE	Stopped	Disabled	Share	Process	Task Scheduler	Schedule	Stopped	Manual	Share
Own Process	c:\windows\system32\netdde.exe	Normal				Process	c:\windows\system32\svchost.exe -k netsvcs		Normal	
LocalSystem	0					LocalSystem	0			
Network DDE DSDM	NetDDEdsdm	Stopped	Disabled	Share	Process	Secondary Logon	seclogon	Stopped	Manual	Share
Process	c:\windows\system32\netdde.exe	Normal				Process	c:\windows\system32\svchost.exe -k netsvcs		Ignore	
LocalSystem	0					LocalSystem	0			
Net Logon	Netlogon	Stopped	Manual	Share	Process	System Event Notification Process	SENS	Running	Auto	Share
Own Process	c:\windows\system32\lsass.exe	Normal				Process	c:\windows\system32\svchost.exe -k netsvcs		Normal	
LocalSystem	0					LocalSystem	0			
Network Connections	Netman	Running	Manual	Share	Process	Windows Firewall/Internet Connection Sharing (ICS)	SharedAccess	Stopped	Disabled	Share
Own Process	c:\windows\system32\svchost.exe -k netsvcs	Normal				Process	c:\windows\system32\svchost.exe -k netsvcs		Normal	
LocalSystem	0					LocalSystem	0			
Network Location Awareness (NLA)	Nla	Running	Manual			Shell Hardware Detection	ShellHWDetection	Running	Auto	
Share Process	c:\windows\system32\svchost.exe -k netsvcs	Normal				Share Process	c:\windows\system32\svchost.exe -k netsvcs		Ignore	LocalSystem
LocalSystem	0					Ignore	LocalSystem	0		
File Replication	NtFrs	Stopped	Manual	Own	Process	Print Spooler	Spooler	Stopped	Manual	Own
Own Process	c:\windows\system32\ntfrs.exe	Ignore				Process	c:\windows\system32\spoolsv.exe		Normal	
LocalSystem	0					LocalSystem	0			
NT LM Security Support Provider	NtLmSsp	Stopped	Manual			SQL Server Browser Process	SQLBrowser	Stopped	Disabled	Own
Share Process	c:\windows\system32\lsass.exe	Normal				Process	"c:\program files (x86)\microsoft sql server\90\shared\sqlbrowser.exe"	Normal	LocalSystem	0
LocalSystem	0					SQL Server Agent (MSSQLSERVER)	SQLSERVERAGENT	Stopped	Manual	Own
Removable Storage	NtmsSvc	Stopped	Manual	Share	Process	Process	"c:\program files\microsoft sql server\mssql.1\mssql\bin\sqlagent90.exe" -i mssqlserver	Normal	LocalSystem	0
Own Process	c:\windows\system32\svchost.exe -k netsvcs	Normal				LocalSystem	0			
LocalSystem	0					SQL Server VSS Writer Process	SQLWriter	Stopped	Manual	Own
Office Source Engine	ose	Stopped	Manual	Own	Process	Process	"c:\program files\microsoft sql server\90\shared\sqlwriter.exe"	Normal	LocalSystem	0
Own Process	"c:\program files (x86)\common files\microsoft shared\source engine\ose.exe"	Normal				LocalSystem	0			
LocalSystem	0					Windows Image Acquisition (WIA)	stisvc	Stopped	Disabled	
Plug and Play	PlugPlay	Running	Auto	Share	Process	Share Process	c:\windows\system32\svchost.exe -k imgsvc		Normal	NT AUTHORITY\LocalService
Own Process	c:\windows\system32\services.exe	Normal				Normal	NT AUTHORITY\LocalService	0		
LocalSystem	0					Microsoft Software Shadow Copy Provider	swprv	Stopped	Manual	
IPSEC Services	PolicyAgent	Stopped	Manual	Share	Process	Own Process	c:\windows\system32\svchost.exe -k swprv		Normal	LocalSystem
Process	c:\windows\system32\lsass.exe	Normal				Normal	LocalSystem	0		
LocalSystem	0					Performance Logs and Alerts	SysmonLog	Stopped	Auto	
Protected Storage	ProtectedStorage	Stopped	Manual	Share	Process	Own Process	c:\windows\system32\smlogsvc.exe		Normal	NT Authority\NetworkService
Process	c:\windows\system32\lsass.exe	Normal				Normal	NT Authority\NetworkService	0		
LocalSystem	0					Telephony	TapiSrv	Stopped	Manual	Share
Remote Access Auto Connection Manager	RasAuto	Stopped	Manual			Process	c:\windows\system32\svchost.exe -k tapisrv		Normal	
Share Process	c:\windows\system32\svchost.exe -k netsvcs	Normal				LocalSystem	0			
Normal	LocalSystem	0				Terminal Services	TermService	Running	Manual	Share
Remote Access Connection Manager	RasMan	Stopped	Manual			Process	c:\windows\system32\svchost.exe -k termsvcs		Normal	
Share Process	c:\windows\system32\svchost.exe -k netsvcs	Normal				LocalSystem	0			
Normal	LocalSystem	0				Themes	Themes	Stopped	Disabled	Share
Remote Desktop Help Session Manager	RDSessMgr	Stopped				Process	c:\windows\system32\svchost.exe -k netsvcs		Normal	
Manual	Own Process					LocalSystem	0			
Own Process	c:\windows\system32\sessmgr.exe	Normal				Telnet	TlntSvr	Stopped	Disabled	Own
LocalSystem	0					Process	c:\windows\system32\tlntsvr.exe		Normal	NT
Routing and Remote Access	RemoteAccess	Stopped	Disabled			AUTHORITY\LocalService	0			
Share Process	c:\windows\system32\svchost.exe -k netsvcs	Normal				Distributed Link Tracking Server	TrkSvr	Stopped	Disabled	Share
Normal	LocalSystem	0				Process	c:\windows\system32\svchost.exe -k netsvcs		Normal	
Remote Registry	RemoteRegistry	Stopped	Manual	Share		LocalSystem	0			
Process	c:\windows\system32\svchost.exe -k regsvc	Normal				Distributed Link Tracking Client	TrkWks	Stopped	Manual	Share
AUTHORITY\LocalService	0					Process	c:\windows\system32\svchost.exe -k netsvcs		Normal	
Remote Procedure Call (RPC) Locator	RpcLocator	Stopped				LocalSystem	0			
Manual	Own Process					Process	c:\windows\system32\locator.exe		Normal	NT AUTHORITY\NetworkService
Normal	NT AUTHORITY\NetworkService	0								

Terminal Services Session Directory	Tssdis	Stopped	Disabled		
Own Process	c:\windows\system32\tssdis.exe		Normal		
LocalSystem	0				
Windows User Mode Driver Framework	UMWdf	Stopped	Manual		
Own Process	c:\windows\system32\wdmfr.exe		Normal		
NT AUTHORITY\LocalService	0				
Uninterruptible Power Supply	UPS	Stopped	Manual	Own	
Process	c:\windows\system32\ups.exe		Normal	NT	
AUTHORITY\LocalService	0				
Virtual Disk Service	vds	Stopped	Manual	Own Process	
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	Stopped	Manual	Share Process	
Process	c:\windows\system32\svchost.exe -k localservice		Normal		
NT AUTHORITY\LocalService	0				
World Wide Web Publishing Service	W3SVC	Running	Auto		
Share Process	c:\windows\system32\svchost.exe -k iissvc		Normal		
LocalSystem	0				
WebClient	WebClient	Stopped	Disabled	Share Process	
Process	c:\windows\system32\svchost.exe -k localservice		Normal		
NT AUTHORITY\LocalService	0				
WinHTTP	Web Proxy Auto-Discovery Service				
Process	WinHttpAutoProxySvc	Stopped	Manual	Share	
Process	c:\windows\system32\svchost.exe -k localservice		Normal		
NT AUTHORITY\LocalService	0				
Windows Management Instrumentation	wimgmt	Running	Auto		
Share Process	c:\windows\system32\svchost.exe -k netsvcs		Normal		
Ignore	LocalSystem	0			
Portable Media Serial Number Service	WmdmPmSN			Stopped	
Manual	Share Process				
Process	c:\windows\system32\svchost.exe -k netsvcs		Normal		
LocalSystem	0				
Windows Management Instrumentation Driver Extensions				Wmi	
Stopped	Manual	Share Process			
Process	c:\windows\system32\svchost.exe -k netsvcs		Normal		
LocalSystem	0				
WMI Performance Adapter	WmiApSrv	Stopped	Manual		
Own Process	c:\windows\system32\wbem\wmiaprv.exe		Normal	LocalSystem	
0					
Automatic Updates	wuauclt	Stopped	Manual	Share Process	
Process	c:\windows\system32\svchost.exe -k netsvcs		Normal		
LocalSystem	0				
Wireless Configuration	WZCSVC	Stopped	Manual	Share	
Process	c:\windows\system32\svchost.exe -k netsvcs		Normal		
LocalSystem	0				
Network Provisioning Service	xmlprov	Stopped	Manual	Share	
Process	c:\windows\system32\svchost.exe -k netsvcs		Normal		
LocalSystem	0				

[Program Groups]

Group Name	Name	User Name
Accessories	Default	User:Accessories Default User
Accessories\Accessibility		Default User:Accessories\Accessibility Default User
Accessories\Entertainment		Default User:Accessories\Entertainment Default User
Startup	Default	User:Startup Default User
Accessories		All Users:Accessories All Users
Accessories\Accessibility		All Users:Accessories\Accessibility All Users
Accessories\Communications		All Users:Accessories\Communications All Users
Accessories\Entertainment		All Users:Accessories\Entertainment All Users
Accessories\System Tools		All Users:Accessories\System Tools All Users
Administrative Tools		All Users:Administrative Tools All Users
Microsoft SQL Server 2005		All Users:Microsoft SQL Server 2005 All Users

Microsoft SQL Server 2005\Analysis Services	All Users:Microsoft
SQL Server 2005\Analysis Services	All Users
Microsoft SQL Server 2005\Configuration Tools	All Users:Microsoft
SQL Server 2005\Configuration Tools	All Users
Microsoft SQL Server 2005\Documentation and Tutorials	All Users:Microsoft
Microsoft SQL Server 2005\Documentation and Tutorials\Tutorials	All Users
Microsoft SQL Server 2005\Documentation and Tutorials\Tutorials\Tutorials	All Users:Microsoft
Microsoft SQL Server 2005\Performance Tools	All Users:Microsoft
SQL Server 2005\Performance Tools	All Users
Startup	All Users:Startup All Users
Accessories	NT AUTHORITY\SYSTEM:Accessories
AUTHORITY\SYSTEM	
Accessories\Accessibility	NT AUTHORITY\SYSTEM:Accessories\Accessibility
AUTHORITY\SYSTEM	
Accessories\Entertainment	NT AUTHORITY\SYSTEM:Accessories\Entertainment
AUTHORITY\SYSTEM	
Startup	NT AUTHORITY\SYSTEM:Startup
AUTHORITY\SYSTEM	
Accessories	PE6950\Administrator:Accessories
PE6950\Administrator	
Accessories\Accessibility	PE6950\Administrator:Accessories\Accessibility
PE6950\Administrator	
Accessories\Entertainment	PE6950\Administrator:Accessories\Entertainment
PE6950\Administrator	
Administrative Tools	PE6950\Administrator:Administrative Tools
PE6950\Administrator	
Startup	PE6950\Administrator:Startup
PE6950\Administrator	

[Startup Programs]

Program	Command	User Name	Location
desktop	desktop.ini	NT AUTHORITY\SYSTEM	Startup
desktop	desktop.ini	PE6950\Administrator	Startup
desktop	desktop.ini	.DEFAULT	Startup
desktop	desktop.ini	All Users	Common Startup

[OLE Registration]

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

[Windows Error Reporting]

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

[Internet Settings]

[Internet Explorer]

[Following are sub-categories of this main category]

[Summary]

Item	Value
Version	6.0.3790.1830
Build	63790.1830
Application Path	C:\Program Files\Internet Explorer
Language	English (United States)

Active Printer Not Available

Cipher Strength 128-bit
Content Advisor Disabled
IEAK Install No

[File Versions]

File	Version	Size	Date	Path	Company
actxprxy.dll	6.0.3790.1830	221 KB	3/25/2005 7:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
actxprxy.dll	6.0.3790.1830	221 KB	3/25/2005 7:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
advpack.dll	6.0.3790.1830	146 KB	3/25/2005 7:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
advpack.dll	6.0.3790.1830	146 KB	3/25/2005 7:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
asctrls.ocx	6.0.3790.1830	147 KB	3/25/2005 7:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
asctrls.ocx	6.0.3790.1830	147 KB	3/25/2005 7:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
browsecl.dll	6.0.3790.1830	63 KB	3/25/2005 7:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
browsecl.dll	6.0.3790.1830	63 KB	3/25/2005 7:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
browseui.dll	6.0.3790.1830	1,564 KB	3/25/2005 7:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
browseui.dll	6.0.3790.1830	1,564 KB	3/25/2005 7:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
cdfview.dll	6.0.3790.1830	216 KB	3/25/2005 7:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
cdfview.dll	6.0.3790.1830	216 KB	3/25/2005 7:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
comctl32.dll	5.82.3790.1830	935 KB	3/25/2005 7:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
comctl32.dll	5.82.3790.1830	935 KB	3/25/2005 7:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
dxtrans.dll	6.3.3790.1830	320 KB	3/25/2005 7:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
dxtrans.dll	6.3.3790.1830	320 KB	3/25/2005 7:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
dxtmsft.dll	6.3.3790.1830	549 KB	3/25/2005 7:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
dxtmsft.dll	6.3.3790.1830	549 KB	3/25/2005 7:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
iecont.dll	<File Missing>	Not Available	Not Available		Not Available
iecont.dll	Not Available	Not Available	Not Available		Not Available
iecontlc.dll	<File Missing>	Not Available	Not Available		Not Available
iecontlc.dll	Not Available	Not Available	Not Available		Not Available
iedkcs32.dll	16.0.3790.1830	417 KB	3/25/2005 7:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
iedkcs32.dll	16.0.3790.1830	417 KB	3/25/2005 7:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
iepeers.dll	6.0.3790.1830	361 KB	3/25/2005 7:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
iepeers.dll	6.0.3790.1830	361 KB	3/25/2005 7:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
iesetup.dll	6.0.3790.1830	71 KB	3/25/2005 7:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
iesetup.dll	6.0.3790.1830	71 KB	3/25/2005 7:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
ieunit.inf	Not Available	24 KB	3/25/2005 7:00:00 AM	C:\WINDOWS\system32	Not Available
ieunit.inf	Not Available	24 KB	3/25/2005 7:00:00 AM	C:\WINDOWS\system32	Not Available
ieexplore.exe	6.0.3790.1830	94 KB	3/25/2005 7:00:00 AM	C:\Program Files\Internet Explorer	Microsoft Corporation
imgutil.dll	6.0.3790.1830	61 KB	3/25/2005 7:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
imgutil.dll	6.0.3790.1830	61 KB	3/25/2005 7:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation

inetcp.cpl	6.0.3790.1830	428 KB	3/25/2005 7:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
inetcp.cpl	6.0.3790.1830	428 KB	3/25/2005 7:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
inetcp.cpl	6.0.3790.1830	110 KB	3/25/2005 7:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
inetcp.cpl	6.0.3790.1830	110 KB	3/25/2005 7:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
inseng.dll	6.0.3790.1830	147 KB	3/25/2005 7:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
inseng.dll	6.0.3790.1830	147 KB	3/25/2005 7:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
mlang.dll	6.0.3790.1830	686 KB	3/25/2005 7:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
mlang.dll	6.0.3790.1830	686 KB	3/25/2005 7:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
msencode.dll	<File Missing>	Not Available	Not Available		Not Available
mshta.exe	6.0.3790.1830	38 KB	3/25/2005 7:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
mshta.exe	6.0.3790.1830	38 KB	3/25/2005 7:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
mshtml.dll	6.0.3790.1830	5,790 KB	3/25/2005 7:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
mshtml.dll	6.0.3790.1830	5,790 KB	3/25/2005 7:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
mshtml.tlb	6.0.3790.1830	1,320 KB	3/25/2005 7:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
mshtml.tlb	6.0.3790.1830	1,320 KB	3/25/2005 7:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
mshtml.tlb	6.0.3790.1830	906 KB	3/25/2005 7:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
mshtml.tlb	6.0.3790.1830	906 KB	3/25/2005 7:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
mshtml.tlb	6.0.3790.1830	56 KB	3/25/2005 7:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
mshtml.tlb	6.0.3790.1830	56 KB	3/25/2005 7:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
msident.dll	6.0.3790.1830	69 KB	3/25/2005 7:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
msident.dll	6.0.3790.1830	69 KB	3/25/2005 7:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
msident.dll	6.0.3790.1830	16 KB	3/25/2005 7:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
msident.dll	6.0.3790.1830	16 KB	3/25/2005 7:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
msieftp.dll	6.0.3790.1830	369 KB	3/25/2005 7:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
msieftp.dll	6.0.3790.1830	369 KB	3/25/2005 7:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
msrating.dll	6.0.3790.1830	240 KB	3/25/2005 7:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
msrating.dll	6.0.3790.1830	240 KB	3/25/2005 7:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
mstime.dll	6.0.3790.1830	878 KB	3/25/2005 7:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
mstime.dll	6.0.3790.1830	878 KB	3/25/2005 7:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
occache.dll	6.0.3790.1830	126 KB	3/25/2005 7:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
occache.dll	6.0.3790.1830	126 KB	3/25/2005 7:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
proctexe.ocx	<File Missing>	Not Available	Not Available		Not Available
sendmail.dll	6.0.3790.1830	64 KB	3/25/2005 7:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
sendmail.dll	6.0.3790.1830	64 KB	3/25/2005 7:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
shdoclc.dll	6.0.3790.1830	590 KB	3/25/2005 7:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
shdoclc.dll	6.0.3790.1830	590 KB	3/25/2005 7:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation

```

shdocvw.dll 6.0.3790.1830 2,360 KB 3/25/2005 7:00:00
AM C:\WINDOWS\system32 Microsoft Corporation
shdocvw.dll 6.0.3790.1830 2,360 KB 3/25/2005 7:00:00
AM . Microsoft Corporation
shfolder.dll 6.0.3790.1830 34 KB 3/25/2005 7:00:00
AM C:\WINDOWS\system32 Microsoft Corporation
shfolder.dll 6.0.3790.1830 34 KB 3/25/2005 7:00:00
AM . Microsoft Corporation
shlwapi.dll 6.0.3790.1830 607 KB 3/25/2005 7:00:00 AM
C:\WINDOWS\system32 Microsoft Corporation
shlwapi.dll 6.0.3790.1830 607 KB 3/25/2005 7:00:00 AM
. Microsoft Corporation
tdc.ocx 1.3.0.3130 91 KB 3/25/2005 7:00:00 AM
C:\WINDOWS\system32 Microsoft Corporation
tdc.ocx 1.3.0.3130 91 KB 3/25/2005 7:00:00 AM
. Microsoft Corporation
url.dll 6.0.3790.1830 40 KB 3/25/2005 7:00:00 AM
C:\WINDOWS\system32 Microsoft Corporation
url.dll 6.0.3790.1830 40 KB 3/25/2005 7:00:00 AM
. Microsoft Corporation
urlmon.dll 6.0.3790.1830 1,049 KB 3/25/2005 7:00:00 AM
C:\WINDOWS\system32 Microsoft Corporation
urlmon.dll 6.0.3790.1830 1,049 KB 3/25/2005 7:00:00 AM
. Microsoft Corporation
webcheck.dll 6.0.3790.1830 439 KB 3/25/2005 7:00:00
AM C:\WINDOWS\system32 Microsoft Corporation
webcheck.dll 6.0.3790.1830 439 KB 3/25/2005 7:00:00
AM . Microsoft Corporation
wininet.dll 6.0.3790.1830 1,159 KB 3/25/2005 7:00:00 AM
C:\WINDOWS\system32 Microsoft Corporation
wininet.dll 6.0.3790.1830 1,159 KB 3/25/2005 7:00:00 AM
. Microsoft Corporation

```

[Personal Certificates]

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

[Other People Certificates]

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

[Publishers]

Name
No publisher information available

[Security]

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

[Connectivity]

Item	Value
Connection Preference	Never dial

LAN Settings

AutoConfigProxy	wininet.dll
AutoProxyDetectMode	Disabled
AutoConfigURL	
Proxy	Disabled
ProxyServer	
ProxyOverride	

[Cache]

[Following are sub-categories of this main category]

[Summary]

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

[List of Objects]

Program File	Status	CodeBase
No cached object information available		

[Content]

[Following are sub-categories of this main category]

[Summary]

Item	Value
Content Advisor	Disabled

Appendix A

Appendix B: Database Build Scripts

Appendix B

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

--
--      Drop the existing database
--
if exists (select name from sysdatabases where name =
'%DBNAME%')
    drop database %DBNAME%

