



**TPC Benchmark™ H
Full Disclosure Report
DELL PowerEdge 6800/Dual-Core Intel® Xeon™
7041/3.0GHz 2x2MB L2 Cache
Using
Microsoft Windows Server 2003 Enterprise x64 Edition™
and SQL Server 2005 Enterprise (x64) Edition™**



First Edition

Submitted for Review

May 1, 2006

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

First Printing May 2006

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Abstract

This report document the methodology and results of the TPC Benchmark H test conducted on a PowerEdge 6800 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 6800 with Quad Dual-Core Intel® Xeon™ 7041/ 3.0GHz Dell PowerVault 220R Storage Enclosures	Microsoft Windows Server 2003 Enterprise x64 Edition™ SQL Server 2005 Enterprise (x64) Edition™	\$128,847

TPC-H Power@100GB	TPC-H Throughput@100GB	<u>QphH@100GB</u>	\$/QphH@100GB
15,208.7	8,739.8	11,529.1	\$11.18

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 6800
with SQL Server 2005
Enterprise (x64) Edition™

TPC-H Revision
2.3.0

Report Date:
May 1, 2006

Total System Cost
\$128,847 USD

TPC-H Composite Query per Hour
11,529.1 QphH@100GB

Price/Performance
\$11.18 USD/ QphH@100GB

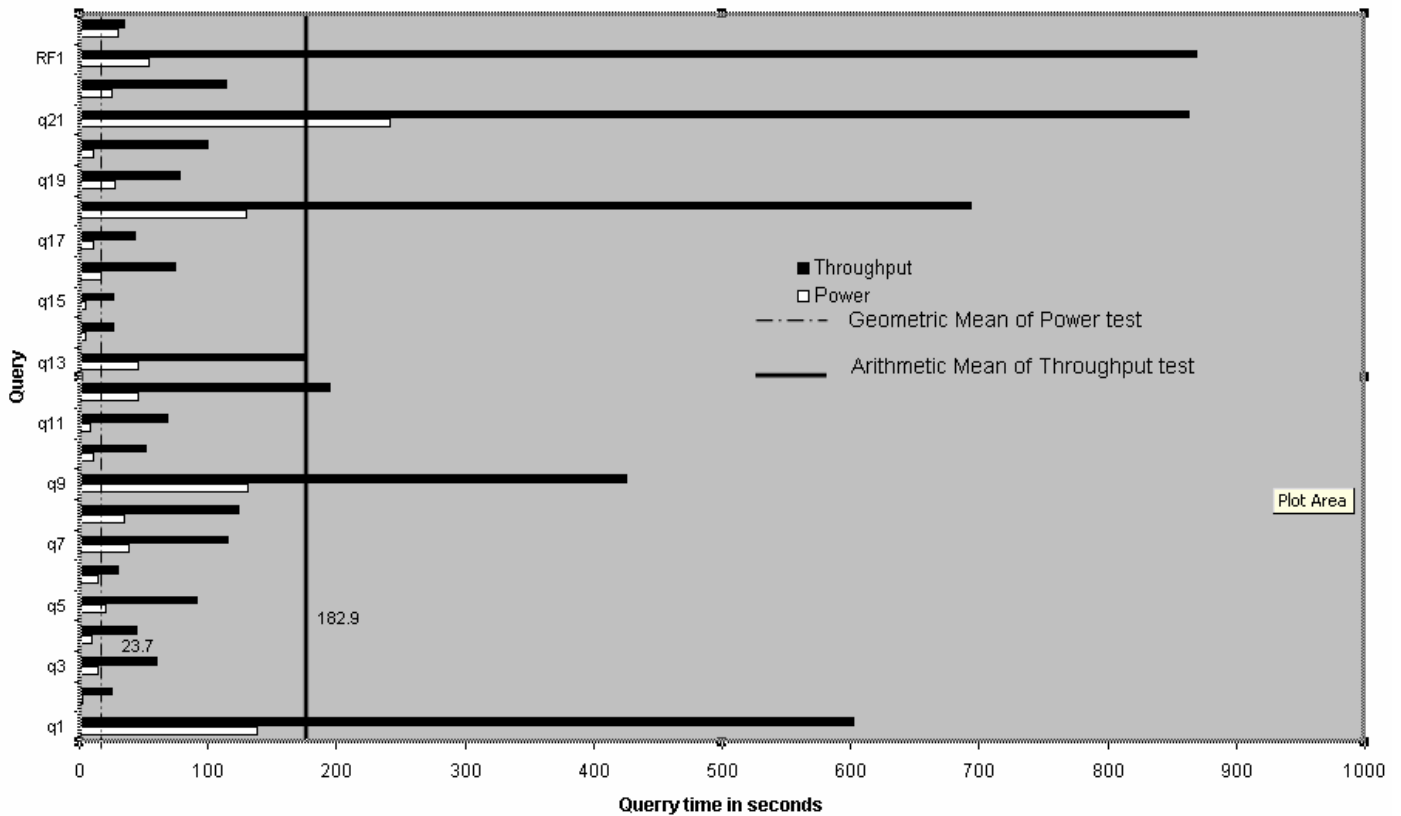
Database Size
100GB

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
May 1, 2006



Database Load Time
 1:27:34

Total Disk/Database Size
 40.66

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 Dual-Core Intel® Xeon™ 7041/3.0GHz 2x2MB L2 Cache
Memory: (per node) : 64GB RAM
Disk Drives: 112 – 36GB 15k HDD & 8 – 73GB 10k HDD

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

Dell		PowerEdge PE6800			TPC-H REV 2.3 EXECUTIVE SUMMARY		
		Server			Report Date: 1-May-06		
					Revision Date: 1-May-06		
Description	Part Number	Third Party		Unit Price	Qty	Extended Price	3 yr. Maint. Price
		Brand	Pricing				
Server Hardware							
Dell PowerEdge 6800 3.0GHz Dual Core XEON w/2+2MB	222-0685			\$4,094.00	1	\$4,094.00	\$300.00
L2 cache, 800MHZ FSB, 2 onboard Gigabit NICs							
3.0GHZ/2+2MB_Dual Core XEON,QUAD PROC	311-6107			\$10,497.00	1	\$10,497.00	
1.44 Floppy Drive	341-1308			\$30.00	1	\$30.00	
24X IDE CD-ROM Drive	313-2694			\$30.00	1	\$30.00	
Motherboard PERC4ei cntr RAID 10, PE6800	341-1959			\$5.58	1	\$5.58	
64GB_DDR2,400MHZ(16X4GB),2R	311-5706			\$59,998.00	1	\$59,998.00	
PERC4e/Di 256MB	341-1903			\$299.00	1	\$299.00	
PERC4eDC,128MB,2-EXT CHN	341-1642			\$799.00	4	\$3,196.00	
73GB U320M SCSI 10K RPM Hard Drive (OS+LOG)	341-1287			\$299.00	8	\$2,392.00	
Dell E773,17 in Gray (16.0 VIS)	320-2907			\$159.00	1	\$159.00	
					Subtotal	\$80,700.58	\$300.00
PowerVault Disk Subsystem							
PV220S, U3	220-4476			\$2,255.00	8	\$18,040.00	\$3,208.00
ZEMM,U320,PV22XS,SINGLE	340-9324			\$399.00	8	\$3,192.00	
600W,PWR SPLY,PV22XS	310-0677			\$0.00	8	\$0.00	
600W,PWR SPLY,PV22XS	310-0683			\$89.00	8	\$712.00	
SCSI Cables	310-0679			\$99.00	8	\$792.00	
36GB U320M SCSI 15K RPM Hard Drive *	340-9371			\$249.00	112	\$27,888.00	
RACK-111/24U/Dell	A0213544			\$479.95	1	\$479.95	
					Subtotal	\$51,103.95	\$3,208.00
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 Standard	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%)		\$21,650.00	
					Total	\$125,094	\$3,753
Notes: * Maint. included in PowerVault 220 disk pod					Three-Year Cost of Ownership:		\$128,847 USD
** All Microsoft maintenance is covered by the maintenance costs of Microsoft SQL Server					QphH@100G		11,529.1
Pricing: 1 = Microsoft, all others are Dell							
Pricing may be verified by calling 1-800-BUY-DELL and referencing quote # 291512779 as a complex quote.							
Audited by Lorna Livingtree, Performance Metrics Inc.					\$ / QphH@100G:		\$11.18 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 6800
w/ SQL Server 2005
Enterprise (x64) Edition™

TPC-H Revision
2.3.0

Report Date:
May 1, 2006

Numerical Quantities Summary

Measurement Results:

Database Scale Factor	100
Total Data Storage/Database Size	40.66
Start of Database Load	02/10/2006 03:35:09
End of Database Load	02/10/2006 05:02:42
Database Load Time	1:27:34
Query Streams for Throughput Test	5
TPC-H Power	15,208.7
TPC-H Throughput	8,739.8
TPC-H Composite Query-per-Hour Metric (QphH@300GB)	11,529.1
Total System Price Over 3 Years	\$128,847
TPC-H Price Performance Metric (\$/QphH@300GB)	\$11.18