CREATE DATABASE %DBNAME%
ON PRIMARY
(
    NAME          = %DBNAME%_root,
    FILENAME      = "C:%DBNAME%_root.mdf",
    SIZE          = 7MB,
    FILEGROWTH    = 0),
FILEGROUP LINEITEM_FG
(
    NAME          = %DBNAME%_li_1,
    FILENAME      = "F:",
    SIZE          = 55740MB,
    FILEGROWTH    = 0),
(
    NAME          = %DBNAME%_li_2,
    FILENAME      = "G:",
    SIZE          = 55740MB,
    FILEGROWTH    = 0),
(
    NAME          = %DBNAME%_li_3,
    FILENAME      = "H:",
    SIZE          = 55740MB,
    FILEGROWTH    = 0),
(
    NAME          = %DBNAME%_li_4,
    FILENAME      = "I:",
    SIZE          = 55740MB,
    FILEGROWTH    = 0),
(
    NAME          = %DBNAME%_li_5,
    FILENAME      = "J:",
    SIZE          = 55740MB,
    FILEGROWTH    = 0),
(
    NAME          = %DBNAME%_li_6,
    FILENAME      = "K:",
    SIZE          = 55740MB,
    FILEGROWTH    = 0),
(
    NAME          = %DBNAME%_li_7,
    FILENAME      = "L:",
    SIZE          = 55740MB,
    FILEGROWTH    = 0),
FILEGROUP GENERAL_FG
(
    NAME          = %DBNAME%_gen_1,
    FILENAME      = "O:",
    SIZE          = 26820MB,
    FILEGROWTH    = 0),
(
    NAME          = %DBNAME%_gen_2,
    FILENAME      = "P:",
    SIZE          = 26820MB,
```

```
FILEGROWTH = 0),
(
    NAME          = %DBNAME%_gen_3,
    FILENAME      = "Q:",
    SIZE          = 26820MB,
    FILEGROWTH    = 0),
(
    NAME          = %DBNAME%_gen_4,
    FILENAME      = "R:",
    SIZE          = 26820MB,
    FILEGROWTH    = 0),
(
    NAME          = %DBNAME%_gen_5,
    FILENAME      = "S:",
    SIZE          = 26820MB,
    FILEGROWTH    = 0),
(
    NAME          = %DBNAME%_gen_6,
    FILENAME      = "T:",
    SIZE          = 26820MB,
    FILEGROWTH    = 0),
(
    NAME          = %DBNAME%_gen_7,
    FILENAME      = "U:",
    SIZE          = 26820MB,
    FILEGROWTH    = 0)
LOG ON
(
    NAME          = %DBNAME%_log,
    FILENAME      = "E:",
    SIZE          = 61400MB,
    FILEGROWTH    = 0)

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

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

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

create table PARTSUPP
(PS_PARTKEY int not null,
```

Appendix B

```

PS_SUPPKEY int not null,
PS_SUPPLYCOST float not null,
PS_AVAILQTY int not null,
PS_COMMENT varchar(199) not null)
on GENERAL_FG

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

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

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

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

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

```

```

-- File: CREATECLUSTEREDINDEXES.SQL
-- Microsoft TPC-H Benchmark Kit Ver. 1.00
-- Copyright Microsoft, 1999
--
alter table NATION add constraint PK_N_NATIONKEY
primary key (N_NATIONKEY)
ON GENERAL_FG

alter table REGION add constraint PK_R_REGIONKEY
primary key (R_REGIONKEY)
ON GENERAL_FG

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

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

alter table SUPPLIER add constraint PK_S_SUPPKEY
primary key (S_SUPPKEY)
ON GENERAL_FG

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

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

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

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

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

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

```

Appendix B

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

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

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

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

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

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

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

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

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

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

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

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

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

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

```
-- Drop the LOAD_FG
```

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

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

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

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

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

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

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

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

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

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

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

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

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

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

```
go
ALTER DATABASE %DBNAME% REMOVE FILE
%DBNAME%_load15
```

```
go
ALTER DATABASE %DBNAME% REMOVE FILE
%DBNAME%_load16
```

```
go
ALTER DATABASE %DBNAME% REMOVE
FILEGROUP LOAD_FG
```

Appendix B

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

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

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

if exists (select name from sysdevices where name =
'BackupDev4')
    exec sp_dropdevice BackupDev4
GO

if exists (select name from sysdevices where name =
'BackupDev5')
    exec sp_dropdevice BackupDev5
GO

sp_addumpdevice 'disk', 'BackupDev1',
'C:\B\O\TPCHbackup1'
GO
sp_addumpdevice 'disk', 'BackupDev2',
'C:\B\P\TPCHbackup2'
GO
sp_addumpdevice 'disk', 'BackupDev3',
'C:\B\Q\TPCHbackup3'
GO
sp_addumpdevice 'disk', 'BackupDev4',
'C:\B\R\TPCHbackup4'
GO
sp_addumpdevice 'disk', 'BackupDev5',
'C:\B\S\TPCHbackup5'
GO

--      File:  BACKUPDATABASE.SQL
--      Microsoft TPC-H Benchmark Kit Version
2.00
--      Copyright Microsoft, 1999
--
--      File:  RESTOREDATABASE.SQL
--      Microsoft TPC-H Benchmark Kit Version
2.00
--      Copyright Microsoft, 1999
--
backup database %DBNAME% to BackupDev1,
BackupDev2, BackupDev3, BackupDev4, BackupDev5 with
init, stats=10

restore database tpch from BackupDev1, BackupDev2,
BackupDev3, BackupDev4, BackupDev5 with replace,
stats=1

--
-- MoveTemp.sql
--
alter database tempdb modify file
(name='tempdev',filename='C:\B\O\TempdB.mdf')

alter database tempdb modify file
(name='templog',filename='C:\B\P\Templog.ldf')

alter database tempdb modify file
(name=tempdev,
filename='C:\B\O\TempdB.mdf',size=30000mb)
alter database tempdb modify file
(name=templog,
filename='C:\B\O\Templog.ldf',size=30000mb)
alter database tempdb add file
(name=tempdev2,
filename='C:\B\P\tempdev_2',size=15000mb),
(name=tempdev3,
filename='C:\B\P\tempdev_3',size=15000mb),
(name=tempdev4,
filename='C:\B\Q\tempdev_4',size=15000mb),
(name=tempdev5,
filename='C:\B\Q\tempdev_5',size=15000mb),
(name=tempdev6,
filename='C:\B\R\tempdev_6',size=15000mb),
(name=tempdev7,
filename='C:\B\R\tempdev_7',size=15000mb),
(name=tempdev8,
filename='C:\B\S\tempdev_8',size=15000mb),
(name=tempdev9,
filename='C:\B\S\tempdev_9',size=15000mb),
(name=tempdev10,
filename='C:\B\T\tempdev_10',size=15000mb),
(name=tempdev11,
filename='C:\B\U\tempdev_11',size=15000mb)

-- Drop the LOAD_FG
```


Appendix B

```
ALTER DATABASE %DBNAME% REMOVE FILE
%DBNAME%_load1
go
ALTER DATABASE %DBNAME% REMOVE FILE
%DBNAME%_load2
go
ALTER DATABASE %DBNAME% REMOVE FILE
%DBNAME%_load3
go
ALTER DATABASE %DBNAME% REMOVE FILE
%DBNAME%_load4
go
ALTER DATABASE %DBNAME% REMOVE FILE
%DBNAME%_load5
go
ALTER DATABASE %DBNAME% REMOVE FILE
%DBNAME%_load6
go
ALTER DATABASE %DBNAME% REMOVE FILE
%DBNAME%_load7
go
ALTER DATABASE %DBNAME% REMOVE FILE
%DBNAME%_load8
go
ALTER DATABASE %DBNAME% REMOVE FILE
%DBNAME%_load9
go
ALTER DATABASE %DBNAME% REMOVE FILE
%DBNAME%_load10
go
ALTER DATABASE %DBNAME% REMOVE FILE
%DBNAME%_load11
go
ALTER DATABASE %DBNAME% REMOVE FILE
%DBNAME%_load12
go
ALTER DATABASE %DBNAME% REMOVE FILE
%DBNAME%_load13
go
ALTER DATABASE %DBNAME% REMOVE FILE
%DBNAME%_load14
go
ALTER DATABASE %DBNAME% REMOVE FILE
%DBNAME%_load15
go
ALTER DATABASE %DBNAME% REMOVE FILE
%DBNAME%_load16
go
ALTER DATABASE %DBNAME% REMOVE
FILEGROUP LOAD_FG
go
```

Appendix C: ACID Scripts

Appendix C

```

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

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

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

begin

    begin tran T

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

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

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

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

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

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

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

        commit transaction T

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

    end
go

-- File: ACID_HIST.SQL

```

Appendix C

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

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

GO

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

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

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

```
--
-- Check for pre-existing table
if exists ( select name from sysobjects where name =
'acid_values' )
    drop table acid_values

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

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

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

go

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

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

begin
    begin tran T

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

Appendix C

```

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

```

Appendix C

```

--      loop to populate table for ACID
while (@counter <= (@cons_rows + 10) )
begin

--      Set ACI test name based on counter
select @acid_test = case      @counter
      when 1 then 'Atomicity_Commit'
      when 2 then 'Atomicity_Rollback'
      when 3 then 'Isolation 1'
      when 4 then 'Isolation 2'
      when 5 then 'Isolation 3'
      when 6 then 'Isolation 3'
      when 7 then 'Isolation 4'
      when 8 then 'Isolation 4'
      when 9 then 'Isolation 5'
      when 10 then 'Isolation 6'
      else 'Consistency_Durability'
end

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

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

      if (@counter = 9)
begin
      while (@cnt =
0)
begin

```

```

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

      select
      select
      from
      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

```

Appendix C

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

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

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

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

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

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

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

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

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

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

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

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

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

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

create proc cons_tran @counter int
as

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

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

Appendix C

```

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

exec    acid_tran_com  @rand_o_key,
                    @rand_l_key,
                    @rand_delta

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

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

go

create proc dur_tran      @counter      int

as

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

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

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

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

exec    acid_dur_tran_com      @rand_o_key,
                              @rand_l_key,
                              @rand_delta

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

```

```

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

go

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

as

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

begin

        begin tran T

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

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

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

print " "
--        ACID CODE END

```


Appendix C

```

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
@new_extprice,
@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 1.01 ACID Transaction
--
--
if exists ( select name from sysobjects where name =
'iso5_parts' )
drop procedure iso5_parts

go

```

Appendix C

```

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

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

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

        commit transaction P

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

end

go

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

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

create proc iso6_tran_w_com
    @o_key int,
    @l_key int,
    @delta int
as

```

```

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

begin
    begin tran T

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

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

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

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

```

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```

                L_LINENUMBER      =
@l_key

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

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

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

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

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

        commit transaction T

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

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

end

go

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

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

create proc iso_query          @o_key          int
as

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

```

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```

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

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

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

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

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

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

begin
        begin tran T

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

print " "
print "Data from LINEITEM before updates:"
select  L_QUANTITY   'L_QUANTITY',
        L_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

```

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```

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

update  ORDERS
set     O_TOTALPRICE      =

@new_ototal

where   O_ORDERKEY = @o_key

insert into HISTORY_ACI values( @pkey,
                                @skey,

                                @o_key,

                                @l_key,
                                @delta,

                                getdate())

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

commit transaction T

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

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

end

go

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

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

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

begin

begin tran T

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

```

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```

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

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

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

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

update LINEITEM
set L_EXTENDEDPRIE =
@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_EXTENDEDPRIE 'L_EXTENDEDPRIE',
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

```

Appendix C

```
print " "  
print " "  
print "TPC-H ACID Transaction End:"  
select convert(char(30), getdate(),9)  
print " "  
end  
-- ACID CODE END  
  
select @rprice 'RPrice',  
       @quantity 'Quantity',  
       @tax 'Tax',  
       @disc 'Discount',  
       @extprice 'Extended Price',  
       @ototal 'Total'  
  
end  
  
go  
  
-- File: ISOL1_1.SQL  
-- Microsoft TPC-H Benchmark Kit Ver. 2.00  
-- Copyright Microsoft, 1999  
  
declare @acid_test char(25),  
        @rand_o_key int,  
        @rand_l_key int,  
        @rand_delta tinyint  
  
select @rand_o_key = acid_o_key,  
       @rand_l_key = acid_l_key,  
       @rand_delta = acid_delta  
  
from acid_values  
where acid_test= 'Isolation 1'  
  
select 'Random Values Used',  
       @rand_o_key '@RAND_O_KEY',  
       @rand_l_key '@RAND_L_KEY',  
       @rand_delta '@RAND_DELTA'  
  
exec tran_w_com @rand_o_key,  
               @rand_l_key,  
               @rand_delta  
  
GO  
  
-- File: ISOL1_2.SQL  
-- Microsoft TPC-H Benchmark Kit Ver. 2.00  
-- Copyright Microsoft, 1998  
  
-- ACID CODE BEGIN  
-- Wait for 5 seconds to allow ISOL1_1 to execute  
WAITFOR DELAY '00:00:05'  
-- ACID CODE END  
  
declare @acid_test char(25),  
        @rand_o_key int
```

```
select @rand_o_key = acid_o_key  
from acid_values  
where acid_test= 'Isolation 1'  
  
select 'Random Values Used',  
       @rand_o_key '@RAND_O_KEY'  
  
exec iso_query @rand_o_key  
GO  
  
-- File: ISOL2_1.SQL  
-- Microsoft TPC-H Benchmark Kit Ver. 2.00  
-- Copyright Microsoft, 1999  
  
declare @acid_test char(25),  
        @rand_o_key int,  
        @rand_l_key int,  
        @rand_delta tinyint  
  
select @rand_o_key = acid_o_key,  
       @rand_l_key = acid_l_key,  
       @rand_delta = acid_delta  
  
from acid_values  
where acid_test= 'Isolation 2'  
  
select 'Random Values Used',  
       @rand_o_key "@RAND_O_KEY",  
       @rand_l_key "@RAND_L_KEY",  
       @rand_delta "@RAND_DELTA"  
  
exec tran_w_rb @rand_o_key,  
               @rand_l_key,  
               @rand_delta  
  
GO  
  
-- File: ISOL2_2.SQL  
-- Microsoft TPC-H Benchmark Kit Ver. 2.00  
-- Copyright Microsoft, 1999  
  
-- ACID CODE BEGIN  
-- Wait for 5 seconds to allow ISOL2_1 to execute  
WAITFOR DELAY '00:00:05'  
-- ACID CODE END  
  
declare @acid_test char(25),  
        @rand_o_key int  
  
select @rand_o_key = acid_o_key  
from acid_values  
where acid_test= 'Isolation 2'  
  
select 'Random Values Used',  
       @rand_o_key "@RAND_O_KEY"  
  
exec iso_query @rand_o_key  
GO  
  
-- File: ISOL3_1.SQL
```

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

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

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

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

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

GO

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

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

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

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

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

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

```
exec iso34_tran_w_com @rand_o_key,
```

```
@rand_l_key,
@rand_delta
```

GO

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

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

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

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

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

GO

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

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

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

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

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

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


Appendix C

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

exec iso34_tran_w_com @rand_o_key,
                    @rand_l_key,
                    @rand_delta

GO

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

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

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

from acid_values
where acid_test= 'Isolation 5'

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

exec tran_w_com @rand_o_key,
               @rand_l_key,
               @rand_delta

GO

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

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

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

select @rand_part = acid_part,
       @rand_supp = acid_supp

from acid_values
where acid_test= 'Isolation 5'

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

exec iso5_parts @rand_part,
               @rand_supp

GO

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

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

SELECT          L_RETURNFLAG,
                L_LINESTATUS,
                SUM(L_QUANTITY)
                AS SUM_QTY,
                SUM(L_EXTENDEDPRICE)
                AS SUM_BASE_PRICE,
                SUM(L_EXTENDEDPRICE*(1-L_DISCOUNT))
                AS SUM_DISC_PRICE,
                SUM(L_EXTENDEDPRICE*(1-
L_DISCOUNT)*(1+L_TAX)) AS SUM_CHARGE,
                AVG(L_QUANTITY )
                AS AVG_QTY,
                AVG(L_EXTENDEDPRICE)
                AS AVG_PRICE,
                AVG(L_DISCOUNT)
                AS AVG_DISC,
                COUNT(*)
                AS COUNT_ORDER
FROM LINEITEM
WHERE L_SHIPDATE <= dateadd(dd, 0, '1998/12/01')
GROUP BY L_RETURNFLAG,
         L_LINESTATUS
ORDER BY L_RETURNFLAG,
         L_LINESTATUS

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

GO

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

Appendix C

```

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

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

from    acid_values

where   acid_test= 'Isolation 6'

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

exec iso6_tran_w_com    @rand_o_key,
                        @rand_l_key,
                        @rand_delta

GO

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

SELECT      L_RETURNFLAG,
            L_LINESTATUS,
            SUM(L_QUANTITY)
            AS SUM_QTY,
            SUM(L_EXTENDEDPRICE)
            AS SUM_BASE_PRICE,
            SUM(L_EXTENDEDPRICE*(1-L_DISCOUNT))
            AS SUM_DISC_PRICE,
            SUM(L_EXTENDEDPRICE*(1-
L_DISCOUNT)*(1+L_TAX))    AS SUM_CHARGE,
            AVG(L_QUANTITY    )
            AS AVG_QTY,
            AVG(L_EXTENDEDPRICE)
            AS AVG_PRICE,
            AVG(L_DISCOUNT)
            AS AVG_DISC,
            COUNT(*)
            AS COUNT_ORDER
FROM    LINEITEM
WHERE   L_SHIPDATE <= dateadd(dd, 2000, '1998/12/01')
GROUP BY L_RETURNFLAG,

```

```

            L_LINESTATUS
ORDER BY L_RETURNFLAG,
            L_LINESTATUS

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

GO

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

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

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

from    acid_values

where   acid_test= 'Atomicity_Rollback'

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

exec tran_w_rb    @rand_o_key,
                  @rand_l_key,
                  @rand_delta

GO

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

and

                        H_L_KEY = acid_l_key

and

```

Appendix C

<pre>) -- 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 </pre>	and	<pre> not exists (select * from HISTORY_DUR where H_O_KEY = acid_o_key H_L_KEY = acid_l_key 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 </pre>
--	-----	---

Appendix C

```

and          where  H_O_KEY = acid_o_key                (      o_orderkey
int,
and          H_L_KEY = acid_l_key                    o_totalprice
money,
and          H_DELTA = acid_delta                    l_orderkey
int,
)                                                    lineitem_sum
money
)

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

and

H_L_KEY = acid_l_key

and

H_DELTA = acid_delta
)

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

and

H_L_KEY = acid_l_key

and

H_DELTA = acid_delta
)

-- File:  DUR_VERIFY1.SQL
-- Microsoft TPC-H Kit Ver. 2.00
-- Copyright Microsoft, 1999
--
-- Durability Verification test 1
-- -----
--
-- Comment: ORDERS.O_TOTALPRICE should equal
LINEITEM sums

print ''
print 'Timestamp for Pre-Failure Durability Verification 1
start:'
select convert(char(30), getdate(),9)
print ''

select count(*) from HISTORY_DUR
GO

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

CREATE TABLE temp_dur1_output

INSERT INTO temp_dur1_output
SELECT DISTINCT(o.O_ORDERKEY),
o.O_TOTALPRICE,
I.L_ORDERKEY,

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

-- Select data from temporary table...
print ''
print 'Select all rows from temporary table'
print ''
SELECT o_orderkey 'O_OrderKey',
o_totalprice 'O_TotalPrice',
l_orderkey 'L_OrderKey',
lineitem_sum 'LineItem Sum'
FROM temp_dur1_output

print ''
print 'Select any rows where o_totalprice is not equal to
lineitem_sum'
print ''
SELECT *
FROM temp_dur1_output
WHERE o_totalprice <> lineitem_sum

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

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

-- File:  DUR_VERIFY2.SQL

```

Appendix C

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

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

select count(*) from HISTORY_DUR
GO

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

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

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

-- Select data from temporary table...
print ''
print 'Select all rows from temporary table'
print ''
SELECT o_orderkey 'O_OrderKey',
o_totalprice 'O_TotalPrice',
l_orderkey 'L_OrderKey',
```

```
lineitem_sum 'LineItem Sum'
FROM temp_dur2_output

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

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

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

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

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

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

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

exec tran_w_com @rand_o_key,
@rand_l_key,
@rand_delta

GO

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

Appendix C

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

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

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

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

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

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

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

```
WHERE o_totalprice <> lineitem_sum

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

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

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

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

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

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

Appendix C

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

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

```
print ''
```

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

```
print ''
```

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

```
print ''
```

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

```
print ''
```

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

```
print ''
```

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

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

```
print ''
```

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

```
drop table temp_con2_output
```

```
GO
```

Appendix D: Query text and Output

Appendix D

(4 row(s) affected)