Measurement Interval:

Measurement Interval in Throughput Test (Ts) = 4,531 seconds

Duration of stream execution:

	Seed	Start Date/Time	End Date/Time	Duration
Stream00	210050242	2/10/06 7:50:28	2/10/06 8:06:52	0:16:24
Stream01	210050243	2/10/06 8:07:24	2/10/06 9:12:19	1:04:55
Stream02	210050244	2/10/06 8:07:24	2/10/06 9:16:30	1:09:06
Stream03	210050245	2/10/06 8:07:24	2/10/06 9:11:55	1:04:31
Stream04	210050246	2/10/06 8:07:24	2/10/06 9:14:59	1:07:35
Stream05	210050247	2/10/06 8:07:24	2/10/06 9:16:31	1:09:06
Refresh00		2/10/06 7:49:34	2/10/06 7:50:28	0:00:54
		2/10/06 8:06:52	2/10/06 8:07:23	0:00:31
Refresh01		2/10/06 8:07:24	2/10/06 9:17:48	1:10:24
Refresh02		2/10/06 9:17:50	2/10/06 9:19:05	0:01:16
Refresh03		2/10/06 9:19:07	2/10/06 9:20:24	0:01:18
Refresh04		2/10/06 9:20:26	2/10/06 9:21:35	0:01:08
Refresh05		2/10/06 9:21:36	2/10/06 9:22:55	0:01:19



Numerical Quantities Summary

Timing Intervals in Seconds:

Query	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8
Stream00	138.8	3.0	14.9	9.9	20.3	14.0	38.0	34.5
Stream01	582.2	16.4	52.3	37.8	78.2	25.0	100.5	110.4
Stream02	688.4	36.5	63.6	42.3	108.3	18.8	110.3	107.9
Stream03	532.1	13.8	64.7	54.1	101.3	25.5	162.4	165.5
Stream04	523.1	18.3	47.1	46.3	103.9	26.2	103.3	138.5
Stream05	684.9	40.2	73.5	39.7	67.2	52.7	99.0	99.4
Min Qi	523.1	13.8	47.1	37.8	67.2	18.8	99.0	99.4
Max Qi	688.4	40.2	73.5	54.1	108.3	52.7	162.4	165.5
Avg Qi	602.1	25.0	60.2	44.0	91.8	29.6	115.1	124.3
Query	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16
Stream00	130.8	10.5	8.8	46.1	40.5	5.1	5.4	16.9
Stream01	339.0	42.1	80.9	181.9	167.3	20.6	26.8	90.3
Stream02	501.4	63.2	71.3	141.2	171.3	23.7	25.7	65.4
Stream03	487.6	54.0	46.6	197.8	146.3	34.2	22.0	63.4
Stream04	545.8	50.3	60.8	231.1	183.7	26.3	24.8	88.1
Stream05	256.2	46.4	80.6	220.7	204.4	29.9	18.5	67.9
Min Qi	256.2	42.1	46.6	141.2	146.3	20.6	18.5	63.4
Max Qi	545.8	63.2	80.9	231.1	204.4	34.2	26.8	90.3
Avg Qi	426.0	51.2	68.0	194.5	174.6	26.9	23.6	75.0
Query	Q17	Q18	Q19	Q20	Q21	Q22	RF1	RF2
Stream00	10.6	130.4	27.7	10.5	242.1	24.8	54.1	30.5
Stream01	40.2	676.1	59.7	78.6	972.3	116.7	4191.2	32.6
Stream02	54.3	905.5	88.4	92.1	662.1	104.5	39.8	35.4
Stream03	50.6	677.2	52.6	61.4	716.0	141.9	43.0	33.8
Stream04	34.0	549.0	92.5	71.1	989.3	101.6	35.4	32.4
Stream05	37.8	660.8	95.6	193.7	972.6	104.9	37.7	40.1
Min Qi	34.0	549.0	52.6	61.4	662.1	101.6	35.4	32.4
Max Qi	54.3	905.5	95.6	193.7	989.3	141.9	4191.2	40.1
Avg Qi	43.4	693.7	77.8	99.4	862.5	113.9	869.4	34.9