-- using default substitutions

/* TPC_H Query 2 - Minimum Cost Supplier */

```

SELECT          TOP 100
                S_ACCTBAL,
                S_NAME,
                N_NAME,
                P_PARTKEY,
                P_MFGR,
                S_ADDRESS,
                S_PHONE,
                S_COMMENT
FROM            PART,
                SUPPLIER,
                PARTSUPP,
                NATION,
                REGION
WHERE          P_PARTKEY = PS_PARTKEY AND
                S_SUPPKEY = PS_SUPPKEY AND
                P_SIZE = 15 AND
                P_TYPE LIKE '%%BRASS' AND
                S_NATIONKEY = N_NATIONKEY AND
                N_REGIONKEY = R_REGIONKEY AND
                R_NAME = 'EUROPE' AND
                PS_SUPPLYCOST = ( SELECT
                MIN(PS_SUPPLYCOST)
FROM            PARTSUPP,
                SUPPLIER,
                NATION,
                REGION
WHERE          P_PARTKEY
                = PS_PARTKEY AND
                S_SUPPKEY
                = PS_SUPPKEY AND
                S_NATIONKEY
                = N_NATIONKEY AND
                N_REGIONKEY
                = R_REGIONKEY AND
                R_NAME
                = 'EUROPE'
                )
ORDER BY      S_ACCTBAL DESC,
                N_NAME,
                S_NAME,
                P_PARTKEY
S_ACCTBAL      S_NAME      N_NAME
P_PARTKEY P_MFGR      S_ADDRESS
S_PHONE      S_COMMENT
-----
9938.530000      Supplier#000005359      UNITED
KINGDOM      185358      Manufacturer#4
QKuHYh,vZGiwu2FWEJdLDx04      33-429-790-

```

-- using default substitutions

/* TPC_H Query 1 - Pricing Summary Report */

```

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

L_RETURNFLAG L_LINESTATUS SUM_QTY
SUM_BASE_PRICE      SUM_DISC_PRICE
SUM_CHARGE      AVG_QTY
AVG_PRICE      AVG_DISC
COUNT_ORDER
-----
-----
A      F      37734107.000000
56586554400.730225      53758257134.870094
55909065222.827438      25.522006      38273.129735
0.049985      1478493
N      F      991417.000000      1487504710.379998
1413082168.054097      1469649223.194375      25.516472
38284.467761      0.050093      38854
N      O      74476040.000000
111701729697.739550      106118230307.604950
110367043872.497480      25.502227      38249.117989
0.049997      2920374
R      F      37719753.000000
56568041380.899918      53741292684.604118
55889619119.832108      25.505794      38250.854626
0.050009      1478870

```

Appendix D

6131 blithely silent pinto beans are furiously. slyly final deposits across			packages across the ironic accounts grow slyly after the furiously
9937.840000	Supplier#000005969	ROMANIA	9739.860000
108438	Manufacturer#1		138357
ANDENSOSmk,miq23Xfb5RWt6dvUcvt6Qa		29-520-692-3537	carefully slow deposits use furiously. slyly ironic theodolites hag
692-3537			9721.950000
platelets above the ironic			KINGDOM
9936.220000	Supplier#000005250	UNITED	156241
KINGDOM	249	Manufacturer#4	Atg6GnM4dT2
B3rqp0xbSEim4Mpy2RH J		33-320-228-2957	33-821-407-2995
blithely special packages are. stealthily express deposits around the caref			even dolphins above the furiously ironic foxes sleep slyly
across the closely final instructi			9681.330000
9923.770000	Supplier#000002324	GERMANY	78405
29821	Manufacturer#4	y3OD9UywSTOk	Manufacturer#1
17-779-299-1839		quickly express packages breach quiet pinto beans. requ	.qUuXcftUI
9871.220000	Supplier#000006373	GERMANY	32-139-873-8571
43868	Manufacturer#5	J8fcXWSTqM	furiously even deposits affix thinly special theodolites. furiou
17-813-485-8637		never silent deposits integrate furiously blit	9643.550000
9870.780000	Supplier#000001286	GERMANY	107617
81285	Manufacturer#2		Manufacturer#1
YKA,E2fjiVd7eUrzp2Ef8j1QxGo2DFnosaTEH		17-516-924-4574	kt4ciVFslx9z4s79p Js825
924-4574		final theodolites cajole slyly special,	29-252-617-4850
9870.780000	Supplier#000001286	GERMANY	doggedly even ideas boost furiously against the furiously express
181285	Manufacturer#4		9624.820000
YKA,E2fjiVd7eUrzp2Ef8j1QxGo2DFnosaTEH		17-516-924-4574	Supplier#000001816
924-4574		final theodolites cajole slyly special,	FRANCE
9852.520000	Supplier#000008973	RUSSIA	34306
18972	Manufacturer#2		Manufacturer#3
t5L67YdBYH6o,Vz24jpDyQ9		32-188-594-7038	e7vab91vLJPWxxZnewmnDBpDmxYHrb
quickly regular instructions wake-- carefully unusual braids into the expres			16-392-237-6726
9847.830000	Supplier#000008097	RUSSIA	blithely regular accounts cajole furiously. regular
130557	Manufacturer#2	xMe97bpE69NzdwLoX	9624.780000
32-375-640-3593		slyly regular dependencies sleep slyly furiously express dep	Supplier#000009658
9847.570000	Supplier#000006345	FRANCE	ROMANIA
86344	Manufacturer#1		189657
VSt3rzk3qG698u6ld8HhOByvrTcSTSvQIDQDag		16-886-766-7945	Manufacturer#1
766-7945		silent pinto beans should have to snooze carefully along the final reques	oE9uBgEfSS4opIcepXyAYM,x
9847.570000	Supplier#000006345	FRANCE	29-748-876-2014
173827	Manufacturer#2		regular deposits haggle. furiously express asympto
VSt3rzk3qG698u6ld8HhOByvrTcSTSvQIDQDag		16-886-766-7945	9612.940000
766-7945		silent pinto beans should have to snooze carefully along the final reques	Supplier#000003228
9836.930000	Supplier#000007342	RUSSIA	ROMANIA
4841	Manufacturer#4	JOIK7C1,7xrEZSSOw	120715
32-399-414-5385		final accounts haggle. bold accounts are furiously dugouts. furiously silent asymptotes are slyly	Manufacturer#2
9817.100000	Supplier#000002352	RUSSIA	KDdpNKN3cWu7ZSrbdq7AfSLxx,qWB
124815	Manufacturer#2	4LfoHUZjgEbAKw	29-325-784-8187
TgdKcgOc4D4uCYw		32-551-831-1437	carefully pending accounts serve. furiously close deposits boost slyly. q
packages across the ironic accounts grow slyly after the furiously			9612.940000
9817.100000	Supplier#000002352	RUSSIA	Supplier#000003228
152351	Manufacturer#3	4LfoHUZjgEbAKw	ROMANIA
TgdKcgOc4D4uCYw		32-551-831-1437	198189
blithely pending			Manufacturer#4
			KDdpNKN3cWu7ZSrbdq7AfSLxx,qWB
			29-325-784-8187
			carefully pending accounts serve. furiously close deposits boost slyly. q
			9571.830000
			Supplier#000004305
			ROMANIA
			179270
			Manufacturer#2
			qNHZ7WmCzygwMPRDO9Ps
			29-973-481-1831
			furiously final deposits
			9558.100000
			Supplier#000003532
			UNITED
			KINGDOM
			88515
			Manufacturer#4
			EOeuiiOn21OVpTIGguufFDFsbN1p0lhpXHp
			33-152-301-2164
			daring, sly accounts breach about th
			9492.790000
			Supplier#000005975
			GERMANY
			25974
			Manufacturer#5
			S6mliCTx82z7IV
			17-992-579-4839
			always pending packages boost slyly.
			9461.050000
			Supplier#000002536
			UNITED
			KINGDOM
			20033
			Manufacturer#1
			8mmGbyzaU 7ZS2wJumTibypncu9pNkDc4FYA
			33-556-973-5522
			even foxes are quickly furiously express requests. packages
			9453.010000
			Supplier#000000802
			ROMANIA
			175767
			Manufacturer#1
			.6HYXb4uaHITmtMBj4Ak57Pd
			29-342-882-6463
			final, regular packages across the slowly regular packag
			9408.650000
			Supplier#000007772
			UNITED
			KINGDOM
			117771
			Manufacturer#4

Appendix D

AiC5YAH, gdu0i7	33-152-491-1126	blithely	9104.830000	Supplier#000008520	GERMANY
final ideas sleep carefully. requests are			150974	Manufacturer#4	RqRVDgD0ER J9
9359.610000	Supplier#000004856	ROMANIA	b41vR2,3	17-728-804-1793	deposits sleep
62349	Manufacturer#5	HYogcF3Jb yhl	carefully e		
29-334-870-9731		carefully unusual packages sleep carefully	9101.000000	Supplier#000005791	ROMANIA
even ideas. dogged accoun			128254	Manufacturer#5	
9357.450000	Supplier#000006188	UNITED	zub2zCV,jhHPPQqi,P2INAjE1zI n66cOEoXFG	29-549-	
KINGDOM	138648	Manufacturer#1	251-5384	carefully ironic packages after the	
g801,ssP8wpTk4Hm		33-583-607-1633	9094.570000	Supplier#000004582	RUSSIA
carefully regular deposits wake carefully furiously even i			39575	Manufacturer#1	WB0XkCSG3r,mnQ
9352.040000	Supplier#000003439	GERMANY	n,h9Vixjir9ARHFvKgMdf	32-587-577-1351	asymptotes
170921	Manufacturer#4	qYPDgoiBGhCYxjgC	above the slyly even requests haggle furiously about the		
17-128-996-4650		fluffily regular pinto beans wake. unusual,	regular accounts		
final ideas c			8996.870000	Supplier#000004702	FRANCE
9312.970000	Supplier#000007807	RUSSIA	102191	Manufacturer#5	8XVcQK23akp
90279	Manufacturer#5		16-811-269-8946	stealthy requests haggle c	
oGYMPCk9XHGB2PBfKRnHA		32-673-872-	8996.140000	Supplier#000009814	ROMANIA
5854	unusual asymptotes above the		139813	Manufacturer#2	
9312.970000	Supplier#000007807	RUSSIA	af0O5pg83IPU4IDVmEylXZVqYZQzSDIYLA mR	29-995-	
100276	Manufacturer#5		571-8781	ironic theodolites are evenly unusual requests--	
oGYMPCk9XHGB2PBfKRnHA		32-673-872-	pending pinto beans across the in		
5854	unusual asymptotes above the		8968.420000	Supplier#000010000	ROMANIA
9280.270000	Supplier#000007194	ROMANIA	119999	Manufacturer#5	aTGLEusCiL4F
47193	Manufacturer#3	zhRUQkBSrFYxIAXTfInj	PDBdv665XBjHPyCOB0i	29-578-432-2146	furiously
vyGRQjeK	29-318-454-2133	slyly ironic requests	final ideas believe furiously. furiously final ideas		
despite the unusual ins			8936.820000	Supplier#000007043	UNITED
9274.800000	Supplier#000008854	RUSSIA	KINGDOM	109512	Manufacturer#1
76346	Manufacturer#3		FVajceZInZdbJE6Z9XsRUxrUEpiwHDrOXi,1Rz	33-784-	
1xhLoOUM7I3mZ1mKnerw OSqdbb4QbGa		32-524-	177-8208	furiously regular excuses wake after the blithely	
148-5221	ruthlessly ironic instructions along the regular,		special pinto beans? even instructions sl		
furious requests integrate car			8929.420000	Supplier#000008770	FRANCE
9249.350000	Supplier#000003973	FRANCE	173735	Manufacturer#4	R7cG26TtXrHAP9
26466	Manufacturer#1		HckhfRi	16-242-746-9248	final accounts sleep
d18GiDsL6Wm2IsGXM,RZfljCsgZAOjNYVThTRP4	16-		furiously. blithely ironic foxes wake boldly across the		
722-866-1658	quickly ironic sauternes use b		furiously s		
9249.350000	Supplier#000003973	FRANCE	8920.590000	Supplier#000003967	ROMANIA
33972	Manufacturer#1		26460	Manufacturer#1	eHoAXe62SY9
d18GiDsL6Wm2IsGXM,RZfljCsgZAOjNYVThTRP4	16-		29-194-731-3944	quickly even requests should have to affix	
722-866-1658	quickly ironic sauternes use b		blithely-- fur		
9208.700000	Supplier#000007769	ROMANIA	8920.590000	Supplier#000003967	ROMANIA
40256	Manufacturer#5	rsimdze 5o9P Ht7xS	173966	Manufacturer#2	eHoAXe62SY9
29-964-424-9649	furiously ruthless epitaphs among the		29-194-731-3944	quickly even requests should have to affix	
furiously regular accounts use slowly fluffily ev			blithely-- fur		
9201.470000	Supplier#000009690	UNITED	8913.960000	Supplier#000004603	UNITED
KINGDOM	67183	Manufacturer#5	KINGDOM	137063	Manufacturer#2
BnUTlmi5zdeEl7R7		33-121-267-9529	OUzlvMUr7n,utLxmpNeYKsf3T24OXskxB5	33-789-	
unusual accounts integrate slyly. platelets			255-7342	slyly ironic packages detect furious accounts. ironic	
9192.100000	Supplier#000000115	UNITED	de		
KINGDOM	85098	Manufacturer#3	8877.820000	Supplier#000007967	FRANCE
2t0f7Ve,wL1,6WzGBJLNUCKIsV		33-597-248-1220	167966	Manufacturer#5	
slyly bold pinto beans boost across the furiously regular			A3pi1BARM4nx6R,qrwFoRPU	16-442-147-9345	
packages. carefully regu			final deposits after the silent deposits ha		
9189.980000	Supplier#000001226	GERMANY	8862.240000	Supplier#000003323	ROMANIA
21225	Manufacturer#4	qsLCqSvLyZfuXIpjz	73322	Manufacturer#3	W9 IYcsC9FwBqk3ItL
17-725-903-1381	final, express instruction		29-736-951-3710	unusual, pending theodolites integrate	
9128.970000	Supplier#000004311	RUSSIA	furiously slyly even pinto beans. unusual sheaves sleep befor		
146768	Manufacturer#5		8841.590000	Supplier#000005750	ROMANIA
I8IjnXd7NSJR594RxsRR0		32-155-440-7120	100729	Manufacturer#5	
regular pinto beans sleep ca			ErX3lAgu0g62iaHF9x50uMH4EgeN9hEG	29-344-502-	

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5481 excuses after the blithely regular packages mold
carefully deposits. regular a
8781.710000 Supplier#000003121 ROMANIA
13120 Manufacturer#5
wNqTogx238ZYCamFb,50v,bj 4IbNFW9Bvw1xP 29-707-
291-5144 packages are quickly after the final, even packages.
furiously regular
8754.240000 Supplier#000009407 UNITED
KINGDOM 179406 Manufacturer#4
CHRCbkaWcf5B 33-903-970-9604 regular
dependencies haggle across the carefully bold
8691.060000 Supplier#000004429 UNITED
KINGDOM 126892 Manufacturer#2
k,BQms5UhoAF1B2Asi,fLib 33-964-337-5038
quickly special foxes against the furiously silent platelets
wake quickly after t
8655.990000 Supplier#000006330 RUSSIA
193810 Manufacturer#2
UozlaENR0ytKe2w6CeIEWFWn iO3S8Rae7Ou 32-561-
198-3705 blithely even packages alongside
8638.360000 Supplier#000002920 RUSSIA
75398 Manufacturer#1 Je2a8bszf3L
32-122-621-7549 express deposits wake. furiously silent
requests wake carefully silent instru
8638.360000 Supplier#000002920 RUSSIA
170402 Manufacturer#3 Je2a8bszf3L
32-122-621-7549 express deposits wake. furiously silent
requests wake carefully silent instru
8607.690000 Supplier#000006003 UNITED
KINGDOM 76002 Manufacturer#2
EH9wADcEiuenM0NR08zDwMidw,52Y2RyILEiA 33-
416-807-5206 always special foxes wake slyly bold, ironic
accounts. ironic instructions affix carefull
8569.520000 Supplier#000005936 RUSSIA
5935 Manufacturer#5
jXaNZ6vwnEWJ2ksLZJpjtgt0bY2a3AU 32-644-251-
7916 packages sleep furiously. special requests about the
fluffily even accounts detect
8564.120000 Supplier#000000033 GERMANY
110032 Manufacturer#1
gfeKpYw3400L0SDywXA6Ya1Qmq1w6YB9f3R 17-138-
897-9374 ironic instructions are. special pearls above
8553.820000 Supplier#000003979 ROMANIA
143978 Manufacturer#4
BfmVhCAncMY3zpjUMy4CNWs9 HzpdQR7INJU 29-
124-646-4897 express, ironic pinto beans cajole around the
express, even packages. qu
8517.230000 Supplier#000009529 RUSSIA
37025 Manufacturer#5 e44R8o7JAIS9iMcr
32-565-297-8775 furiously silent requests cajole furiously
furiously ironic foxes. slyly express p
8517.230000 Supplier#000009529 RUSSIA
59528 Manufacturer#2 e44R8o7JAIS9iMcr
32-565-297-8775 furiously silent requests cajole furiously
furiously ironic foxes. slyly express p
8503.700000 Supplier#000006830 RUSSIA
44325 Manufacturer#4 BC4WFCYRUZyalgchU
4S 32-147-878-5069 quickly regular excuses
detect evenly around

8457.090000 Supplier#000009456 UNITED
KINGDOM 19455 Manufacturer#1
7SBhZs8gP1cJtT0Qf433YBk 33-858-440-4349
carefully final accounts sleep blithely special foxes. slyly
regular pinto beans alon
8441.400000 Supplier#000003817 FRANCE
141302 Manufacturer#2 hU3fz3xL78
16-339-356-5115 blithely blithe ideas are
8432.890000 Supplier#000003990 RUSSIA
191470 Manufacturer#1
wehBBp1RQbfxAYDASS75MsywmsKHRVdkrvNe6m 32-
839-509-9301 final requests along the blithely ironic packages
kindle against the carefully fina
8431.400000 Supplier#000002675 ROMANIA
5174 Manufacturer#1
HJFStOu9R5NGPOegKhgbzBdyvrG2yh8w 29-474-643-
1443 express, final deposits cajole carefully. stealthily unusual
requests
8407.040000 Supplier#000005406 RUSSIA
162889 Manufacturer#4 j7 gYF5RW8DC5UrkKC
32-626-152-4621 quickly final sheaves boost. car
8386.080000 Supplier#000008518 FRANCE
36014 Manufacturer#3
2jqzqqAVe9crMVGp,n9nTsQXulNLTUYoJjEDcqWV 16-
618-780-7481 slyly ironic theodolites are slyly. dogged,
pendin
8376.520000 Supplier#000005306 UNITED
KINGDOM 190267 Manufacturer#5 9t8Y8
QqSIsoADPt6NLdk,TP5zyRx41oBUlgoGc9 33-632-514-
7931 furiously even instructions integrate during the furiously
regular re
8348.740000 Supplier#000008851 FRANCE
66344 Manufacturer#4 nWxi7GwEbjhw1
16-796-240-2472 ironic instructions nag slyly against the
slyly even theodolites. requests alongside of
8338.580000 Supplier#000007269 FRANCE
17268 Manufacturer#4 ZwhJSwABUoiB04,3
16-267-277-4365 ruthlessly regular asymptotes a
8328.460000 Supplier#000001744 ROMANIA
69237 Manufacturer#5
oLo3fV64q2,FKHa3p,qHnS7Yzv,ps8 29-330-728-5873
blithely silent excuses are slyly above the furiously even
courts
8307.930000 Supplier#000003142 GERMANY
18139 Manufacturer#1 dqblvV8dCNAorGIJ
17-595-447-6026 theodolites sleep blithely carefully regular
warhorses. slyly regular ins
8231.610000 Supplier#000009558 RUSSIA
192000 Manufacturer#2 mcdgen,yT1iJDHDS5fv
32-762-137-5858 slyly regular theodolites sleep fluffily
express depos
8152.610000 Supplier#000002731 ROMANIA
15227 Manufacturer#4 nluXJCuY1tu
29-805-463-2030 gifts use. slyly silent ideas are carefully
beneath the silent instructions. slyly sil
8109.090000 Supplier#000009186 FRANCE
99185 Manufacturer#1
wgfosrVPexI9pEXWyaqlBMDYYf 16-668-570-