Table of Contents

General Items	1
Test Sponsor.....	1
Parameter Settings.....	1
Configuration Items.....	1
Clause 1: Logical Database Design	4
Table Definitions.....	4
Physical Organization of Database	4
Horizontal Partitioning	4
Replication	4
Clause 2: Queries and Update Functions	5
Query Language	5
Random Number Generation	5
Substitution Parameters Generation	5
Query Text and Output Data from Database.....	5
Query Substitution Parameters and Seeds Used.....	5
Isolation Level	5
Refresh Function Source Code	5
Clause 3: Database System Properties	7
Atomicity.....	7
Completed Transaction.....	7
Aborted Transaction.....	7
Consistency.....	7
Consistency Test	7
Isolation.....	8
Read-Write Conflict with Commit	8
Read-Write Conflict with Rollback.....	8
Write-Write Conflict with Commit	8
Write-Write Conflict with Rollback	8
Concurrent Read and Write Transactions on Different Tables.....	9
Update Transactions During Continuous Read-Only Query Stream.....	9
Durability	9
Failure of a Durable Medium.....	9
System Crash	10
Memory Failure.....	10
Clause 4: Scaling and Database Population	11
Initial Cardinality of Tables	11
Distribution of Tables and Logs Across Media	11
Partitioning and Replication.....	16

RAID Implementations	16
DBGEN Version and Modifications.....	16
Database Load time	17
Data Storage Ratio.....	17
Database Load Mechanism Details and Illustration.....	17
Clause 5: Performance Metrics and Execution Rules	19
Steps in the Power Test	19
Timing Intervals.....	19
Number of Streams for The Throughput Test.....	19
Start/Finish Time of Each Query Stream.....	19
Total Elapsed Time	19
Start/Finish Time for Update Function.....	19
Timing Intervals for Each Query and Each Update	19
Performance Metrics	20
Reproducibility Method.....	20
System Activity Between Run1 and Run2	20
Clause 6: SUT and Driver Implementation	21
Driver.....	21
Implementation Specific Layer (ISL).....	21
Profile-Directed Optimization.....	18
Clause 7: Pricing	22
Hardware and Software Used in the Priced System.....	22
Total Three Year Price	22
Availability Date.....	22
Clause 8: Auditor-Related Items	23
Auditor's Report	23
Appendix A: Parameter settings	A
Appendix B: Database Build Scripts.....	B
Appendix C: ACID Scripts.....	C
Appendix D: Query text and Output.....	D
Appendix E: Seed and Input Parameters.....	E
Appendix F: Benchmark Scripts	F
Appendix G: Price Quotations.....	G

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), 2x DELL PowerEdge 6800 Servers, depicted in the next diagram consists of:

- 4 - Dual-Core Intel® Xeon™ 7041/3.0GHz 2x2MB L2 Cache.
- 64GB RAM.
- 4 - DELL PERC4e-DC RAID Controllers, each with 128MB RAM of cache.
- 8 - DELL PowerVault 22XS.
- 112 – 36GB,U320 15k SCSI
- 8 – 73GB 10k HDD.

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.

PE6800

4xDual-Core Intel Xeon 7041/
3.0GHz 2x2MB L2 cache
64 GB DDR
4xPERC4E-DC Controllers
8x73GB, U320, 15K SCSI

DBMS

SQL Server 2005 Enterprise
(x64) Edition

OS

Microsoft Windows Server 2003
Enterprise x64 Edition



Storage

8xPV220S
112x36GB, 15K, U320 SCSI

8xPV220S

Measured Configuration

PE6800

4xDual-Core Intel Xeon 7041/
3.0GHz 2x2MB L2 cache
64 GB DDR
4xPERC4E-DC Controllers
8x73GB, U320, 15K SCSI

DBMS

SQL Server 2005 Enterprise
(x64) Edition

OS

Microsoft Windows Server 2003
Enterprise x64 Edition



Client: PE SC 1420

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

Storage

8xPV220S
56x36GB, 15K, U320 SCSI

8xPV220S

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:

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

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 PV220 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:

- 4 x DELL PERC4E-DC Disk Controllers
- 8 x PowerVault 22XS Disk Enclosures
- 112x 36GB,U320, 15k rpm, SCSI disk drives
- 8 x 73GB 10k rpm disk drives

8 logical volumes were configured each spanning 14 physical drives across both SCSI channels of the controller in a RAID0 formation. The server had 8 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 PERC4E-DC Configuration			
Disk 0 474.13 GB			Controller # 0			
Partition			Slot# 1	Channels		
1	2	3	SCSI ID	A	B	
G: Lineitem_fg RAW 47.75 GB	N: General_fg RAW 23 GB	T: backup NTFS 402.38 GB	0	A0-1		
			1	A0-2		
			2	A0-3		
			3	A0-4		
			4	A0-5		
			5	A0-6		
			8	A0-7		
			9	A0-8		
			10	A0-9		
			11	A0-10		
			12	A0-11		
			13	A0-12		
			14	A0-13		
			15	A0-14		

Windows 2003 Disk Administration			DELL PERC4E-DC Configuration			
Disk 1 474.13 GB			Controller # 0			
Partition			Slot# 1	Channels		
1	2	3	SCSI ID	A	B	
H: Lineitem_fg RAW 47.75 GB	O: General_fg RAW 23 GB	U: backup NTFS 402.38 GB	0		B0-1	
			1		B0-2	
			2		B0-3	
			3		B0-4	
			4		B0-5	
			5		B0-6	
			8		B0-7	
			9		B0-8	
			10		B0-9	
			11		B0-10	
			12		B0-11	
			13		B0-12	
			14		B0-13	
			15		BO-14	

Windows 2003 Disk Administration

DELL PERC4E-DC Configuration

Disk 2 272.96 GB			Controller # 1				
Partition			Onboard		Channels		
1	2	3	SCSI ID	A	B		
C: OS NTFS 40 GB	E: LOG NTFS 45 GB		0	A0-1			
			1	A0-2			
			2	A0-3			
			3	A0-4			
			4		B0-5		
			5		B0-6		
			8		B0-7		
			9		B0-8		
			10				
			11				
			12				
			13				
			14				
			15				

Windows 2003 Disk Administration			DELL PERC4E-DC Configuration				
Disk 3 474.13 GB			Controller # 2				
Partition			Slot# 2		Channels		
1	2	3	SCSI ID	A	B		
I: Lineitem_fg RAW 47.75 GB	P: General_fg RAW 23 GB	Y: RF files NTFS 2 GB	0	A0-1			
			1	A0-2			
			2	A0-3			
			3	A0-4			
			4	A0-5			
			5	A0-6			
			8	A0-7			
			9	A0-8			
			10	A0-9			
			11	A0-10			
			12	A0-11			
			13	A0-12			
			14	A0-13			
			15	A0-14			

Windows 2003 Disk Administration			DELL PERC4E-DC Configuration				
Disk 4 474.13 GB			Controller # 2				

Partition			Slot# 1		Channels			
1	2	3		SCSI ID	A	B		
J: Lineitem_fg RAW 47.75 GB	Q: General_fg RAW 23 GB	F: Flat files NTFS 402.38 GB		0		B0-1		
				1		B0-2		
				2		B0-3		
				3		B0-4		
				4		B0-5		
				5		B0-6		
				8		B0-7		
				9		B0-8		
				10		B0-9		
				11		B0-10		
				12		B0-11		
				13		B0-12		
				14		B0-13		
				15		BO-14		

Windows 2003 Disk Administration			DELL PERC4E-DC Configuration					
Disk 5 474.13 GB			Controller # 3					
Partition			Slot# 3		Channels			
1	2	3		SCSI ID	A	B		
K: Lineitem_fg RAW 47.75 GB	R: General_fg RAW 23 GB	X: Temp db NTFS 402.38 GB		0	A0-1			
				1	A0-2			
				2	A0-3			
				3	A0-4			
				4	A0-5			
				5	A0-6			
				8	A0-7			
				9	A0-8			
				10	A0-9			
				11	A0-10			
				12	A0-11			
				13	A0-12			
				14	A0-13			
				15	AO-14			

Windows 2003 Disk Administration			DELL PERC4E-DC Configuration					
Disk 6 474.13 GB			Controller # 3					

Partition			Slot# 3		Channels			
1	2	3		SCSI ID	A	B		
L: Lineitem_fg RAW 47.75 GB	S: General_fg RAW 23 GB	Z: backup NTFS 402.38 GB		0		B0-1		
				1		B0-2		
				2		B0-3		
				3		B0-4		
				4		B0-5		
				5		B0-6		
				8		B0-7		
				9		B0-8		
				10		B0-9		
				11		B0-10		
				12		B0-11		
				13		B0-12		
				14		B0-13		
				15		BO-14		

Windows 2003 Disk Administration			DELL PERC4E-DC Configuration					
Disk 7 474.13 GB			Controller # 4					
Partition			Slot# 4		Channels			
1	2	3		SCSI ID	A	B		
B: Lineitem_fg RAW 47.75 GB	V: General_fg RAW 23 GB			0	A0-1			
				1	A0-2			
				2	A0-3			
				3	A0-4			
				4	A0-5			
				5	A0-6			
				8	A0-7			
				9	A0-8			
				10	A0-9			
				11	A0-10			
				12	A0-11			
				13	A0-12			
				14	A0-13			
				15	AO-14			

Windows 2003 Disk Administration			DELL PERC4E-DC Configuration					
Disk 8 474.13 GB			Controller # 4					
Partition			Slot# 4		Channels			