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1402 quickly pending requests are blithely along the ironic, final requests; instr
 8102.620000 Supplier#000003347 UNITED
 KINGDOM 18344 Manufacturer#5 m
 CtXS2S16i 33-454-274-8532 packages
 grow special orbits. regular theodolites about the carefully pe
 8046.070000 Supplier#000008780 FRANCE
 191222 Manufacturer#3 AczzuE0UK9osj ,Lx0Jmh
 16-473-215-6395 regular epitaphs integrate slyly.
 8042.090000 Supplier#000003245 RUSSIA
 135705 Manufacturer#4
 Dh8lkg39onrbOL4DyTfGw8a9oKUX3d9Y 32-836-132-
 8872 carefully regular instructions integrate blithely silent
 foxes. furiously express instructions hagggl
 8042.090000 Supplier#000003245 RUSSIA
 150729 Manufacturer#1
 Dh8lkg39onrbOL4DyTfGw8a9oKUX3d9Y 32-836-132-
 8872 carefully regular instructions integrate blithely silent
 foxes. furiously express instructions hagggl
 7992.400000 Supplier#000006108 FRANCE
 118574 Manufacturer#1 8tBydnTDwUqfBfFV413
 16-974-998-8937 regular pinto beans are after
 7980.650000 Supplier#000001288 FRANCE
 13784 Manufacturer#4 zE,7HgVPrCn
 16-646-464-8247 unusual pinto beans cajole furiously
 according t
 7950.370000 Supplier#000008101 GERMANY
 33094 Manufacturer#5 kkYvL6IuvojJgTNG
 IKkaXQDYgx8ILohj 17-627-663-8014 quickly regular
 requests are furiously. pending deposits wake
 7937.930000 Supplier#000009012 ROMANIA
 83995 Manufacturer#2
 iUiTziH,Ek3i4lwSgunXMgrcTzwdb 29-250-925-9690
 blithely bold ideas haggle quickly final, regular request
 7914.450000 Supplier#000001013 RUSSIA
 125988 Manufacturer#2
 riRcntps4KEDtYScjpMIWeYF6mNnR 32-194-698-
 3365 final, ironic theodolites alongside of the ironic
 7912.910000 Supplier#000004211 GERMANY
 159180 Manufacturer#5
 2wQRVovHrm3,v03IKzfTd,1PYsFXQFFOG 17-266-
 947-7315 final requests integrate slyly above the silent, even
 7912.910000 Supplier#000004211 GERMANY
 184210 Manufacturer#4
 2wQRVovHrm3,v03IKzfTd,1PYsFXQFFOG 17-266-
 947-7315 final requests integrate slyly above the silent, even
 7894.560000 Supplier#000007981 GERMANY
 85472 Manufacturer#4 NSJ96vMROAbeXP
 17-963-404-3760 regular, even theodolites integrate carefully.
 bold, special theodolites are slyly fluffily iron
 7887.080000 Supplier#000009792 GERMANY
 164759 Manufacturer#3
 Y28ITVeYriT3kiGdV2K8fSZ V2UqT5H1Otz 17-988-
 938-4296 pending, ironic packages sleep among the carefully
 ironic accounts. quickly final accounts
 7871.500000 Supplier#000007206 RUSSIA
 104695 Manufacturer#1 3w
 fNCnrVmvJjE95sgWZzvW 32-432-452-7731

furiously dogged pinto beans cajole. bold, express notornis
 until the slyly pending
 7852.450000 Supplier#000005864 RUSSIA
 8363 Manufacturer#4 WCNfBPZeSXh3h,c
 32-454-883-3821 blithely regular deposits
 7850.660000 Supplier#000001518 UNITED
 KINGDOM 86501 Manufacturer#1
 ONda3YJiHKJOC 33-730-383-3892
 furiously final accounts wake carefully idle requests. even
 dolphins wake acc
 7843.520000 Supplier#000006683 FRANCE
 11680 Manufacturer#4
 2ZOJGkiv01Y00oCFwUGfviIbhzCdy 16-464-517-
 8943 carefully bold accounts doub

(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
00:00:00.000 0
3459808         405838.698900      1995-03-04
00:00:00.000 0
492164         390324.061000      1995-02-19
00:00:00.000 0
1188320         384537.935900      1995-03-09
00:00:00.000 0
2435712         378673.055800      1995-02-26
00:00:00.000 0
4878020         378376.795200      1995-03-12
00:00:00.000 0
5521732         375153.921500      1995-03-13
00:00:00.000 0

```

Appendix D

```
2628192      373133.309400      1995-02-22
00:00:00.000 0
993600      371407.459500      1995-03-05
00:00:00.000 0
2300070     367371.145200      1995-03-13
00:00:00.000 0
```

(10 row(s) affected)

-- using default substitutions

/* TPC_H Query 4 - Order Priority Checking */

```
SELECT      O_ORDERPRIORITY,
            COUNT(*)          AS ORDER_COUNT
FROM ORDERS
WHERE O_ORDERDATE >= '1993-07-01' AND
      O_ORDERDATE < dateadd (mm, 3, '1993-
07-01') AND
      EXISTS (
        SELECT *
        FROM LINEITEM
        WHERE L_ORDERKEY
        = O_ORDERKEY AND
        L_COMMITDATE < L_RECEIPTDATE
      )
GROUP BY   O_ORDERPRIORITY
ORDER BY   O_ORDERPRIORITY
O_ORDERPRIORITY ORDER_COUNT
```

```
-----
1-URGENT    10594
2-HIGH      10476
3-MEDIUM   10410
4-NOT SPECIFIED 10556
5-LOW       10487
```

(5 row(s) affected)

-- using default substitutions

/* TPC_H Query 5 - Local Supplier Volume */

```
SELECT      N_NAME,
            SUM(L_EXTENDEDPRI*(1-L_DISCOUNT))
            AS REVENUE
FROM CUSTOMER,
ORDERS,
LINEITEM,
SUPPLIER,
NATION,
REGION
WHERE C_CUSTKEY = O_CUSTKEY AND
      L_ORDERKEY = O_ORDERKEY AND
      L_SUPPKEY = S_SUPPKEY AND
      C_NATIONKEY = S_NATIONKEY AND
      S_NATIONKEY = N_NATIONKEY AND
      N_REGIONKEY = R_REGIONKEY AND
      R_NAME = 'ASIA' AND
      O_ORDERDATE >= '1994-01-01' AND
```

```
O_ORDERDATE < DATEADD(YY, 1,
'1994-01-01')
GROUP BY   N_NAME
ORDER BY   REVENUE DESC
N_NAME     REVENUE
```

```
-----
INDONESIA   55502041.169700
VIETNAM    55295086.996700
CHINA      53724494.256600
INDIA      52035512.000200
JAPAN      45410175.695400
```

(5 row(s) affected)

-- using default substitutions

/* TPC_H Query 6 - Forecasting Revenue Change */

```
SELECT
            SUM(L_EXTENDEDPRI*L_DISCOUNT)
            AS REVENUE
FROM LINEITEM
WHERE L_SHIPDATE >= '1994-01-01' AND
      L_SHIPDATE < dateadd (yy, 1, '1994-01-01')
AND
      L_DISCOUNT BETWEEN .06 - 0.01 AND .06 +
0.01 AND
      L_QUANTITY < 24
REVENUE
```

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

(1 row(s) affected)

-- using default substitutions

/* TPC_H Query 7 - Volume Shipping */

```
SELECT      SUPP_NATION,
            CUST_NATION,
            L_YEAR,
            SUM(VOLUME) AS REVENUE
FROM (
  SELECT      N1.N_NAME
  AS SUPP_NATION,
              N2.N_NAME
  AS CUST_NATION,
              datepart(yy,L_SHIPDATE)
  AS L_YEAR,
              L_EXTENDEDPRI*(1-
L_DISCOUNT) AS VOLUME
  FROM SUPPLIER,
LINEITEM,
ORDERS,
CUSTOMER,
NATION N1,
NATION N2
  WHERE S_SUPPKEY = L_SUPPKEY
AND
```

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```

O_ORDERKEY =
L_ORDERKEY AND
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
WHEREP_PARTKEY = L_PARTKEY
AND
S_SUPPKEY = L_SUPPKEY
AND
L_ORDERKEY =
O_ORDERKEY AND
O_CUSTKEY = C_CUSTKEY
AND
C_NATIONKEY =
N1.N_NATIONKEY AND
N1.N_REGIONKEY =
R_REGIONKEY AND
R_NAME =
'AMERICA' AND
S_NATIONKEY =
N2.N_NATIONKEY AND
O_ORDERDATE
BETWEEN '1995-01-01' AND '1996-12-31' AND
P_TYPE = 'ECONOMY
ANODIZED STEEL'
) AS ALL_NATIONS
GROUP BY O_YEAR
ORDER BY O_YEAR
O_YEAR MKT_SHARE

```

```

-----
1995 0.034436
1996 0.041486

```

(2 row(s) affected)

-- using default substitutions

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

```

SELECT NATION,
O_YEAR,
SUM(AMOUNT) AS SUM_PROFIT
FROM ( SELECT N_NAME
AS NATION,
datepart(yy, O_ORDERDATE)
AS O_YEAR,
L_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

```

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AND	PS_PARTKEY = L_PARTKEY		ETHIOPIA	1998	28040717.267400
			ETHIOPIA	1997	47455009.866400
AND	P_PARTKEY = L_PARTKEY		ETHIOPIA	1996	46491097.572900
			ETHIOPIA	1995	46804449.300900
L_ORDERKEY AND	O_ORDERKEY =		ETHIOPIA	1994	48516143.917000
			ETHIOPIA	1993	46551891.562900
N_NATIONKEY AND	S_NATIONKEY =		ETHIOPIA	1992	44934648.642800
			FRANCE	1998	32226407.839200
	P_NAME	LIKE	FRANCE	1997	47121485.860200
'%%green%%'			FRANCE	1996	47263135.496000
)	AS PROFIT		FRANCE	1995	47275997.570700
GROUP BY	NATION,		FRANCE	1994	47067209.331500
	O_YEAR		FRANCE	1993	51163370.106200
ORDER BY	NATION,		FRANCE	1992	47846235.331300
	O_YEAR	DESC	GERMANY	1998	28624942.659800
NATION	O_YEAR	SUM_PROFIT	GERMANY	1997	49309074.877300
-----			GERMANY	1996	49918683.168400
ALGERIA	1998	31342867.234500	GERMANY	1995	52650718.724200
ALGERIA	1997	57138193.023300	GERMANY	1994	50346900.422600
ALGERIA	1996	56140140.133000	GERMANY	1993	50991895.805900
ALGERIA	1995	53051469.653400	GERMANY	1992	48274126.099100
ALGERIA	1994	53867582.128600	INDIA	1998	29943144.354400
ALGERIA	1993	54942718.132400	INDIA	1997	50665453.231200
ALGERIA	1992	54628034.712700	INDIA	1996	50283092.291200
ARGENTINA	1998	30211185.708100	INDIA	1995	50006774.644600
ARGENTINA	1997	50805741.752300	INDIA	1994	48995190.755600
ARGENTINA	1996	51923746.575500	INDIA	1993	50286902.852500
ARGENTINA	1995	49298625.766600	INDIA	1992	50850329.402300
ARGENTINA	1994	50835610.109500	INDONESIA	1998	27672339.996500
ARGENTINA	1993	51646079.177500	INDONESIA	1997	50512145.725600
ARGENTINA	1992	50410314.994800	INDONESIA	1996	51653060.116600
BRAZIL	1998	27217924.383200	INDONESIA	1995	51508779.594000
BRAZIL	1997	48378669.198900	INDONESIA	1994	52817950.321800
BRAZIL	1996	50482870.357200	INDONESIA	1993	47959994.955100
BRAZIL	1995	47623383.634900	INDONESIA	1992	51776605.032300
BRAZIL	1994	47840165.725600	IRAN	1998	29065736.238100
BRAZIL	1993	49054694.035100	IRAN	1997	50042063.054500
BRAZIL	1992	48667639.084200	IRAN	1996	50926653.188100
CANADA	1998	30379833.768500	IRAN	1995	51249667.648500
CANADA	1997	50465052.311400	IRAN	1994	50337085.865000
CANADA	1996	52560501.390400	IRAN	1993	51730763.490200
CANADA	1995	52375332.809200	IRAN	1992	49955856.563400
CANADA	1994	52600364.658700	IRAQ	1998	31624551.001700
CANADA	1993	52644504.073500	IRAQ	1997	55121749.019500
CANADA	1992	53932871.697000	IRAQ	1996	55897663.793700
CHINA	1998	31075466.164900	IRAQ	1995	54815472.517000
CHINA	1997	50551874.449900	IRAQ	1994	54408516.126600
CHINA	1996	51039293.875400	IRAQ	1993	53633167.977000
CHINA	1995	49287534.616900	IRAQ	1992	55891939.339600
CHINA	1994	50851090.067400	JAPAN	1998	27934179.669500
CHINA	1993	54229629.833000	JAPAN	1997	44517162.546300
CHINA	1992	52400529.372000	JAPAN	1996	42545606.120400
EGYPT	1998	29054433.385600	JAPAN	1995	43749356.399600
EGYPT	1997	50627611.452400	JAPAN	1994	44840243.070000
EGYPT	1996	49542212.844600	JAPAN	1993	44660015.532800
EGYPT	1995	48311550.320700	JAPAN	1992	45410249.121600
EGYPT	1994	49790644.736000	JORDAN	1998	26901488.578100
EGYPT	1993	48904292.969200	JORDAN	1997	45471878.409900
EGYPT	1992	49434932.619200	JORDAN	1996	46794325.791800

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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
WHERE      C_CUSTKEY = O_CUSTKEY           AND
            L_ORDERKEY = O_ORDERKEY
            AND
            O_ORDERDATE >= '1993-10-01'
            AND
            O_ORDERDATE < dateadd(mm, 3, '1993-
10-01') AND
            L_RETURNFLAG = 'R'
            AND
            C_NATIONKEY = N_NATIONKEY
GROUP BY   C_CUSTKEY,
            C_NAME,
            C_ACCTBAL,
            C_PHONE,
            N_NAME,
            C_ADDRESS,
            C_COMMENT
ORDER BY   REVENUE      DESC
            C_CUSTKEY  C_NAME      REVENUE
            C_ACCTBAL  N_NAME      C_ADDRESS
            C_PHONE    C_COMMENT
-----
-----
-----

```

Appendix D

```
-----
57040 Customer#000057040 734235.245500
632.870000 JAPAN Eioyzjf4pp
22-895-641-3466 requests sleep blithely about the furiously i
143347 Customer#000143347 721002.694800
2557.470000 EGYPT 1aReFYv,Kw4
14-742-935-3718 fluffily bold excuses haggle finally after the
u
60838 Customer#000060838 679127.307700
2454.770000 BRAZIL
64EaJ5vMAHWJIBOXJklpNc2RJiWE 12-913-494-
9813 furiously even pinto beans integrate under the ruthless
foxes; ironic, even dolphins across the slyl
101998 Customer#000101998 637029.566700
3790.890000 UNITED KINGDOM
01c9CILnNtfOQYmZj 33-593-865-6378
accounts doze blithely! enticing, final deposits sleep blithely
special accounts. slyly express accounts pla
125341 Customer#000125341 633508.086000
4983.510000 GERMANY
S29ODD6bceU8QSuueJznkNaK 17-582-695-5962
quickly express requests wake quickly blithely
25501 Customer#000025501 620269.784900
7725.040000 ETHIOPIA
W556MXuoiaYCCZamJI,Rn0B4ACUGdkQ8DZ 15-874-
808-6793 quickly special requests sleep evenly among the
special deposits. special deposi
115831 Customer#000115831 596423.867200
5098.100000 FRANCE rFeBbEEYk dl
ne7zV5fDrmiq1oK09wV7pxqCgIc 16-715-386-3788
carefully bold excuses sleep alongside of the thinly idle
84223 Customer#000084223 594998.023900
528.650000 UNITED KINGDOM
nAVZCs6BaWap rrM27N 2qBnzc5WBauxbA 33-442-
824-8191 pending, final ideas haggle final requests. unusual,
regular asymptotes affix according to the even foxes.
54289 Customer#000054289 585603.391800
5583.020000 IRAN
vXCxocSuo0Bad5JQI ,oobkZ 20-834-292-4707
express requests sublata blithely regular requests. regular,
even ideas solve.
39922 Customer#000039922 584878.113400
7321.110000 GERMANY
Zgy4s50I2GKN4pLDPBU8m342gIw6R 17-147-757-
8036 even pinto beans haggle. slyly bold accounts inte
6226 Customer#000006226 576783.760600
2230.090000 UNITED KINGDOM
8gPu8,NPGkfyQQ0hcIYUGPIBWc,ybP5g, 33-657-701-
3391 quickly final requests against the regular instructions
wake blithely final instructions. pa
922 Customer#000000922 576767.533300
3869.250000 GERMANY
Az9RFaut7NkPnc5zSD2PwHgVwr4jRzq 17-945-916-
9648 boldly final requests cajole blith
147946 Customer#000147946 576455.132000
2030.130000 ALGERIA
iANyZHjqhy7Ajah0pTrYyhJ 10-886-956-3143
furiously even accounts are blithely above the furiousl
```

```
115640 Customer#000115640 569341.193300
6436.100000 ARGENTINA Vtgfia9qI
7EpHgecU1X 11-411-543-4901 final instructions
are slyly according to the
73606 Customer#000073606 568656.857800
1785.670000 JAPAN
xuR0Tro5yChDfOCrjkd2ol 22-437-653-6966
furiously bold orbits about the furiously busy requests wake
across the furiously quiet theodolites. d
110246 Customer#000110246 566842.981500
7763.350000 VIETNAM 7KzflgX
MDOq7sOkI 31-943-426-9837 dolphins sleep
blithely among the slyly final
142549 Customer#000142549 563537.236800
5085.990000 INDONESIA
ChqEoK43OysjdHbtKCp6dKqjNyvvi9 19-955-562-
2398 regular, unusual dependencies boost slyly; ironic
attainments nag fluffily into the unusual packages?
146149 Customer#000146149 557254.986500
1791.550000 ROMANIA s87fvzFQpU
29-744-164-6487 silent, unusual requests detect quickly slyly
regul
52528 Customer#000052528 556397.350900
551.790000 ARGENTINA
NFztyTOR10UOJ 11-208-192-3205 unusual
requests detect. slyly dogged theodolites use slyly. deposit
23431 Customer#000023431 554269.536000
3381.860000 ROMANIA
HgiV0phqhaIa9aydNoIib 29-915-458-2654
instructions nag quickly. furiously bold accounts cajol
```

(20 row(s) affected)

-- using default substitutions

/* TPC_H Query 11 - Important Stock Identification */

```
SELECT PS_PARTKEY,
SUM(PS_SUPPLYCOST*PS_AVAILQTY)
AS VALUE
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
```

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```

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

..... Additional Rows Deleted .....
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

```

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```

/* TPC_H Query 12 - Shipping Modes and Order Priority */
                                C_COUNT  CUSTDIST  DESC
                                -----
SELECT      L_SHIPMODE,
            SUM( CASE WHEN O_ORDERPRIORITY =
'1-URGENT'  OR
            O_ORDERPRIORITY = '2-
HIGH'
            THEN 1
            ELSE 0
            END) AS HIGH_LINE_COUNT,
            SUM( CASE WHEN O_ORDERPRIORITY <
'1-URGENT'  AND
            O_ORDERPRIORITY < '2-
HIGH'
            THEN 1
            ELSE 0
            END) AS LOW_LINE_COUNT
FROM ORDERS,
     LINEITEM
WHERE O_ORDERKEY = L_ORDERKEY
     AND
     L_SHIPMODE IN ('MAIL','SHIP')
     AND
     L_COMMITDATE < L_RECEIPTDATE
     AND
     L_SHIPDATE < L_COMMITDATE
     AND
     L_RECEIPTDATE >= '1994-01-01'
     AND
     L_RECEIPTDATE < dateadd(yy, 1, '1994-01-
01')
GROUP BY   L_SHIPMODE
ORDER BY   L_SHIPMODE
L_SHIPMODE HIGH_LINE_COUNT LOW_LINE_COUNT
-----
MAIL      6202      9324
SHIP      6200      9262
(2 row(s) affected)
-- using default substitutions

/* 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%'
     )
AS C_ORDERS (C_CUSTKEY,
C_COUNT)
GROUP BY   C_COUNT
ORDER BY   CUSTDIST DESC,

                                (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

```

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```

                END) /
SUM(L_EXTENDEDPRICE*(1-L_DISCOUNT)) AS
PROMO_REVENUE
FROM LINEITEM,
     PART
WHERE L_PARTKEY = P_PARTKEY AND
      L_SHIPDATE >= '1995-09-01' AND
      L_SHIPDATE < dateadd(mm, 1, '1995-09-01')
PROMO_REVENUE
-----
16.380779

```

(1 row(s) affected)

-- using default substitutions

/* TPC_H Query 15 - Create View for Top Supplier Query */

```

CREATE VIEW REVENUE0 (SUPPLIER_NO,
TOTAL_REVENUE)
AS
SELECT L_SUPPKEY,
       SUM(L_EXTENDEDPRICE*(1-L_DISCOUNT))
FROM LINEITEM
WHERE L_SHIPDATE >= '1996-01-01' AND
      L_SHIPDATE < dateadd(mm, 3, '1996-01-01')
GROUP BY L_SUPPKEY
GO

```

/* TPC_H Query 15 - Top Supplier */

```

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

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

```

(1 row(s) affected)

-- using default substitutions

/* TPC_H Query 16 - Parts/Supplier Relationship */

```

SELECT P_BRAND,
       P_TYPE,
       P_SIZE,
       COUNT(DISTINCT PS_SUPPKEY) AS
SUPPLIER_CNT
FROM PARTSUPP,
     PART
WHERE P_PARTKEY = PS_PARTKEY
AND
      P_BRAND <> 'Brand#45'
AND
      P_TYPE NOT LIKE 'MEDIUM
POLISHED%%' AND
      P_SIZE IN (49, 14, 23, 45, 19, 3, 36, 9)
AND
      PS_SUPPKEY NOT IN ( SELECT
S_SUPPKEY
                        FROM
SUPPLIER
                        WHERE
S_COMMENT LIKE
'%%Customer%%Complaints%%'
                        )
GROUP BY P_BRAND,
         P_TYPE,
         P_SIZE
ORDER BY SUPPLIER_CNT DESC,
         P_BRAND,
         P_TYPE,
         P_SIZE
P_BRAND P_TYPE P_SIZE
SUPPLIER_CNT
-----
Brand#41 MEDIUM BRUSHED TIN 3 28
Brand#54 STANDARD BRUSHED COPPER 14 27
Brand#11 STANDARD BRUSHED TIN 23 24
Brand#11 STANDARD BURNISHED BRASS 36 24
Brand#15 MEDIUM ANODIZED NICKEL 3 24
Brand#15 SMALL ANODIZED BRASS 45 24
Brand#15 SMALL BURNISHED NICKEL 19 24
Brand#21 MEDIUM ANODIZED COPPER 3 24
Brand#22 SMALL BRUSHED NICKEL 3 24
Brand#22 SMALL BURNISHED BRASS 19 24
Brand#25 MEDIUM BURNISHED COPPER 36 24
Brand#31 PROMO POLISHED COPPER 36 24
Brand#33 LARGE POLISHED TIN 23 24
Brand#33 PROMO POLISHED STEEL 14 24
Brand#35 PROMO BRUSHED NICKEL 14 24
Brand#41 ECONOMY BRUSHED STEEL 9 24
Brand#41 ECONOMY POLISHED TIN 19 24
Brand#41 LARGE PLATED COPPER 36 24
Brand#42 ECONOMY PLATED BRASS 3 24
Brand#42 STANDARD POLISHED TIN 49 24
Brand#43 PROMO BRUSHED TIN 3 24
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

```

Appendix D

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

..... Additional Rows Deleted

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)

```

Appendix D

```

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 00:00:00.000 544089.090000 323.000000
Customer#000144617 144617 3043270 1997-
02-12 00:00:00.000 530604.440000 317.000000
Customer#000013940 13940 2232932 1997-
04-13 00:00:00.000 522720.610000 304.000000
Customer#000066790 66790 2199712 1996-
09-30 00:00:00.000 515531.820000 327.000000
Customer#000046435 46435 4745607 1997-
07-03 00:00:00.000 508047.990000 309.000000
Customer#000015272 15272 3883783 1993-
07-28 00:00:00.000 500241.330000 302.000000
Customer#000146608 146608 3342468 1994-
06-12 00:00:00.000 499794.580000 303.000000
Customer#000096103 96103 5984582 1992-
03-16 00:00:00.000 494398.790000 312.000000
Customer#000024341 24341 1474818 1992-
11-15 00:00:00.000 491348.260000 302.000000
Customer#000137446 137446 5489475 1997-
05-23 00:00:00.000 487763.250000 311.000000
Customer#000107590 107590 4267751 1994-
11-04 00:00:00.000 485141.380000 301.000000
Customer#000050008 50008 2366755 1996-
12-09 00:00:00.000 483891.260000 302.000000
Customer#000015619 15619 3767271 1996-
08-07 00:00:00.000 480083.960000 318.000000
Customer#000077260 77260 1436544 1992-
09-12 00:00:00.000 479499.430000 307.000000
Customer#000109379 109379 5746311 1996-
10-10 00:00:00.000 478064.110000 302.000000
Customer#000054602 54602 5832321 1997-
02-09 00:00:00.000 471220.080000 307.000000
Customer#000105995 105995 2096705 1994-
07-03 00:00:00.000 469692.580000 307.000000
Customer#000148885 148885 2942469 1992-
05-31 00:00:00.000 469630.440000 313.000000
Customer#000114586 114586 551136 1993-
05-19 00:00:00.000 469605.590000 308.000000
Customer#000105260 105260 5296167 1996-
09-06 00:00:00.000 469360.570000 303.000000
Customer#000147197 147197 1263015 1997-
02-02 00:00:00.000 467149.670000 320.000000
Customer#000064483 64483 2745894 1996-
07-04 00:00:00.000 466991.350000 304.000000
Customer#000136573 136573 2761378 1996-
05-31 00:00:00.000 461282.730000 301.000000
Customer#000016384 16384 502886 1994-
04-12 00:00:00.000 458378.920000 312.000000
Customer#000117919 117919 2869152 1996-
06-20 00:00:00.000 456815.920000 317.000000
Customer#000012251 12251 735366 1993-
11-24 00:00:00.000 455107.260000 309.000000
Customer#000120098 120098 1971680 1995-
06-14 00:00:00.000 453451.230000 308.000000
Customer#000066098 66098 5007490 1992-
08-07 00:00:00.000 453436.160000 304.000000
Customer#000117076 117076 4290656 1997-
02-05 00:00:00.000 449545.850000 301.000000
Customer#000129379 129379 4720454 1997-
06-07 00:00:00.000 448665.790000 303.000000
Customer#000126865 126865 4702759 1994-
11-07 00:00:00.000 447606.650000 320.000000
Customer#000088876 88876 983201 1993-
12-30 00:00:00.000 446717.460000 304.000000
Customer#000036619 36619 4806726 1995-
01-17 00:00:00.000 446704.090000 328.000000
Customer#000141823 141823 2806245 1996-
12-29 00:00:00.000 446269.120000 310.000000
Customer#000053029 53029 2662214 1993-
08-13 00:00:00.000 446144.490000 302.000000
Customer#000018188 18188 3037414 1995-
01-25 00:00:00.000 443807.220000 308.000000
Customer#000066533 66533 29158 1995-
10-21 00:00:00.000 443576.500000 305.000000
Customer#000037729 37729 4134341 1995-
06-29 00:00:00.000 441082.970000 309.000000
Customer#000003566 3566 2329187 1998-
01-04 00:00:00.000 439803.360000 304.000000
Customer#000045538 45538 4527553 1994-
05-22 00:00:00.000 436275.310000 305.000000
Customer#000081581 81581 4739650 1995-
11-04 00:00:00.000 435405.900000 305.000000
Customer#000119989 119989 1544643 1997-
09-20 00:00:00.000 434568.250000 320.000000
Customer#000003680 3680 3861123 1998-
07-03 00:00:00.000 433525.970000 301.000000
Customer#000113131 113131 967334 1995-
12-15 00:00:00.000 432957.750000 301.000000
Customer#000141098 141098 565574 1995-
09-24 00:00:00.000 430986.690000 301.000000
Customer#000093392 93392 5200102 1997-
01-22 00:00:00.000 425487.510000 304.000000

```

Appendix D

```

Customer#000015631    15631    1845057    1994-
05-12 00:00:00.000  419879.590000    302.000000
Customer#000112987    112987    4439686    1996-
09-17 00:00:00.000  418161.490000    305.000000
Customer#000012599    12599    4259524    1998-
02-12 00:00:00.000  415200.610000    304.000000
Customer#000105410    105410    4478371    1996-
03-05 00:00:00.000  412754.510000    302.000000
Customer#000149842    149842    5156581    1994-
05-30 00:00:00.000  411329.350000    302.000000
Customer#000010129    10129    5849444    1994-
03-21 00:00:00.000  409129.850000    309.000000
Customer#000069904    69904    1742403    1996-
10-19 00:00:00.000  408513.000000    305.000000
Customer#000017746    17746    6882    1997-
04-09 00:00:00.000  408446.930000    303.000000
Customer#000013072    13072    1481925    1998-
03-15 00:00:00.000  399195.470000    301.000000
Customer#000082441    82441    857959    1994-
02-07 00:00:00.000  382579.740000    305.000000
Customer#000088703    88703    2995076    1994-
01-30 00:00:00.000  363812.120000    302.000000

```

(57 row(s) affected)

-- using default substitutions

/* TPC_H Query 19 - Discounted Revenue */

```

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

```

```

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

```

PERSON'
)
REVENUE

3083843.057800

(1 row(s) affected)

-- using default substitutions

/* TPC_H Query 20 - Potential Part Promotion */

```

SELECT      S_NAME,
           S_ADDRESS
FROM SUPPLIER,
NATION
WHERE S_SUPPKEY IN (
SELECT
PS_SUPPKEY
FROM
PARTSUPP
WHERE
PS_PARTKEY in (
SELECT
P_PARTKEY
FROM PART
WHERE P_NAME like 'forest%'
)
AND
PS_AVAILQTY
> (
SELECT
sum(L_QUANTITY)
FROM LINEITEM

```


Appendix D

```

WHEREL_PARTKEY = PS_PARTKEY
AND
L_SUPPKEY = PS_SUPPKEY
AND
L_SHIPDATE >= '1994-01-01'
AND
L_SHIPDATE <
dateadd(yy,1,'1994-01-01')
)
) AND
S_NATIONKEY = N_NATIONKEY AND
N_NAME = 'CANADA'
ORDER BY S_NAME
S_NAME S_ADDRESS
-----
Supplier#000000020 iybAE,RmTymrZVYaFZva2SH,j
Supplier#000000091
YV45D7TkfdQanOOZ7q9QxkyGUapU1oOWU6q3
Supplier#000000197
YC2Acon6kjY3zj3Fbxs2k4Vdf7X0cd2F
Supplier#000000226 83qOdU2EYRdPQAQhEtn GRZEd
Supplier#000000285 Br7e1nnt1yxrw6ImgpJ7YdhFDjuBf
Supplier#000000378 FfbhyCxWvcPrO8ltp9
Supplier#000000402
i9Sw4DoyMhzhKXCH9By,AYSgmD
Supplier#000000530 0qwCMwobKY
OcmLyfRXlagA8ukENJv,
Supplier#000000688 D
fw5ocppmZpYBBIP1718hCihLDZ5KhKX
Supplier#000000710 f19YPvOyb
QoYwjKC,oPycpGfieBAcwKJo
Supplier#000000736
l6i2nMwVuovfKnuVgaSGK2rDy65D1AFLegiL7
Supplier#000000761
zISLelQUj2XrvTTFnv7WAcYZGvvtMx882d4
Supplier#000000884 bmhEShejaS
Supplier#000000887 urEaTejH5POADP2ARrf
Supplier#000000935 ij98czM
2KzWe7dDToxB8sq0UfCdvrx
Supplier#000000975 ,AC e,tBpNwKb5xMUzeohx1Rn,
hdZJo73gFQF8y
Supplier#000001263 rQWr6nf8ZhB2TAiIDivo5Io
Supplier#000001399 LmrocIMSyYOWuANx7
Supplier#000001446 lch9HMNU1R7a0LIybsUodVknk6
Supplier#000001454 TOpingu2TVXIjhiL93h,
Supplier#000001500 wDmF5xLxtQch9ctVu,
Supplier#000001602 uKNWleafaM644
Supplier#000001626 UhxNRzUu1dtFmp0
Supplier#000001682 pXTkGxrTQVyH1Rr
Supplier#000001699 Q9C4rfJ26oijVPqqcqVXeRI
Supplier#000001700 7hMICof1Y5zLfg
Supplier#000001726 TeRY7TtTH24sEword7yAaSkjx8
Supplier#000001730 Rc8e,1Pybn r6zo0VJIEiD0UD vhk
Supplier#000001746
qWsendlOekQG1aW4uq06uQaCm51se8lrv7 hBRd
Supplier#000001752 Fra7outx41THYJaRThdOGiBk
Supplier#000001856
jXcRgzYF0ah05iR8p6w5SbJLcUGyYiURPvFwUWM
Supplier#000001931 FpJbMU2h6ZR2eBv8I9NIxF
Supplier#000001939 Nrk,JA4bfReUs
Supplier#000001990
DSDJkCgBJzuPg1yuM,CUdLnsRliOxkkHezTCA
Supplier#000002020 jB6r1d7MxP6co
Supplier#000002022 dwebGX7Id2pc25YvY33
Supplier#000002036 20yrTtVObjKUUI2WCB0A
Supplier#000002204
uYmlr46C06udCqanj0KiRsoTQakZsEyssL
Supplier#000002243 nSOEV3JeOU79
Supplier#000002245
hz2qWXWVjOyKhqPYMoEwz6zFkrTaDM
Supplier#000002282
ES21K9dxoW1I1TzWCj7ekdlNwSWnv1Z 6mQ,BKn
Supplier#000002303 nCoWfpB6YOymbgOht7lftkpkHI
Supplier#000002373 RzHSxOTQmElCjxIBiVA52Z
JB58rJhPRyIR
..... Additional Rows Deleted .....
Supplier#000007885
u3sicch5ZpyTUpn1cJKncAoabiWgY
Supplier#000007918 r,v9mBQ6LoEYyj1
Supplier#000007926 ErzCF80K9Uy
Supplier#000007957 ELwnio14ssoU1 dRyZIL OK3Vtzb
Supplier#000007965 F7Un5IJ7p5hhj
Supplier#000007968
DsF9UIZ2Fo6HXN9aErvyglkHoD582HSGZpP
Supplier#000007998
LnASFBfYRFOo9d6d,asBvVq9Lo2P
Supplier#000008168 aOa82a8ZbKcfnDLX
Supplier#000008231 IK7eGw Yj90sTdpsP,vcqWxLB
Supplier#000008243 2AyePMkDqmqzVzjGTizXthFL08h
EiudCMxOmIIG
Supplier#000008275 BlbNdfWg,gpXKQILN
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 HmPIQEzKCPEcTUL14,kKq
Supplier#000008841 I 85Lu1sekbq2xrSlzm0
Supplier#000008895
2cH4okfaLSZTTg8sKRbbJQxkmeFu2Esj

```

Appendix D

```

Supplier#000008967      2kwEHyMG                                WHERE
7FwozNImAUE6mH0hYtqYculJM                                L3.L_ORDERKEY      =
Supplier#000008972      w2vF6 D5YZO3visPXsqVfLADTK                L1.L_ORDERKEY      AND
Supplier#000009032      qK,trB6Sdy4Dz1BRUFNy                        <> L1.L_SUPPKEY      L3.L_SUPPKEY
Supplier#000009147      rOAuryHxpZ9eOvx                                <> L1.L_SUPPKEY      AND
Supplier#000009252      F7cZaPUHwh1                                L3.L_RECEIPTDATE   > L3.L_COMMITDATE
ZKyj3xmAVWC1XdP ue1p5m,i                                )                   AND
Supplier#000009278      RqYTzgxj93CLX 0mcYfCENOfD                S_NATIONKEY = N_NATIONKEY AND
Supplier#000009327      uoqMdf7e7Gj9dbQ53                          N_NAME             = 'SAUDI ARABIA'
Supplier#000009430      igRqmneFt
Supplier#000009567      r4Wfx4c3xsEAjcGj71HHZByornl              GROUP BY           S_NAME
D9vrztXlv4                                ORDER BY           NUMWAIT           DESC,
Supplier#000009601      51m637bO,Rw5DnHWFUvLacRx9                S_NAME
Supplier#000009709      rRnCbHYgDgl9PZYnyWKVYSUW0vKg              S_NAME           NUMWAIT
-----
Supplier#000009753      wLhVEcRmd7PkJF4FBnGK7Z                    Supplier#000002829  20
Supplier#000009796      z,y4Idmr15DOvPUqYG                          Supplier#000005808  18
Supplier#000009799      4wNjXGa4OKWl                                Supplier#000000262  17
Supplier#000009811      E3iuyq7UnZxU7oPZie2Gu6                     Supplier#000000496  17
Supplier#000009812      APFRMy3lCbgFga53n5t9DxzFPQPgnjrGt32       Supplier#000002160  17
Supplier#000009862      rJzweWeN58                                   Supplier#000002301  17
Supplier#000009868      ROjGgx5gvtkmmUUoeyy7v                       Supplier#000002540  17
Supplier#000009869      ucLqxzrpBTRMewGSM29t0rNTM30g1Tu3Xgg3mKag  Supplier#000003063  17
Supplier#000009899      7XdpaHrzt1t,UQFZE                           Supplier#000005178  17
Supplier#000009974      7wJ,J5DKcxSU4Kp1cQLpbcAvB5AsvKT           Supplier#000008331  17
7wJ,J5DKcxSU4Kp1cQLpbcAvB5AsvKT           Supplier#000008331  17
Supplier#000009899      7XdpaHrzt1t,UQFZE                           Supplier#000008331  17
Supplier#000009974      7wJ,J5DKcxSU4Kp1cQLpbcAvB5AsvKT           Supplier#000002005  16
Supplier#000009974      7wJ,J5DKcxSU4Kp1cQLpbcAvB5AsvKT           Supplier#000002095  16
Supplier#000009974      7wJ,J5DKcxSU4Kp1cQLpbcAvB5AsvKT           Supplier#000005799  16
Supplier#000009974      7wJ,J5DKcxSU4Kp1cQLpbcAvB5AsvKT           Supplier#000005842  16
Supplier#000009974      7wJ,J5DKcxSU4Kp1cQLpbcAvB5AsvKT           Supplier#000005842  16
Supplier#000009974      7wJ,J5DKcxSU4Kp1cQLpbcAvB5AsvKT           Supplier#000006450  16
Supplier#000009974      7wJ,J5DKcxSU4Kp1cQLpbcAvB5AsvKT           Supplier#000006939  16
Supplier#000009974      7wJ,J5DKcxSU4Kp1cQLpbcAvB5AsvKT           Supplier#000009200  16
Supplier#000009974      7wJ,J5DKcxSU4Kp1cQLpbcAvB5AsvKT           Supplier#000009727  16
Supplier#000009974      7wJ,J5DKcxSU4Kp1cQLpbcAvB5AsvKT           Supplier#00000486   15
Supplier#000009974      7wJ,J5DKcxSU4Kp1cQLpbcAvB5AsvKT           Supplier#00000565   15
Supplier#000009974      7wJ,J5DKcxSU4Kp1cQLpbcAvB5AsvKT           Supplier#000001046  15
Supplier#000009974      7wJ,J5DKcxSU4Kp1cQLpbcAvB5AsvKT           Supplier#000001047  15
Supplier#000009974      7wJ,J5DKcxSU4Kp1cQLpbcAvB5AsvKT           Supplier#000001161  15
Supplier#000009974      7wJ,J5DKcxSU4Kp1cQLpbcAvB5AsvKT           Supplier#000001336  15
Supplier#000009974      7wJ,J5DKcxSU4Kp1cQLpbcAvB5AsvKT           Supplier#000001435  15
Supplier#000009974      7wJ,J5DKcxSU4Kp1cQLpbcAvB5AsvKT           Supplier#000003075  15
Supplier#000009974      7wJ,J5DKcxSU4Kp1cQLpbcAvB5AsvKT           Supplier#000003335  15
Supplier#000009974      7wJ,J5DKcxSU4Kp1cQLpbcAvB5AsvKT           Supplier#000005649  15
Supplier#000009974      7wJ,J5DKcxSU4Kp1cQLpbcAvB5AsvKT           Supplier#000006027  15
Supplier#000009974      7wJ,J5DKcxSU4Kp1cQLpbcAvB5AsvKT           Supplier#000006795  15
Supplier#000009974      7wJ,J5DKcxSU4Kp1cQLpbcAvB5AsvKT           Supplier#000006800  15
Supplier#000009974      7wJ,J5DKcxSU4Kp1cQLpbcAvB5AsvKT           Supplier#000006824  15
Supplier#000009974      7wJ,J5DKcxSU4Kp1cQLpbcAvB5AsvKT           Supplier#000007131  15
Supplier#000009974      7wJ,J5DKcxSU4Kp1cQLpbcAvB5AsvKT           Supplier#000007382  15
Supplier#000009974      7wJ,J5DKcxSU4Kp1cQLpbcAvB5AsvKT           Supplier#000008913  15
Supplier#000009974      7wJ,J5DKcxSU4Kp1cQLpbcAvB5AsvKT           Supplier#000009787  15
Supplier#000009974      7wJ,J5DKcxSU4Kp1cQLpbcAvB5AsvKT           Supplier#000000633  14
Supplier#000009974      7wJ,J5DKcxSU4Kp1cQLpbcAvB5AsvKT           Supplier#000001960  14
Supplier#000009974      7wJ,J5DKcxSU4Kp1cQLpbcAvB5AsvKT           Supplier#000002323  14
Supplier#000009974      7wJ,J5DKcxSU4Kp1cQLpbcAvB5AsvKT           Supplier#000002490  14
Supplier#000009974      7wJ,J5DKcxSU4Kp1cQLpbcAvB5AsvKT           Supplier#000002993  14
Supplier#000009974      7wJ,J5DKcxSU4Kp1cQLpbcAvB5AsvKT           Supplier#000003101  14
Supplier#000009974      7wJ,J5DKcxSU4Kp1cQLpbcAvB5AsvKT           Supplier#000004489  14
Supplier#000009974      7wJ,J5DKcxSU4Kp1cQLpbcAvB5AsvKT           Supplier#000005435  14

```

(204 row(s) affected)

-- using default substitutions

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