1	2	3	SCSI ID	A	B		
M: Lineitem_fg RAW 47.75 GB	W: General_fg RAW 23 GB		0		B0-1		
			1		B0-2		
			2		B0-3		
			3		B0-4		
			4		B0-5		
			5		B0-6		
			8		B0-7		
			9		B0-8		
			10		B0-9		
			11		B0-10		
			12		B0-11		
			13		B0-12		
			14		B0-13		
			15		BO-14		

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

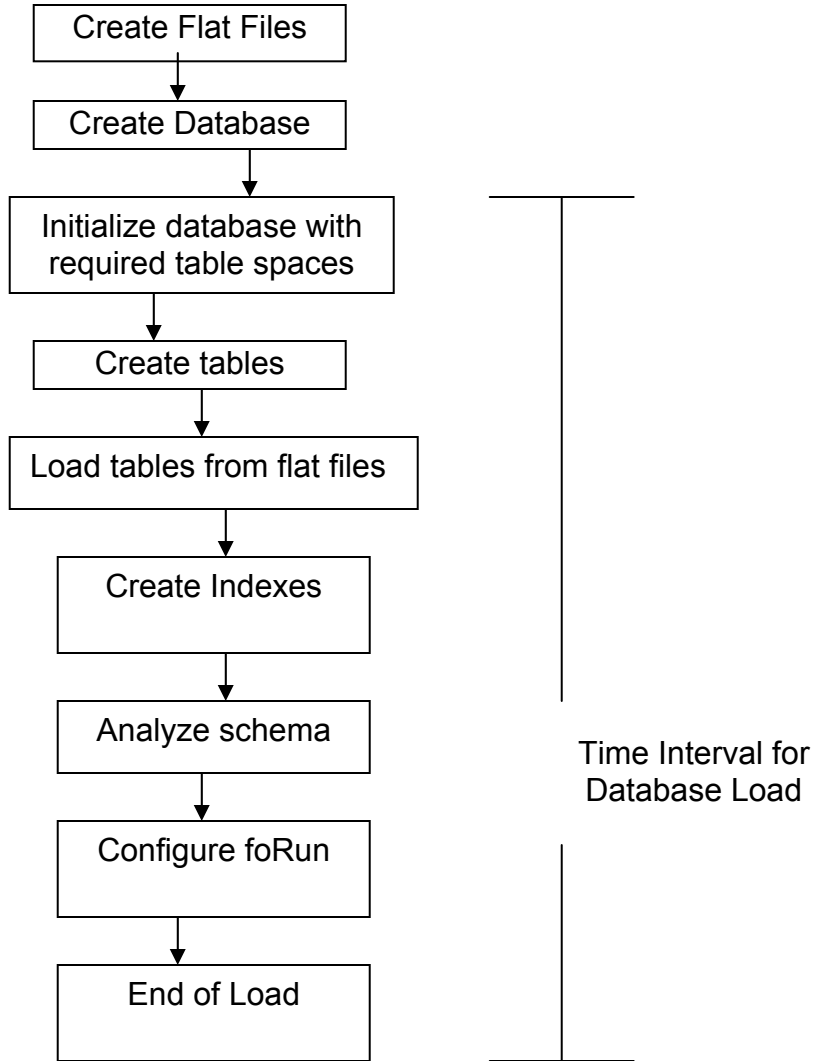
Disk Type	Number of Disks	Space per Disk	Subtotal Disk Space	Total Disk Storage	Data Storage Ratio
36GB 15k	112	33.87GB	3793.44GB		
73GB 15k	8	68.24GB	272.96GB		
				4066.4GB	40.66

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 5072.4 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	15521.8	8835.1	11710.5
2	15208.7	8739.6	11529.1
Percent Difference	0.98%	0.99%	0.98%

System Activity Between Run1 and Run2

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

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

Clause 6: SUT and Driver Implementation

Driver

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

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

For each power-test run:

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

Implementation Specific Layer (ISL)

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

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

Profile-Directed Optimization

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

Profile-directed optimization was not used.

Clause 7: Pricing

Hardware and Software Used in the Priced System

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

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

Total Three Year Price

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

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

Availability Date

The committed delivery date for general availability of products used in the price calculations must be reported. When the priced system includes products with different availability dates, the availability date reported on the executive summary must be the date by which all components are committed to being available. The full disclosure report must report availability dates individually for at least each of the categories for which a pricing subtotal must be provided.

All Dell components are available at the time of publication.