```

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

```

Appendix D

Supplier#000005583 14
 Supplier#000005774 14
 Supplier#000007579 14
 Supplier#000008180 14
 Supplier#000008695 14
 Supplier#000009224 14
 Supplier#000000357 13
 Supplier#000000436 13
 Supplier#000000610 13
 Supplier#000000788 13
 Supplier#000000889 13
 Supplier#000001062 13
 Supplier#000001498 13
 Supplier#000002056 13
 Supplier#000002312 13
 Supplier#000002344 13
 Supplier#000002596 13
 Supplier#000002615 13
 Supplier#000002978 13
 Supplier#000003048 13
 Supplier#000003234 13
 Supplier#000003727 13
 Supplier#000003806 13
 Supplier#000004472 13
 Supplier#000005236 13
 Supplier#000005906 13
 Supplier#000006241 13
 Supplier#000006326 13
 Supplier#000006384 13
 Supplier#000006394 13
 Supplier#000006624 13
 Supplier#000006629 13
 Supplier#000006682 13
 Supplier#000006737 13
 Supplier#000006825 13
 Supplier#000007021 13
 Supplier#000007417 13
 Supplier#000007497 13
 Supplier#000007602 13
 Supplier#000008134 13
 Supplier#000008234 13
 Supplier#000009435 13
 Supplier#000009436 13
 Supplier#000009564 13
 Supplier#000009896 13
 Supplier#000000379 12
 Supplier#000000673 12
 Supplier#000000762 12
 Supplier#000000811 12
 Supplier#000000821 12
 Supplier#000001337 12
 Supplier#000001916 12
 Supplier#000001925 12
 Supplier#000002039 12
 Supplier#000002357 12
 Supplier#000002483 12

-- using default substitutions

/* TPC_H Query 22 - Global Sales Opportunity */

```

SELECT      CNTRYCODE,
            COUNT(*)      AS NUMCUST,
            SUM(C_ACCTBAL) AS TOTACCTBAL
FROM (      SELECT
            SUBSTRING(C_PHONE,1,2) AS
CNTRYCODE,
            C_ACCTBAL
FROM CUSTOMER
WHERE SUBSTRING(C_PHONE,1,2)
IN ('13', '31', '23', '29', '30', '18', '17') AND
C_ACCTBAL >
(      SELECT      AVG(C_ACCTBAL)
FROM CUSTOMER
WHERE C_ACCTBAL > 0.00 AND
SUBSTRING(C_PHONE,1,2) IN
('13', '31', '23', '29', '30', '18', '17')
) AND
NOT EXISTS (
SELECT      *
FROM ORDERS
WHERE O_CUSTKEY = C_CUSTKEY
) AS CUSTSALE
GROUP BY   CNTRYCODE
ORDER BY   CNTRYCODE
CNTRYCODE NUMCUST TOTACCTBAL
-----
13      888      6737713.990000
17      861      6460573.720000
18      964      7236687.400000
23      892      6701457.950000
29      948      7158866.630000
30      909      6808436.130000
31      922      6806670.180000

```

(7 row(s) affected)

(100 row(s) affected)

Appendix E: Seed and Input Parameters

Appendix E

Seed

1010112241

Stream0

1 118
 2 16 STEEL AFRICA
 3 FURNITURE 1995-03-04
 4 1993-08-01
 5 AMERICA 1996-01-01
 6 1996-01-01 0.05 25
 7 JAPAN SAUDI ARABIA
 8 SAUDI ARABIAMIDDLE EAST ECONOMY
 PLATED COPPER
 9 rose
 10 1994-12-01
 11 MOROCCO 0.0000010000
 12 SHIP REG AIR 1997-01-01
 13 special deposits
 14 1997-12-01
 15 1994-10-01
 16 Brand#21 SMALL BURNISHED 17
 33 18 31 32 27 19
 8
 17 Brand#12 LG PKG
 18 312
 19 Brand#22 Brand#34 Brand#41
 4 19 24
 20 deep 1995-01-01 MOROCCO
 21 JORDAN
 22 12 29 13 19 32 21
 10

Stream1

21 ETHIOPIA
 3 AUTOMOBILE 1995-03-21
 18 314
 5 EUROPE 1996-01-01
 11 CANADA 0.0000010000
 7 EGYPT JAPAN
 6 1996-01-01 0.03 24
 20 papaya 1994-01-01 ETHIOPIA
 17 Brand#14 MED CASE
 12 FOB REG AIR 1993-01-01
 16 Brand#11 LARGE POLISHED 10
 3 17 11 9 44 46
 20
 15 1997-04-01
 13 special packages
 10 1993-09-01
 2 4 BRASS EUROPE
 8 JAPAN ASIA ECONOMY BURNISHED TIN

14 1993-04-01
 19 Brand#34 Brand#22 Brand#45
 10 20 21
 9 pink
 22 18 23 10 32 33 14
 13
 1 65
 4 1996-03-01

Stream2

6 1997-01-01 0.08 24
 17 Brand#15 MED BAG
 14 1993-07-01
 16 Brand#41 PROMO BRUSHED 9
 5 39 2 8 14 11
 48
 19 Brand#31 Brand#54 Brand#44
 5 10 28
 10 1994-06-01
 9 orange
 2 42 NICKEL AFRICA
 15 1995-01-01
 8 EGYPT MIDDLE EAST LARGE BRUSHED TIN
 5 MIDDLE EAST 1997-01-01
 22 29 26 16 27 28 12
 18
 12 MAIL REG AIR 1993-01-01
 7 VIETNAM EGYPT
 13 special packages
 18 315
 1 73
 4 1993-12-01
 20 blanched 1997-01-01 ROMANIA
 3 FURNITURE 1995-03-06
 11 MOZAMBIQUE 0.0000010000
 21 RUSSIA

Stream3

8 VIETNAM ASIA LARGE PLATED TIN
 5 AFRICA 1997-01-01
 4 1996-07-01
 6 1997-01-01 0.06 25
 17 Brand#12 MED PKG
 7 JORDAN VIETNAM
 1 81
 18 313
 22 18 17 28 33 14 22
 31
 14 1993-10-01
 9 mint
 10 1993-03-01
 15 1997-08-01
 11 CANADA 0.0000010000

Appendix E

20	lime	1996-01-01	INDONESIA	14	1994-04-01				
2	30	TIN	EUROPE	22	13	21	16	23	18
21	MOROCCO				15				24
19	Brand#33	Brand#42	Brand#33	11	EGYPT	0.0000010000			
	10	11	24	13	special	packages			
13	special	packages		3	MACHINERY	1995-03-25			
16	Brand#31	MEDIUM BURNISHED	2	1	97				
	25	49	24	32	45	48			
	11			2	5	BRASS EUROPE			
12	TRUCK AIR	1993-01-01		5	ASIA	1997-01-01			
3	MACHINERY	1995-03-23		8	EGYPT MIDDLE EAST	MEDIUM POLISHED			

Stream4

5	AMERICA	1997-01-01							
21	GERMANY								
14	1994-01-01								
19	Brand#45	Brand#25	Brand#33						
	5	12	20						
15	1995-05-01								
17	Brand#14	JUMBO CASE							
12	AIR TRUCK	1993-01-01							
6	1997-01-01	0.03	25						
4	1994-04-01								
9	linen								
8	JORDAN	MIDDLE EAST	LARGE						
	ANODIZED TIN								
16	Brand#11	ECONOMY PLATED	34						
	37	42	49	18	19	28			
	4								
11	MOZAMBIQUE	0.0000010000							
2	17	COPPER	AMERICA						
10	1993-12-01								
18	315								
1	89								
13	special	packages							
7	ETHIOPIA	JORDAN							
22	19	17	12	10	16	32			
	14								
3	FURNITURE	1995-03-08							
20	tan	1994-01-01	UNITED STATES						

Stream5

21	UNITED STATES								
15	1997-11-01								
4	1996-11-01								
6	1997-01-01	0.09	24						
7	RUSSIAEGYPT								
16	Brand#41	STANDARD BRUSHED	7						
	22	49	28	23	14	33			
	8								
19	Brand#42	Brand#53	Brand#32						
	1	13	27						
18	312								

Appendix F: Benchmark Scripts

print.c

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

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

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

FILE *
```

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

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

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

                            this_segment=++insert_orders_segment;
                        else

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

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

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

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

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



```

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

    switch(format)
    {
    case DT_STR:
        if (columnar)
            fprintf(target, "%-*s", len, (char
*)data);
        else
            fprintf(target, "%s", (char *)data);
        break;
#ifdef MVS
        case DT_VSTR:
            /* note: only used in MVS, assumes
columnar output */
            fprintf(target, "%c%c%-*s",
                (len >> 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);
    PR_STR(fp, c->mktsegment, C_MSEG_LEN);
    PR_HUGE(fp, &c->nation_code);
    PR_VSTR(fp, c->name, C_NAME_LEN);
    PR_VSTR(fp, c->address,
        (columnar)?(long)(ceil(C_ADDR_LEN *
V_STR_HGH)):c->alen);
    PR_STR(fp, c->phone, PHONE_LEN);
    PR_MONEY(fp, &c->acctbal);
    PR_VSTR_LAST(fp, c->comment,
        (columnar)?(long)(ceil(C_CMNT_LEN *
V_STR_HGH)):c->clen);
    PR_END(fp);

return(0);
}

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

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

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

```

```

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

return(0);
}

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

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

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

  return(0);
}

```

```

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

```

```

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

  return(0);
}

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

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

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

  return(0);
}

```

```

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

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

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

```

```

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

return(0);
}

/*
 * print the given part *and* its suppliers
 */
int
pr_part_psupp(part_t *part, int mode)
{
    tdefs[PART].name = tdefs[PART_PSUPP].name;
    pr_part(part, mode);
    pr_psupp(part, mode);

    return(0);
}

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

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

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

    return(0);
}

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

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

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

    return(0);
}

/*
 * NOTE: this routine does NOT use the BCD2_* routines. As
a result,
 * it WILL fail if the keys being deleted exceed 32 bits. Since
this
 * would require ~660 update iterations, this seems an
acceptable
 * oversight
 */
int
pr_drange(int tbl, DSS_HUGE min, DSS_HUGE cnt, long
num)
{
    static int last_num = 0;
    static FILE *dfp = NULL;
    DSS_HUGE child = -1;
    DSS_HUGE start, last, new;

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

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

```

```

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

rows_per_segment = (cnt / delete_segments) + 1;

if(++rows_this_segment) > rows_per_segment)
{

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

last_num = num;

rows_this_segment=1;
}
}

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

}

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

return(0);
}

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

return(0);
}

```

```

}

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

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

    return(0);
}

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

    return(0);
}

/*
 * print the given part
 */
int
vrf_part(part_t *part, int mode)
{
    VRF_STRT(PART);
    VRF_INT(PART, part->partkey);
    VRF_STR(PART, part->name);
    VRF_STR(PART, part->mfgr);
    VRF_STR(PART, part->brand);

    VRF_STR(PART, part->type);
    VRF_INT(PART, part->size);
    VRF_STR(PART, part->container);
    VRF_MONEY(PART, part->retailprice);
    VRF_STR(PART, part->comment);
    VRF_END(PART);

    return(0);
}

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

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

    return(0);
}

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

    return(0);
}

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

    return(0);
}

```

```

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

    return(0);
}

```

```

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

    return(0);
}

```

CreateRF1proc.sql

```

-- File:  CREATERF1PROC.SQL
--      Microsoft TPC-H Benchmark Kit Ver. 1.00
--      Copyright Microsoft, 1999
--
IF exists (SELECT name FROM sysobjects WHERE name =
'RF1')
    DROP PROCEDURE RF1
GO
--
-- Create a stored RefreshInsert procedure which will catch
the deadlock
-- victim abort and restart the insert transaction.
--
CREATE PROCEDURE RF1
    @current_execution INTEGER, @insert_sets INTEGER,
@parallel_executions INTEGER, @total_executions
INTEGER
AS
BEGIN

    DECLARE @startdate DATETIME
    DECLARE @enddate DATETIME
    DECLARE @edate DATETIME
    DECLARE @rangeStart INTEGER
    DECLARE @rangeSize INTEGER
    DECLARE @range INTEGER

    DECLARE @success INTEGER

```

```

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

```

```

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

```

```

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

```

```

IF (@total_executions > @parallel_executions)
    BEGIN
        SET @div = (@index-1)/@skip
        SET @mod = (@index-1) - @div * @skip
        SET @rangeSize = datediff(day, @startdate,
@enddate)/@parallel_executions + 1
        SET @totRangeSize = @rangeSize
        SET @rangeSum = 0
        SET @rangeStart = @div * @rangeSize
        SET @i = @mod
        while (@i > 0)
            BEGIN
                SET @rangeSize = (@totRangeSize -
@rangeSum)/2
                SET @rangeSum = @rangeSum +
@rangeSize
                SET @rangeStart = @rangeStart +
@rangeSize
                SET @insert_sets = @insert_sets/2
                SET @i = @i - 1
            end

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

```

```

end
ELSE
  BEGIN
    SET @rangeSize = datediff(day, @startdate,
@enddate)/@total_executions
    SET @rangeStart = @rangeSize * (@index - 1)
    end

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

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

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

--
-- Generate the two insert statements
--
SET @edate = dateadd(day, @range, @startdate)
SET @orderSql = N'INSERT INTO ORDERS
(O_ORDERKEY, O_CUSTKEY, O_ORDERSTATUS,
O_TOTALPRICE,
O_ORDERDATE, O_ORDERPRIORITY, O_CLERK,
O_SHIPPRIORITY, O_COMMENT)
(SELECT O_ORDERKEY,
O_CUSTKEY, O_ORDERSTATUS, O_TOTALPRICE,
O_ORDERDATE, O_ORDERPRIORITY, O_CLERK,
O_SHIPPRIORITY, O_COMMENT
FROM NEWORDERS
WHERE O_ORDERDATE >
@startdate AND O_ORDERDATE <= @edate)
option (loop join)'
SET @liSql = N'INSERT INTO LINEITEM
(L_ORDERKEY,L_PARTKEY,L_SUPPKEY,L_LINENUM
BER,L_QUANTITY,
L_EXTENDEDPRICE,
L_DISCOUNT, L_TAX, L_RETURNFLAG,
L_LINESTATUS,
L_SHIPDATE,
L_COMMITDATE, L_RECEIPTDATE,
L_SHIPINSTRUCT, L_SHIPMODE, L_COMMENT)
(SELECT
L_ORDERKEY,L_PARTKEY,L_SUPPKEY,L_LINENUMB
ER,L_QUANTITY,
L_EXTENDEDPRICE,
L_DISCOUNT, L_TAX, L_RETURNFLAG,
L_LINESTATUS,

```

```

L_SHIPDATE,
L_COMMITDATE, L_RECEIPTDATE,
L_SHIPINSTRUCT, L_SHIPMODE, L_COMMENT
FROM NEWLINEITEM,
NEWORDERS
WHERE L_ORDERKEY =
O_ORDERKEY AND O_ORDERDATE > @startdate AND
O_ORDERDATE <= @edate)
option (loop join)'

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

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

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

    COMMIT TRANSACTION

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

```

```

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

```

CreateRF2proc.sql

```

-- File:  CREATERF2PROC.SQL
--      Microsoft TPC-H Benchmark Kit Ver. 1.00
--      Copyright Microsoft, 1999
--
IF exists (SELECT name FROM sysobjects WHERE name =
'RF2')
    DROP PROCEDURE RF2
GO
--
-- Create a stored Refresh Delete procedure which will catch
the deadlock
-- victim abort and restart the delete transaction.
--
CREATE PROCEDURE RF2
    @current_execution INTEGER, @delete_sets INTEGER,
@parallel_executions INTEGER, @total_executions
INTEGER
AS
BEGIN
    DECLARE @startdate DATETIME
    DECLARE @enddate DATETIME
    DECLARE @edate DATETIME
    DECLARE @rangeStart INTEGER
    DECLARE @rangeSize INTEGER
    DECLARE @range INTEGER
    declare @success INTEGER
    declare @index INTEGER
    declare @div INTEGER
    declare @mod INTEGER
    declare @skip INTEGER
    declare @i INTEGER
    declare @rangeSum INTEGER
    declare @totRangeSize INTEGER
    declare @sql NCHAR(1000)
    declare @orderSql NCHAR(1000)
    declare @liSql NCHAR(1000)
    SET @skip = @total_executions/@parallel_executions
    SET @div = floor((@current_execution-
1)/@parallel_executions)
    SET @mod = (@current_execution - 1) - @div *
@parallel_executions
    SET @index = @mod*@skip + @div + 1

```

```

SET @sql = N'SELECT @sdate = dateadd(day,-
1,min(O_ORDERDATE)), @edate = max(O_ORDERDATE)
FROM MOD_OLDORDERS'
EXEC sp_executesql @sql,N'@sdate datetime output, @edate
datetime output',@startdate output, @enddate output

```

```

IF (@total_executions > @parallel_executions)
    BEGIN
        SET @div = (@index-1)/@skip
        SET @mod = (@index-1) - @div * @skip
        SET @rangeSize = datediff(day, @startdate,
@enddate)/@parallel_executions + 1
        SET @totRangeSize = @rangeSize
        SET @rangeSum = 0
        SET @rangeStart = @div * @rangeSize
        SET @i = @mod
        WHILE (@i > 0)
            BEGIN
                SET @rangeSize = (@totRangeSize -
@rangeSum)/2
                SET @rangeSum = @rangeSum +
@rangeSize
                SET @rangeStart = @rangeStart +
@rangeSize
                SET @delete_sets = @delete_sets/2
                SET @i = @i - 1
            END
        IF (@mod + 1 = @skip) -- last allocation
            SET @rangeSize = @totRangeSize -
@rangeSum
        ELSE
            SET @rangeSize = (@totRangeSize -
@rangeSum)/2
        IF (@rangeSize < 0)
            SET @rangeSize = 0
        IF (@delete_sets <= 0)
            SET @delete_sets = 1
        END
    ELSE
        BEGIN
            SET @rangeSize = datediff(day, @startdate,
@enddate)/@total_executions
            SET @rangeStart = @rangeSize * (@index - 1)
        END
        SET @startdate = dateadd(day, @rangeStart, @startdate)
        IF (@index < @total_executions)
            SET @enddate = dateadd(day, @rangeSize,
@startdate)
        SET @range = datediff(day, @startdate, @enddate) /
@delete_sets
        --
        -- This handles the case when the max-min/delete_sets is less
that 1
        --

```



```

IF @range = 0
    SET @range = 1

--
-- Loop through the order keys deleting sets from orders
-- and lineitem tables
--
SET @edate = dateadd(day, @range, @startdate)
SET @liSql = N'DELETE FROM LINEITEM WHERE
L_ORDERKEY in
    (SELECT O_ORDERKEY FROM
MOD_OLDORDERS
    WHERE O_ORDERDATE >
@startdate AND O_ORDERDATE <= @edate)
option (loop join)'
SET @orderSql = N'DELETE FROM ORDERS WHERE
O_ORDERKEY in
    (SELECT O_ORDERKEY FROM
MOD_OLDORDERS
    WHERE O_ORDERDATE >
@startdate AND O_ORDERDATE <= @edate)
option (loop join)'

WHILE @startdate < @enddate
    BEGIN

        DELETE_TRANS:
        SET @success = 1
        BEGIN TRANSACTION

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

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

```

```

COMMIT TRANSACTION

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

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

END
END
GO

ErrHandling.bas

Attribute VB_Name = "ErrHandling"
' FILE:    ErrHandling.bas
'        Reporting Program for Microsoft TPC-H Kit Ver.
1.00
'        Copyright Microsoft, 1999
'        All Rights Reserved
'
' PURPOSE:  Error handling module for TPCHMetrics
report generation program
' Contact:  Reshma Tharamal (reshmat@microsoft.com)
'
Option Explicit

Public Sub DisplayErrors()
' Display error information such as error number,
description, etc to the user

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

    If Err.Number <> 0 Then
        ' Visual Basic Error
        If Err.Number > vbObjectError And Err.Number <
(vbObjectError + 65536) Then
            errCode = Err.Number - vbObjectError
        Else
            errCode = Err.Number
        End If
        strError = "Error # " & Str(errCode) & " was generated
by " _
            & Err.Source & Chr(13) & Err.Description
        MsgBox strError, , "Error", Err.HelpFile,
Err.HelpContext
    Else
        ' DAO Error
        ' Enumerate Errors collection and display properties of
' each Error object.
        For Each errLoop In DAO.Errors
            With errLoop

```

```

    If Err.Number > vbObjectError And Err.Number <
(vbObjectError + 65536) Then
        errCode = .Number - vbObjectError
    Else
        errCode = .Number
    End If
    strError = "Error #" & errCode & vbCrLf
    strError = strError & " " & .Description & vbCrLf
    strError = strError & _
        " (Source: " & .Source & ")" & vbCrLf
    End With

    MsgBox strError
Next
End If

```

```
End Sub
```

TPCHReports.bas

```

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

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

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

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

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

```

```

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

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

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

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

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

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

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

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

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

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

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

```

```

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

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

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

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

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

' Array containing step execution statistics for each query in
each stream
Private 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
```

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

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

```
' Calculate the elapsed time for a query as the
difference
```

```
' between the end time and the start time for a step
arExecutionDtls(iStreamId, iQueryId).ElapsedTime =
```

```
-
```

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

```
' If the timing interval for a query is less than 0.05
seconds,
' it must be rounded up to 0.1 second to avoid 0 values
' Refer to Section 5.3.7.5 of the TPC-H Spec Rev.
```

```
1.1.0
```

```
If (arExecutionDtls(iStreamId,
iQueryId).ElapsedTime) < mfMinElapsed Then
arExecutionDtls(iStreamId, iQueryId).ElapsedTime
= mfMinElapsedRound
```

```
Else
arExecutionDtls(iStreamId, iQueryId).ElapsedTime
= _
```

```
Round(arExecutionDtls(iStreamId,
iQueryId).ElapsedTime, miNumDecimalPlaces)
End If
```

```
' Calculate the timing interval for the TPC-H Metric as
the difference
```

```
' between the start time of the next step and the start
time for a step
```

```
arExecutionDtls(iStreamId, iQueryId).ElapsedTpch =
```

```
-
(arExecutionDtls(iStreamId,
iQueryId).StartTimeNextStep - _
arExecutionDtls(iStreamId,
iQueryId).StartTime) * 10
```

```
' If the timing interval for a query is less than 0.05
seconds,
' it must be rounded up to 0.1 second to avoid 0 values
' Refer to Section 5.3.7.5 of the TPC-H Spec Rev.
```

```
1.1.0
```

```
If (arExecutionDtls(iStreamId,
iQueryId).ElapsedTpch) < mfMinElapsed Then
arExecutionDtls(iStreamId, iQueryId).ElapsedTpch
= mfMinElapsedRound
```

```
Else
arExecutionDtls(iStreamId, iQueryId).ElapsedTpch
= _
```

```
Round(arExecutionDtls(iStreamId,
iQueryId).ElapsedTpch, miNumDecimalPlaces)
End If
```

```
Next iQueryId
```

```
Next iStreamId
```

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

```
' Determine minimum and maximum query timing
intervals for the PowerRun
```

```

For iQueryId = miQueryIdMin To miQueryIdMax -
miRefreshFuncs Step 1

```

```

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

```

```

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

```

```

Next iQueryId

```

```

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

```

```

For iQueryId = miQueryIdMin To miQueryIdMax
Step 1

```

```

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

```

```

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

```

```

Next iQueryId
End If

```

```

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

```

```

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

```

```

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

```

```

For iStreamId = miStreamPowerRun + 1 To
miStreamIdHi

```

```

    For iQueryId = miQueryIdMin To miQueryIdMax
Step 1

```

```

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

```

```

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

```

```

    Next iQueryId

```

```

Next iStreamId

```

```

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

```

```

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

```

```

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

```

```

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

```

```

End Sub

```

```

Private Sub CloseDbAndWsp()
' Close the database structures

```

```

On Error Resume Next

```

```

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

```

```

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

```

```

End Sub

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

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

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

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

End Sub

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

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

    ParentInstId = 0

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

```

```

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

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

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

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

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

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

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

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

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

```

```

Exit Function
End If

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

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

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

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

ParentInstIdEnd = 0

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

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

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

```

```

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

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

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

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

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

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

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

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

mrecDtls.FindFirst sSql
If mrecDtls.NoMatch = True Then

```

```

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

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

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

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

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

If iQueryId = miQueryIdRF1 Then
sLabel = msLabelThroughputRF1

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

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

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

ParentInstIdEnd = IInstId

#End If

End Function
Public Sub Initialize()

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

```

```

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

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

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

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

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

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

```



```

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

```

' Initialize the sequence in which throughput run queries are executed

```

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

```

```

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

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

```


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

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

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

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

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

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

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

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

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

```

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

End Sub

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

    Dim strSql As String

    On Error GoTo QueryRunDetailsErr

    Screen.MousePointer = vbHourglass

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

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

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

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

    mrecDtls.Close
    CloseDbAndWsp

    Screen.MousePointer = vbDefault

Exit Sub

```

```

QueryRunDetailsErr:

    Screen.MousePointer = vbDefault
    DisplayErrors

    CloseDbAndWsp

End Sub
Public Sub GenerateSelected()
' Called when the user clicks on Generate on the
TPCHMetrics form.
' Validates all the user inputs and calls a function to
generate
' the reports if inputs are valid.
' Initializes module-level variables to the values input by the
user
    Dim sTemp As String

    On Error GoTo GenerateSelectedErr

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

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

' Initialize the stream identifier bounds depending on the
type of
' report being generated
    miStreamIdLo = IIf(mbRunType(eRunType.Power),
miStreamPowerRun, miStreamPowerRun + 1)
    miStreamIdHi = IIf(mbRunType(eRunType.Throughput),
miStreamIdMax, miStreamPowerRun)
    If mbRunType(eRunType.Throughput) Then
        ' Initialize the number of throughput streams if a
throughput
        ' metric is being generated
        sTemp = Trim(frmTPCHMetrics.cboStreams.Text)
        If sTemp = gsEmptyString Then
            MsgBox "Please enter the number of throughput
streams that were executed."
            Exit Sub
        End If

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

```

```

End If

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

' Initialize the run identifier
sTemp = Trim(frmTPCHMetrics.cboRunId.Text)
If sTemp = gsEmptyString Then
    MsgBox "Please enter the run identifier."
    Exit Sub
End If

If IsNumeric(sTemp) = False Then
    MsgBox "The run identifier must be numeric."
    Exit Sub
End If
mlRunId = CLng(sTemp)

' Initialize the scale factor for the run
sTemp = Trim(frmTPCHMetrics.cboSF.Text)
If sTemp = gsEmptyString Then
    MsgBox "Please enter the scale factor for the run."
    Exit Sub
End If

If IsNumeric(sTemp) = False Then
    MsgBox "The scale factor must be numeric."
    Exit Sub
End If
mfSF = CSng(sTemp)

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

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

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

```

```

Exit Sub
End If

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

' Initialize the number of insert and delete segments per
update set
sTemp = Trim(frmTPCHMetrics.txtInsertSegments.Text)
If sTemp = gsEmptyString Then
    MsgBox "Please enter the number of insert segments per
update set. (StepMaster parameter:
INSERT_SEGMENTS_PER_UPDATE_SET)"
    Exit Sub
End If

If IsNumeric(sTemp) = False Then
    MsgBox "The number of insert segments must be
numeric. (StepMaster parameter:
INSERT_SEGMENTS_PER_UPDATE_SET)"
    Exit Sub
End If
miInsSegmentsPerUpdateSet = CInt(sTemp)

sTemp = Trim(frmTPCHMetrics.txtDeleteSegments.Text)
If sTemp = gsEmptyString Then
    MsgBox "Please enter the number of delete segments per
update set. (StepMaster parameter:
DELETE_SEGMENTS_PER_UPDATE_SET)"
    Exit Sub
End If

If IsNumeric(sTemp) = False Then
    MsgBox "The number of delete segments must be
numeric. (StepMaster parameter:
DELETE_SEGMENTS_PER_UPDATE_SET)"
    Exit Sub
End If
miDelSegmentsPerUpdateSet = CInt(sTemp)

#If Not TPCH_KIT Then
If mbRunType(eRunType.Throughput) Then
    ' Initialize the value of the first update set
sTemp = Trim(frmTPCHMetrics.txtUpdateSetFirst.Text)
If sTemp = gsEmptyString Then
    MsgBox "Please enter the first update set for the
throughput run. (StepMaster parameter:
1ST_THRUPUT_UPDATE_SET)"
    Exit Sub
End If

If IsNumeric(sTemp) = False Then
    MsgBox "The first update set for the throughput run
must be numeric. (StepMaster parameter:
1ST_THRUPUT_UPDATE_SET)"

```

```

Exit Sub
End If
miUpdateSetFirst = CInt(sTemp)
End If
#End If

' The user inputs are valid. Call a procedure to query step
execution
' details and generate the TPCHEMetric report.
Call QueryRunDetails

Exit Sub

GenerateSelectedErr:
DisplayErrors

End Sub
Private Function LabelStartPower(iQueryId As Integer) As
String
' Returns the step label for the passed in power query
identifier
' Uses the label that marks the start of execution for the
query
' E.g. TPC-H Kit, Stream1, RF1: the start time for the
refresh function
' is the start time for the step, 'Throughput - Semaphore
Loop for RF Delay'
' but the end time for the refresh function is the end time for
the step,
' 'Throughput - Execute Stream1 RF1'
' Similarly, in the HP version of the TPC-H Kit, Throughput
Run, RF1:
' the start time for RF1 is the start time for the step,
' 'Wait for Throughput Run' but the end time for RF1 is the
end time
' for the step, 'Throughput RF1'
' E.g. in the HP version of the TPC-H Kit, query 15 is
executed in
' 2 parts. Therefore, the start time for query 15 is the start
time
' for the step, 'Create REVENUE View' but the end time for
query 15
' is the end time for the step, 'Execute using REVENUE'

Select Case iQueryId
Case miQueryIdRF1
LabelStartPower = msStartStepLabelPowerRF1

Case miQueryIdRF2
LabelStartPower = msStartStepLabelPowerRF2

#If Not TPCH_KIT Then
Case miQuery15
LabelStartPower = msStartStepLabelPower15
#End If

Case Else
LabelStartPower = msStartStepLabelPowerOther &
Format$(iQueryId, msFmtNumberPadWZeros)

```

```

End Select

End Function
Private Function LabelEndPower(iQueryId As Integer) As
String
' Returns the step label for the passed in power query
identifier
' Uses the label that marks the end of execution for the
query
' E.g. TPC-H Kit, Stream1, RF1: the start time for the
refresh function
' is the start time for the step, 'Throughput - Semaphore
Loop for RF Delay'
' but the end time for the refresh function is the end time for
the step,
' 'Throughput - Execute Stream1 RF1'
' Similarly, in the HP version of the TPC-H Kit, Throughput
Run, RF1:
' the start time for RF1 is the start time for the step,
' 'Wait for Throughput Run' but the end time for RF1 is the
end time
' for the step, 'Throughput RF1'
' E.g. in the HP version of the TPC-H Kit, query 15 is
executed in
' 2 parts. Therefore, the start time for query 15 is the start
time
' for the step, 'Create REVENUE View' but the end time for
query 15
' is the end time for the step, 'Execute using REVENUE'

#If TPCH_KIT Then
Debug.Assert iQueryId = miQueryIdRF1 Or iQueryId =
miQueryIdRF2
Select Case iQueryId
Case miQueryIdRF1
LabelEndPower = msEndStepLabelPowerRF1
Case miQueryIdRF2
LabelEndPower = msEndStepLabelPowerRF2
End Select
#Else
Debug.Assert iQueryId = miQueryIdRF1 Or iQueryId =
miQueryIdRF2 Or iQueryId = miQuery15
Select Case iQueryId
Case miQueryIdRF1
LabelEndPower = msEndStepLabelPowerRF1
Case miQueryIdRF2
LabelEndPower = msEndStepLabelPowerRF2
Case miQuery15
LabelEndPower = msEndStepLabelPower15
End Select
#End If

End Function
#If Not TPCH_KIT Then
Private Function GetEndStepIfThroughput(iQueryId As
Integer) As String
' Returns the iterator value for the passed in query identifier
' for the throughput run

```

' Returns the iterator value that marks the end of execution for the query
 ' E.g. in the HP version of the TPC-H Kit, query 15 is executed in
 ' 2 parts. Therefore, the iterator value for the start of query 15
 ' is 15V but the the iterator value for the end of query 15 is 15

```
Debug.Assert iQueryId = miQuery15
GetEndStepItThroughput = miQuery15
```

```
End Function
#End If
```

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

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

    Case miQueryIdRF2
      LabelStartThroughput = msLblThroughputRF2

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

    Case miQueryIdRF2
```

```
      LabelStartThroughput =
        msStartStepLabelThroughputRF2

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

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

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

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

    Case Else
      Debug.Assert True
  End Select
```

```
#Else
  LabelEndThroughput = msEndStepLabelThroughputRF1
#End If
```

```
End Function
```

```
Private Function IteratorThroughput(iStream As Integer,
  iQuery As Integer) As String
  ' Returns the iterator value for the passed in stream and query
  ' for the throughput run
  ' Returns the iterator value that marks the start of execution for the query
```



```

' E.g. in the HP version of the TPC-H Kit, query 15 is
executed in
' 2 parts. Therefore, the iterator value for the start of query
15
' is 15V but the the iterator value for the end of query 15 is
15

#If TPCH_KIT Then
    Dim iQIndex As Integer
#End If

Select Case iQuery
    Case miQueryIdRF1
        IteratorThroughput = msFirstRFIterator

    Case miQueryIdRF2
        IteratorThroughput = msFirstRFIterator

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

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

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

    Debug.Assert iQuery = miQueryIdRF1 Or iQuery =
miQueryIdRF2

```

```

Select Case iQuery
    Case miQueryIdRF1
        IteratorPowerRF = msFirstRFIterator

    Case miQueryIdRF2
        IteratorPowerRF = msFirstRFIterator

End Select

End Function

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

    Dim iStreamId As Integer
    Dim iParentInstId As Long
    Dim iQueryId As Integer
    Dim iNextQuery As Integer
    Dim iNextStream As Integer
    Dim sLabel As String
    Dim sIt As String
    Dim sSql As String
    Dim iUBound As Integer

    If mbRunType(eRunType.Power) Then
        ' Populate start and end times for the PowerRun
        iStreamId = miStreamPowerRun

        For iQueryId = miQueryIdMin To miQueryIdMax Step 1
label
            ' Determine the start time for the step using the step
            sLabel = LabelStartPower(iQueryId)

            sSql = "step_label = " &
MakeStringFieldValid(sLabel)

            If (iQueryId = miQueryIdRF1 Or iQueryId =
miQueryIdRF2) Then
                sIt = IteratorPowerRF(iStreamId, iQueryId)
                sSql = sSql & " and iterator_value = " &
MakeStringFieldValid(sIt)
            End If

            mrecDtls.FindFirst sSql
            If mrecDtls.NoMatch = True Then
                MsgBox "Step " & "" & sLabel & "" & " not found."
" & _
                    "The PowerRun was not completely executed!"
            End Sub
        End If

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

        ' Determine the end time for the step

```

```

    If iQueryId = miQueryIdRF1 Or iQueryId =
miQueryIdRF2 Then
    ' RF1 and RF2, find the time at which the last
refresh function
    ' completed
    sLabel = LabelEndPower(iQueryId)
    arExecutionDtls(iStreamId, iQueryId).EndTime = 0

    iUBound = IIf(iQueryId = miQueryIdRF1,
miInsSegmentsPerUpdateSet, _
miDelSegmentsPerUpdateSet)

    For iNextQuery = msFirstRFIterator To iUBound
Step 1
    sSql = "step_label = " &
MakeStringFieldValid(sLabel) & _
" and iterator_value = "
    sIt = Format$(iNextQuery,
msFmtNumberWOZeros)
    sSql = sSql & MakeStringFieldValid(sIt)
mrecDtls.FindFirst sSql
    If mrecDtls.NoMatch = True Then
        MsgBox "Step " & "" & sLabel & "" & _
" not found for iterator " & "" & sIt & ""
& ". " & _
"The PowerRun was not completely
executed!"
        Exit Sub
    End If
    If mrecDtls.Fields("end_time").Value > _
arExecutionDtls(iStreamId,
iQueryId).EndTime Then
        arExecutionDtls(iStreamId,
iQueryId).EndTime = _
mrecDtls.Fields("end_time").Value
    End If
    Next iNextQuery
    #If Not TPCH_KIT Then
    ElseIf iQueryId = miQuery15 Then
        sLabel = LabelEndPower(iQueryId)
        sSql = "step_label = " &
MakeStringFieldValid(sLabel)
mrecDtls.FindFirst sSql
        If mrecDtls.NoMatch = True Then
            MsgBox "Step " & "" & sLabel & "" & " not
found. " & _
"The PowerRun was not completely
executed!"
            Exit Sub
        End If
        arExecutionDtls(iStreamId, iQueryId).EndTime =
mrecDtls.Fields("end_time").Value
    #End If
    Else
        arExecutionDtls(iStreamId, iQueryId).EndTime =
mrecDtls.Fields("end_time").Value
    End If

```

```

    ' The timing interval for a query is the time between
the start
    ' time of the next query and the start time of the query,
except
    ' for the last query of the set for which it is the time
between
    ' the end time of the query and the start time
    ' The timing interval for the execution of the refresh
function
    ' must be measured between the start time for the first
' refresh function and the end time for the last refresh
function
    ' Refer to Sections 5.3.7.2 and 5.3.7.3 of the TPC-H
Spec. Rev 1.1.0
    If NextStepExists(iStreamId, iQueryId, iNextQuery)
Then
        ' Determine the start time of the next step, if
applicable
        sLabel = LabelStartPower(iNextQuery)

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

        arExecutionDtls(iStreamId,
iQueryId).StartTimeNextStep =
mrecDtls.Fields("start_time").Value
        Else
            ' Else, initialize start time for the next step to the end
time for the step
            arExecutionDtls(iStreamId,
iQueryId).StartTimeNextStep = _
arExecutionDtls(iStreamId,
iQueryId).EndTime
        End If

        ' Convert all the 64-bit timestamps to string values
arExecutionDtls(iStreamId, iQueryId).sStartTm =
JulianToString(arExecutionDtls(iStreamId,
iQueryId).StartTime)
arExecutionDtls(iStreamId, iQueryId).sEndTm =
JulianToString(arExecutionDtls(iStreamId,
iQueryId).EndTime)
arExecutionDtls(iStreamId, iQueryId).sStartNextTm =
JulianToString(arExecutionDtls(iStreamId,
iQueryId).StartTimeNextStep)
        Next iQueryId
    End If

    If mbRunType(eRunType.Throughput) Then
        ' Populate start and end times for the ThroughputRun
        For iStreamId = miStreamIdMin + 1 To miStreamIdHi

```

```

For iQueryId = miQueryIdMin To miQueryIdMax
Step 1
    ' Determine the start time for the step using the step
    label
    sLabel = LabelStartThroughput(iStreamId,
iQueryId)
    sSql = "step_label = " &
MakeStringFieldValid(sLabel)

    #If TPCH_KIT Then
        If (iQueryId <> miQueryIdRF1 Or iStreamId <>
miStreamPowerRun + 1) Then
            sIt = IteratorThroughput(iStreamId, iQueryId)
            sSql = sSql & " and iterator_value = " &
MakeStringFieldValid(sIt)
            End If
        #Else
            If iQueryId <> miQueryIdRF1 Then
                sIt = IteratorThroughput(iStreamId, iQueryId)
                sSql = sSql & " and iterator_value = " &
MakeStringFieldValid(sIt)
            End If
        #End If

    If iQueryId = miQueryIdRF1 Or iQueryId =
miQueryIdRF2 Then
        IParentInstId = ParentInstId(iStreamId, iQueryId)
        If IParentInstId = 0 Then Exit Sub
        sSql = sSql & " and parent_instance_id = " &
CStr(IParentInstId)
        End If

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

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

        ' Determine the end time for the step

        If iQueryId = miQueryIdRF1 Or iQueryId =
miQueryIdRF2 Then
            ' RF1 and RF2, find the time at which the last
refresh
            ' function completed
            arExecutionDtls(iStreamId, iQueryId).EndTime =
0

            iUBound = IIf(iQueryId = miQueryIdRF1,
miInsSegmentsPerUpdateSet, _
miDelSegmentsPerUpdateSet)

```

```

#If TPCH_KIT Then
    sLabel = LabelEndThroughput(iStreamId,
iQueryId)
#Else
    If iQueryId = miQueryIdRF1 Then
        sLabel = LabelEndThroughput(iStreamId,
iQueryId)
    End If
#End If
IParentInstId = ParentInstIdEnd(iStreamId,
iQueryId)

#If TPCH_KIT Then
    If iQueryId = miQueryIdRF2 And iStreamId
<> miStreamIdHi Then
        sSql = "step_label = " &
MakeStringFieldValid(sLabel) & _
            " and parent_instance_id = " &
CStr(IParentInstId)

        mrecDtls.FindFirst sSql
        If mrecDtls.NoMatch = True Then
            MsgBox "Step " & "" & sLabel & "" & _
                " not found for iterator " & "" & sIt
                & "" & ". " & _
                "The Throughput run was not
completely executed!"
            Exit Sub
        End If
        arExecutionDtls(iStreamId,
iQueryId).EndTime = _
            mrecDtls.Fields("end_time").Value
        Else
        #End If

        ' Find the time at which the last refresh
function completed
        For iNextQuery = msFirstRFIterator To
iUBound Step 1
            sIt = Format$(iNextQuery,
msFmtNumberWOZeroes)
            sSql = "step_label = " &
MakeStringFieldValid(sLabel) & _
                " and iterator_value = " &
MakeStringFieldValid(sIt)
            sSql = sSql & " and parent_instance_id = "
& CStr(IParentInstId)

            mrecDtls.FindFirst sSql
            If mrecDtls.NoMatch = True Then
                MsgBox "Step " & "" & sLabel & "" & _
                    " not found for iterator " & "" & sIt
                    & "" & ". " & _
                    "The Throughput run was not
completely executed!"
                Exit Sub
            End If
            If mrecDtls.Fields("end_time").Value > _

```

```

        arExecutionDtls(iStreamId,
iQueryId).EndTime Then
        arExecutionDtls(iStreamId,
iQueryId).EndTime = _
            mrecDtls.Fields("end_time").Value
        End If
        Next iNextQuery