Clause 8: Auditor-Related Items

Auditor's Report

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

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

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

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

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



March 9, 2006

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

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

Platform: PowerEdge 6800
Database Manager: Microsoft SQL Server 2005 Enterprise Edition
Operating System: Windows Server 2003 Enterprise Edition

CPU's	Memory	Total Disks	Qpph@ 100GB	QthH@100GB	QphH@100GB
4 Intel Xeon @ 3.0 Ghz	65 GB	112 @ 36 GB 8 @ 73GB	15,208.7	8,739.8	11,529.1

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 -T834 -T1204
```

Microsoft SQL Server 2005 Configuration Parameters

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

default full-text language	0	2147483647			
1033	1033				
default language	0	9999	0	0	
default trace enabled	0	1	1	1	
disallow results from triggers	0	1	0	0	
fill factor (%)	0	100	0	0	
ft crawl bandwidth (max)	0	32767	100	100	
ft crawl bandwidth (min)	0	32767	0	0	
ft notify bandwidth (max)	0	32767	100	100	
ft notify bandwidth (min)	0	32767	0	0	
in-doubt xact resolution	0	2	0	0	
index create memory (KB)	704	2147483647			
lightweight pooling	0	1	1	1	
locks	5000	2147483647	0	0	
max degree of parallelism	0	64	0	0	
max full-text crawl range	0	256	4	4	
max server memory (MB)	16	2147483647			
63488	63488				
max text repl size (B)	0	2147483647			
65536	65536				
max worker threads	128	32767	1024	1024	
media retention	0	365	0	0	
min memory per query (KB)	512	2147483647			
512	512				
min server memory (MB)	0	2147483647			
61440	61440				
nested triggers	0	1	1	1	
network packet size (B)	512	32767			
32767	32767				
Ole Automation Procedures	0	1	0	0	
open objects	0	2147483647	0	0	
PH timeout (s)	1	3600	60	60	
precompute rank	0	1	0	0	
priority boost	0	1	1	1	
query governor cost limit	0	2147483647			
0	0				
query wait (s)	-1	2147483647			
2147483647	2147483647				
recovery interval (min)	0	32767	32767	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 EM64T Family 15 Model 4 Stepping 8 GenuineIntel ~2993 Mhz
Processor EM64T Family 15 Model 4 Stepping 8 GenuineIntel ~2993 Mhz
Processor EM64T Family 15 Model 4 Stepping 8 GenuineIntel ~2993 Mhz
Processor EM64T Family 15 Model 4 Stepping 8 GenuineIntel ~2993 Mhz
Processor EM64T Family 15 Model 4 Stepping 8 GenuineIntel ~2993 Mhz
Processor EM64T Family 15 Model 4 Stepping 8 GenuineIntel ~2993 Mhz
BIOS Version/Date Dell Computer Corporation X24, 9/8/2005
SMBIOS Version 2.3
Windows Directory C:\WINDOWS
System Directory C:\WINDOWS\system32
Boot Device \Device\HarddiskVolume23
Locale United States
Hardware Abstraction Layer Version = "5.2.3790.1830
(srv03_sp1_rtm.050324-1447)"
User Name Not Available
Time Zone Central Standard Time
Total Physical Memory 65,531.05 MB
Available Physical Memory 30.92 MB
Total Virtual Memory 64.41 GB
Available Virtual Memory 1.71 GB
Page File Space 2.00 GB
Page File C:\pagefile.sys

```

[Hardware Resources]

[Conflicts/Sharing]

```

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

Memory Address 0xD8000000-0xD80FFFFF PCI standard PCI-to-
PCI bridge
Memory Address 0xD8000000-0xD80FFFFF PCI standard PCI-to-
PCI bridge

Memory Address 0xD8100000-0xD81FFFFF PCI standard PCI-to-
PCI bridge
Memory Address 0xD8100000-0xD81FFFFF PCI standard PCI-to-
PCI bridge

Memory Address 0xD8200000-0xD82FFFFF PCI standard PCI-to-
PCI bridge
Memory Address 0xD8200000-0xD82FFFFF PCI standard PCI-to-
PCI bridge

```

```

I/O Port 0x0000E000-0x0000EFFF PCI standard PCI-to-PCI bridge
I/O Port 0x0000E000-0x0000EFFF Intel(R) 6700PXH PCI Express-
to-PCI Bridge B - 032A

```

```

IRQ 16 Intel(R) 82801EB USB Universal Host Controller - 24D2
IRQ 16 Radeon 7000 / RADEON VE Family (Microsoft Corporation)

```

```

Memory Address 0xD8400000-0xD84FFFFF PCI standard PCI-to-
PCI bridge
Memory Address 0xD8400000-0xD84FFFFF PCI standard PCI-to-
PCI bridge