    #If TPCH_KIT Then
        End If
    #End If

    #If Not TPCH_KIT Then
    ElseIf iQueryId = miQuery15 Then
        sLabel = LabelStartThroughput(iStreamId,
iQueryId)
        sIt = GetEndStepIfThroughput(iQueryId)
        sSql = "step_label = " &
MakeStringFieldValid(sLabel) & _
            " and iterator_value = " &
MakeStringFieldValid(sIt)

        mrecDtls.FindFirst sSql
        If mrecDtls.NoMatch = True Then
            MsgBox "Step " & "" & sLabel & "" & _
                " not found for iterator " & "" & sIt &
"" & ". " & _
                "The Throughput run was not
completely executed!"
            Exit Sub
        End If
        arExecutionDtls(iStreamId,
iQueryId).EndTime = mrecDtls.Fields("end_time").Value
    #End If
    Else
        arExecutionDtls(iStreamId, iQueryId).EndTime =
mrecDtls.Fields("end_time").Value
    End If

    ' The timing interval for a query is the time between
the start
    ' time of the next query and the start time of the
query, except
    ' for the last query of the set for which it is the time
between
    ' the end time of the query and the start time
    ' The timing interval for the execution of the refresh
function
    ' must be measured between the start time for the
first
    ' refresh function and the end time for the last
refresh function
    ' Refer to Sections 5.3.7.2 and 5.3.7.3 of the TPC-H
Spec. Rev 1.1.0
    If NextStepExists(iStreamId, iQueryId, iNextQuery)
Then
        ' Determine the start time of the next step, if
applicable
        iNextStream = iStreamId

```

```

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

        If iQueryId = miQueryIdRF1 Or iQueryId =
miQueryIdRF2 Then
            IParentInstId = ParentInstId(iNextStream,
iNextQuery)
            If IParentInstId = 0 Then Exit Sub
            sSql = sSql & " and parent_instance_id = " &
CStr(IParentInstId)
        End If

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

        arExecutionDtls(iStreamId,
iQueryId).StartTimeNextStep =
mrecDtls.Fields("start_time").Value
    Else
        ' Else, initialize start time for the next step to the
end time for the step
        arExecutionDtls(iStreamId,
iQueryId).StartTimeNextStep = arExecutionDtls(iStreamId,
iQueryId).EndTime
    End If

    ' Convert all the 64-bit timestamps to string values
    arExecutionDtls(iStreamId, iQueryId).sStartTm =
JulianToString(arExecutionDtls(iStreamId,
iQueryId).StartTime)
    arExecutionDtls(iStreamId, iQueryId).sEndTm =
JulianToString(arExecutionDtls(iStreamId,
iQueryId).EndTime)
    arExecutionDtls(iStreamId, iQueryId).sStartNextTm
= JulianToString(arExecutionDtls(iStreamId,
iQueryId).StartTimeNextStep)

    Next iQueryId
    Next iStreamId

```

```

End If

' Call a procedure to calculate the elapsed time for each step
and
' the Power and Throughput Metrics
Call CalcElapsedTmAndPrint

End Sub
Private Function JulianToString(cJTime As Currency)
' Converts the passed in 64-bit date to a formatted string
that can
' be printed in the report
' The format of date/time in reports is yyyy-mm-dd
hh:mm:ss.sss
' This format has these benefits:
' - is sortable, since all fields are arranged most to least
significant
' and all numeric
' - is directly interpreted by Excel as a time/date value
' - is fixed width
' - is Y2K compliant

Dim lYr As Long
Dim lMon As Long
Dim lDt As Long
Dim lHr As Long
Dim lMin As Long
Dim lSec As Long
Dim lMs As Long
Dim cJTemp As Currency

Call smtimelib.JulianToTime(cJTime, lYr, lMon, lDt, lHr,
lMin, lSec, lMs)
JulianToString = Format$(lYr, msFmtYrPadWZeroes) &
msDtSeparator & _
Format$(lMon, msFmtNumberPadWZeroes) &
msDtSeparator & _
Format$(lDt, msFmtNumberPadWZeroes) & msBlank
& _
Format$(lHr, msFmtNumberPadWZeroes) &
msTmSeparator & _
Format$(lMin, msFmtNumberPadWZeroes) &
msTmSeparator & _
Format$(lSec, msFmtNumberPadWZeroes) &
msMsSeparator & _
Format$(lMs, msFmtMsPadWZeroes)

End Function
Public Sub LoadRunIds(cboLoad As ComboBox, sDbFile As
String)
' Opens the passed in workspace definition file and loads all
the
' run identifiers in the passed in combo box

Dim strSql As String
Dim lRunId As Long

On Error GoTo LoadRunIdsErr

```

```

Screen.MousePointer = vbHourglass

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

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

strSql = "select run_id from run_header order by run_id
desc"
Set mrecDtls = mDB.OpenRecordset(strSql,
dbOpenSnapshot)

cboLoad.Clear

If mrecDtls.RecordCount = 0 Then
Screen.MousePointer = vbDefault
MsgBox "There are no run records. Unable to load list of
run ids."
Else
mrecDtls.MoveFirst
While Not mrecDtls.EOF
' Add run identifier to the combo box
lRunId = mrecDtls.Fields("run_id").Value
cboLoad.AddItem CStr(lRunId)

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

mrecDtls.Close
CloseDbAndWsp

Screen.MousePointer = vbDefault

Exit Sub

LoadRunIdsErr:

Screen.MousePointer = vbDefault
DisplayErrors

CloseDbAndWsp

End Sub
Public Sub LoadSFAndStreams(cboSF As ComboBox,
cboStreams As ComboBox)
' Loads all the valid scale factors in cboSF
' Loads the number of throughput streams for each scale
factor in
' cboStreams
' This procedure assumes that the arrays, marrSF and
marrStreams have
' already been initialized.

```

```

Dim iIndex As Integer

On Error GoTo LoadSFAndStreamsErr

cboSF.Clear
cboStreams.Clear

For iIndex = LBound(marrSF) To UBound(marrSF)
    cboSF.AddItem CStr(marrSF(iIndex))
    cboSF.ItemData(iIndex) = iIndex

    cboStreams.AddItem CStr(marrStreams(iIndex))
    cboStreams.ItemData(iIndex) = iIndex
Next iIndex

cboSF.ListIndex = miDefaultSF
cboStreams.ListIndex = miDefaultSF

Exit Sub

LoadSFAndStreamsErr:

    DisplayErrors

End Sub

Private Function NextStepExists(iStream As Integer, iQuery
As Integer, _
    iNextQuery As Integer) As Boolean
    ' Returns False if this is the last step in the query stream
    ' If not, populates iNextQuery with the index of the next
    query

    Dim iQIndex As Integer

    If iQuery = miQueryIdRF1 Or iQuery = miQueryIdRF2
Then
        NextStepExists = False
    Else
        For iQIndex = LBound(arQuerySequence,
miDimensionQuery) _
            To UBound(arQuerySequence, miDimensionQuery)
Step 1
            If arQuerySequence(iStream, iQIndex) = iQuery Then
                Exit For
            End If
        Next iQIndex

        NextStepExists = (iQIndex < UBound(arQuerySequence,
miDimensionQuery))

        If NextStepExists Then
            iNextQuery = arQuerySequence(iStream, iQIndex + 1)
        End If
    End If

End Function

Private Sub PrintStatistics(fQppPower As Double,
fElapsedThroughput As Double, _

```

```

    fQppThroughput As Double, fQppH As Double,
sStartTm As String, _
    sEndTm As String)
    ' This function prints the execution statistics for each step
    ' and the Power and Throughput Metrics to the output file

    Dim iQIndex As Integer
    Dim iSIndex As Integer
    Dim sPrint As String
    Dim hOutputFile As Integer

    hOutputFile = 0

    hOutputFile = FreeFile
    Open msOutput For Output Shared As hOutputFile
    ' Header information
    Print #hOutputFile, "Workspace file:" & vbTab &
msDbFile
    Print #hOutputFile, "Run identifier:" & vbTab &
CStr(mlRunId)
    Print #hOutputFile, "Database Scale Factor:" & vbTab &
CStr(mfSF)
    Print #hOutputFile, "Query Streams for Throughput Test:"
& vbTab & CStr(miStreamIdHi)
    Print #hOutputFile, "Measurement Interval in Throughput
Test (Ts):" & vbTab & CStr(fElapsedThroughput) & vbTab &
vbTab & _
        "Start Time: " & vbTab & sStartTm & vbTab
& vbTab & _
        "End Time: " & vbTab & sEndTm
    Print #hOutputFile, "TPC-H Power:" & vbTab &
CStr(fQppPower)
    Print #hOutputFile, "TPC-H Throughput:" & vbTab &
CStr(fQppThroughput)
    Print #hOutputFile, "TPC-H Composite Query-Per-Hour
Rating (QphH):" & vbTab & CStr(fQppH)
    Print #hOutputFile,

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

    For iQIndex = miQueryIdMin To miQueryIdRF1 - 1
        sPrint = "Q" & Format$(iQIndex,
msFmtNumberWOZeroses) & vbTab
        Print #hOutputFile, sPrint;
    Next iQIndex

    For iQIndex = miQueryIdRF1 To miQueryIdRF2
        sPrint = "RF" & Format$(iQIndex - miQueryIdRF1 + 1,
msFmtNumberWOZeroses) & vbTab
        Print #hOutputFile, sPrint;
    Next iQIndex

    Print #hOutputFile,

    ' Print TPC-H timing intervals for each query in timing grid
    For iSIndex = miStreamIdLo To miStreamIdHi

```

```

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

For iQIndex = miQueryIdMin To miQueryIdMax Step 1

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

Print #hOutputFile,

Next iSIndex

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

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

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

    For iQIndex = miQueryIdMin To miQueryIdMax Step 1

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

    Print #hOutputFile,

Next iSIndex

Print #hOutputFile,
Print #hOutputFile, vbTab & "Query Id" & vbTab & "Start
Time" & vbTab & _
    "End Time" & vbTab & "Start Next Step" & vbTab &
"Step Delta" & vbTab & _
    "Official Query Elapsed" & vbTab & "Difference"

' Print step execution details, viz. start time, end time,
TPCH timing
' interval and elapsed times for each query
For iSIndex = miStreamIdLo To miStreamIdHi

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

    For iQIndex = miQueryIdMin To miQueryIdMax Step 1

        sPrint = vbTab & CStr(iQIndex) & vbTab & _
            arExecutionDtls(iSIndex, iQIndex).sStartTm &
vbTab & _

```

```

arExecutionDtls(iSIndex, iQIndex).sEndTm &
vbTab & _
            arExecutionDtls(iSIndex, iQIndex).sStartNextTm
& vbTab & _
            CStr(arExecutionDtls(iSIndex,
iQIndex).ElapsedTime) & vbTab & _
            CStr(arExecutionDtls(iSIndex,
iQIndex).ElapsedTpch) & vbTab & _
            Round(CStr(arExecutionDtls(iSIndex,
iQIndex).ElapsedTpch - arExecutionDtls(iSIndex,
iQIndex).ElapsedTime), miNumDecimalPlaces)
        Print #hOutputFile, sPrint
        Next iQIndex

    Print #hOutputFile,

Next iSIndex

Close hOutputFile
hOutputFile = 0

MsgBox "The report has been generated at " & gsSQ &
msOutput & gsSQ & "!"

Exit Sub

GenerateSelectedErr:
DisplayErrors

If hOutputFile <> 0 Then
    Close hOutputFile
End If

End Sub
Public Sub SFChanged()

    ' Called when the scale factor is changed - modifies the
number
    ' of streams depending on the scale factor
    frmTPCHMetrics.cboStreams.ListIndex =
frmTPCHMetrics.cboSF.ListIndex

End Sub

```

Utility.bas

```

Attribute VB_Name = "Utility"
' FILE: Utility.bas
' Reporting Program for Microsoft TPC-H Kit Ver.
1.00
' Copyright Microsoft, 1999
' All Rights Reserved
'
' PURPOSE: Utility functions for TPCHMetrics report
generation program
' Contact: Reshma Tharamal (reshmat@microsoft.com)

```

Option Explicit

Private Type OPENFILENAME

lStructSize As Long
hwndOwner As Long
hInstance As Long
lpstrFilter As String
lpstrCustomFilter As String
nMaxCustFilter As Long
nFilterIndex As Long
lpstrFile As String
nMaxFile As Long
lpstrFileTitle As String
nMaxFileTitle As Long
lpstrInitialDir As String
lpstrTitle As String
Flags As Long
nFileOffset As Integer
nFileExtension As Integer
lpstrDefExt As String
lCustData As Long
lpfnHook As Long
lpTemplateName As Long
End Type

Private Declare Function GetOpenFileName Lib

"COMDLG32" _
Alias "GetOpenFileNameA" (file As OPENFILENAME)
As Long

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

Private Const ms_DLG_TITLE_OPEN = "Open"

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

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

Private Const ms_FILE_ALL_FILTER = "|All Files (*.*)*.*)"

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

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

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

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

End If

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

' Replaces all occurrences of ReplaceString in MainString
with ReplaceWith

Dim intPos As Integer
Dim strTemp As String

strTemp = MainString

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

End Function

Public Function ShowFileDialog(ByVal strFilter As
String, _


```

    ByVal strDialogTitle As String, ByVal lngFlags As
Long, _
    Optional ByVal strOldFile As String = gsEmptyString)
As String
' Returns the file name selected by the user
Dim strInitDir As String
Dim intPos As Integer
Dim opfile As OPENFILENAME
Dim sFile As String

On Error GoTo ShowFileDialogErr

If Not strOldFile <> gsEmptyString Then
    intPos = InstrR(strOldFile, gsPeriod)
    If intPos > 0 Then
        strInitDir = Left$(strOldFile, intPos - 1)
    End If
End If

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

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

Exit Function

ShowFileDialogErr:
    Call DisplayErrors
    ' Reset the selection to the passed in file, if any
    ShowFileDialog = strOldFile

End Function
Public Function InstrR(strMain As String, _
    strSearch As String) As Integer
' Finds the last occurrence of the passed in string

Dim intPos As Integer
Dim intPrev As Integer

intPrev = intPos
intPos = InStr(1, strMain, strSearch)

Do While intPos > 0
    intPrev = intPos
    intPos = InStr(intPos + 1, strMain, strSearch)

```

```

Loop
InstrR = intPrev

End Function
Private Function MakeWindowsFilter(sFilter As String) As
String

Dim s As String, ch As String, iTemp As Integer

' To make Windows-style filter, replace | and : with nulls
For iTemp = 1 To Len(sFilter)
    ch = Mid$(sFilter, iTemp, 1)
    If ch = "|" Then
        s = s & vbNullChar
    Else
        s = s & ch
    End If
Next iTemp

' Put double null at end
s = s & vbNullChar & vbNullChar
MakeWindowsFilter = s

End Function
Public Function BrowseStpFile(ByVal strDefaultFile As
String) As String
' This function initializes the values of the filter property,
' the dialog title and flags for the File Open dialog
depending
' on the FileType passed in
' It then calls ShowFileDialog to set these properties
and
' display the File Open dialog to the user

On Error GoTo BrowseStpFileErr

BrowseStpFile = ShowFileDialog( _
    ms_FILE_DB_FILTER & ms_FILE_ALL_FILTER, _
    ms_DLG_TITLE_OPEN, _
    ml_FILE_DB_FLAGS, _
    strDefaultFile)

Exit Function

BrowseStpFileErr:
    DisplayErrors
    BrowseStpFile = gsEmptyString

End Function
Public Function BrowseOutputFile(ByVal strDefaultFile As
String) As String
' This function initializes the values of the filter property,
' the dialog title and flags for the File Open dialog
depending
' on the FileType passed in
' It then calls ShowFileDialog to set these properties
and
' display the File Open dialog to the user

```

```

On Error GoTo BrowseOutputFileErr

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

Exit Function

BrowseOutputFileErr:
    DisplayErrors
    BrowseOutputFile = gsEmptyString

End Function

Public Function MakePathValid(strFileName As String) As
String
    ' Makes the passed in file path valid

    Dim strFileDir As String
    Dim strTempDir As String
    Dim strTempFile As String
    Dim sTemp As String
    Dim intPos As Integer
    Dim intStart As Integer

    strTempFile = strFileName
    intPos = InstrR(strFileName, gsFileSeparator)

    If intPos > 0 Then
        strFileDir = Left$(strTempFile, intPos - 1)
        If Dir$(strFileDir, vbDirectory) = "" Then
            ' Loop through the entire path starting at the root
            ' since Mkdir can create only one level of sub-directory
            ' at a time
            intStart = InStr(strFileDir, gsFileSeparator)
            If Mid(strFileDir, 2, 1) = ":" Then
                ' Remove drive from directory specification
                intStart = InStr(intStart + 1, strFileDir,
gsFileSeparator)
            End If

            Do While strTempDir <> strFileDir

                If intStart > 0 Then
                    strTempDir = Left$(strFileDir, intStart - 1)
                Else
                    strTempDir = strFileDir
                End If

                If Dir$(strTempDir, vbDirectory) <> "" Then
                    ' If the specified directory doesn't exist, try to
                    ' create it.
                    Mkdir strTempDir
                Else
                    ' The directory exists - go to it's sub-directory
                End If
            End Do
        End If
    End If

```

```

        intStart = InStr(intStart + 1, strFileDir,
gsFileSeparator)
    Loop

    ' Sanity check
    If Dir$(strFileDir, vbDirectory) <> "" Then
        ' We were unable to create the file directory
        MsgBox "Unable to create directory " & strFileDir
        MakePathValid = gsEmptyString
    Else
        MakePathValid = strTempFile
    End If
Else
    ' The specified directory exists - we should be able
    ' to create the output file in it
    MakePathValid = strTempFile
End If
Else
    ' The user has only specified a filename - VB will try
    ' to create it in the current directory
    MakePathValid = strTempFile
End If

End Function

```

MoveTempDB.sql

```

--
-- MoveTemp.sql
--

alter database tempdb modify file
    (name='tempdev',filename='C:\B\O\TempdB.mdf')

alter database tempdb modify file
    (name='templog',filename='C:\B\O\Templog.ldf')

```

AddTempDB.sql

```

alter database tempdb modify file
    (name=tempdev,
filename='C:\B\O\TempdB.mdf',size=30000mb)
alter database tempdb modify file
    (name=templog,
filename='C:\B\O\Templog.ldf',size=30000mb)
alter database tempdb add file
    (name=tempdev2,
filename='C:\B\P\tempdev_2',size=15000mb),
    (name=tempdev3,
filename='C:\B\P\tempdev_3',size=15000mb),
    (name=tempdev4,
filename='C:\B\Q\tempdev_4',size=15000mb),
    (name=tempdev5,
filename='C:\B\Q\tempdev_5',size=15000mb),

```

(name=tempdev6,
filename='C:\B\R\tempdev_6',size=15000mb),
(name=tempdev7,
filename='C:\B\R\tempdev_7',size=15000mb),
(name=tempdev8,
filename='C:\B\S\tempdev_8',size=15000mb),
(name=tempdev9,
filename='C:\B\S\tempdev_9',size=15000mb),
(name=tempdev10,
filename='C:\B\T\tempdev_10',size=15000mb),
(name=tempdev11,
filename='C:\B\U\tempdev_11',size=15000mb)

Appendix G: Price Quotations

May 4, 2007

Dell
 Gene Purdy
 1 Dell Way
 Round Rock, TX 78664

Mr. Purdy:

Here is the information you requested regarding pricing for several Microsoft products to be used in conjunction with your TPC-H benchmark testing.

All pricing shown is in US Dollars (\$).

Part Number	Description	Unit Price	Quantity	Price
810-04793	SQL Server 2005 Enterprise x64 Edition <i>Server License with 25 CALs</i> <i>Discount Schedule: Open Program - No Level</i> <i>Unit Price reflects a 39% discount from the retail unit price of \$13,969.</i>	\$8,487	1	\$8,487
359-01911	SQL Server 2005 Client License <i>Discount Schedule: Open Program - No Level</i> <i>Unit Price reflects a 4% discount from the retail unit price of \$163.</i>	\$156	25	\$3,900
P72-00274	Windows Server 2003, Enterprise x64 Edition <i>Server License with 25 CALs</i> <i>Discount Schedule: Open Program - No Level</i> <i>Unit Price reflects a 41% discount from the retail unit price of \$3,999.</i>	\$2,334	1	\$2,334
254-00170	Visual C++ Standard Edition <i>No Discounts Applied</i>	\$109	1	\$109
046-00856	Visual Basic 2003 .Net Professional <i>No Discounts Applied</i>	\$109	1	\$109
N/A	Microsoft Problem Resolution Services <i>Professional Support</i> <i>(1 Incident)</i>	\$245	1	\$245

All products are currently orderable through Microsoft's normal distribution channels. A list of Microsoft's authorized resellers can be found at:
<http://www.microsoft.com/products/info/render.aspx?view=22&type=mpn&content=22/licensing>.

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

This quote is valid for the next 90 days.

If we can be of any further assistance, please contact Jamie Reding at (425) 703-0510 or jamiere@microsoft.com.

Reference ID: PHGePu0705048325.

Please include this Reference ID in any correspondence regarding this price quote.