```

```

IRQ 18 Dell PERC 4e/DC RAID Controller
IRQ 18 Dell PERC 4e/DC RAID Controller
IRQ 18 Dell PERC 4e/DC RAID Controller
IRQ 18 Dell PERC 4e/DC RAID Controller
IRQ 18 Intel(R) 82801EB USB Universal Host Controller - 24D7

```

```

Memory Address 0xA0000-0xBFFFF PCI bus
Memory Address 0xA0000-0xBFFFF Radeon 7000 / RADEON VE
Family (Microsoft Corporation)

```

```

Memory Address 0xD8300000-0xD83FFFFF PCI standard PCI-to-
PCI bridge

```

System Information

System Information report written at: 02/14/06 05:25:29
System Name: PE6800
[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
Activation Status Activation Pending (10 days remaining)
System Name PE6800
System Manufacturer Dell Computer Corporation
System Model PowerEdge 6800
System Type x64-based PC
Processor EM64T Family 15 Model 4 Stepping 8 GenuineIntel ~2993 Mhz
Processor EM64T Family 15 Model 4 Stepping 8 GenuineIntel ~2993 Mhz
Processor EM64T Family 15 Model 4 Stepping 8 GenuineIntel ~2993 Mhz
Processor EM64T Family 15 Model 4 Stepping 8 GenuineIntel ~2993 Mhz
Processor EM64T Family 15 Model 4 Stepping 8 GenuineIntel ~2993 Mhz
Processor EM64T Family 15 Model 4 Stepping 8 GenuineIntel ~2993 Mhz
Processor EM64T Family 15 Model 4 Stepping 8 GenuineIntel ~2993 Mhz
Processor EM64T Family 15 Model 4 Stepping 8 GenuineIntel ~2993 Mhz
Processor EM64T Family 15 Model 4 Stepping 8 GenuineIntel ~2993 Mhz
Processor EM64T Family 15 Model 4 Stepping 8 GenuineIntel ~2993 Mhz

```

Memory Address 0xD8300000-0xD83FFFFF PCI standard PCI-to-PCI bridge

[DMA]

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

[Forced Hardware]

Device PNP Device ID

[I/O]

Resource	Device	Status
0x00000000-0x00000CF7	PCI bus	OK
0x00000000-0x00000CF7	Direct memory access controller	OK
0x00000D00-0x0000FFFF	PCI bus	OK
0x0000E000-0x0000EFFF	PCI standard PCI-to-PCI bridge	OK
0x0000E000-0x0000EFFF	Intel(R) 6700PXH PCI Express-to-PCI Bridge B - 032A	OK
0x0000CCE0-0x0000CCFF	Intel(R) 82801EB USB Universal Host Controller - 24D2	OK
0x0000CCC0-0x0000CCDF	Intel(R) 82801EB USB Universal Host Controller - 24D4	OK
0x0000CCA0-0x0000CCBF	Intel(R) 82801EB USB Universal Host Controller - 24D7	OK
0x0000DC00-0x0000DCFF	Radeon 7000 / RADEON VE Family (Microsoft Corporation)	OK
0x000003B0-0x000003BB	Radeon 7000 / RADEON VE Family (Microsoft Corporation)	OK
0x000003C0-0x000003DF	Radeon 7000 / RADEON VE Family (Microsoft Corporation)	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
0x00000070-0x0000007F	System CMOS/real time clock	OK
0x00000040-0x0000005F	System timer	OK
0x000003F0-0x000003F5	Standard floppy disk controller	OK
0x000003F7-0x000003F7	Standard floppy disk controller	OK
0x000003F8-0x000003FF	Communications Port (COM1)	OK
0x00000800-0x0000087F	System board	OK
0x00000880-0x000008BF	System board	OK
0x000008C0-0x000008DF	System board	OK
0x00000C00-0x00000C1F	System board	OK
0x00000C10-0x00000C1F	System board	OK
0x00000CA0-0x00000CAF	System board	OK
0x00000C20-0x00000C3F	System board	OK
0x000000E0-0x000000E7	System board	OK
0x00000060-0x00000060	System board	OK
0x00000064-0x00000064	System board	OK
0x0000FC00-0x0000FC0F	Intel(R) 82801EB Ultra ATA Storage Controllers - 24DB	OK
0x000001F0-0x000001F7	Primary IDE Channel	OK
0x000003F6-0x000003F6	Primary IDE Channel	OK
0x00000170-0x00000177	Secondary IDE Channel	OK
0x00000376-0x00000376	Secondary IDE Channel	OK

[IRQs]

Resource	Device	Status
IRQ 9	Microsoft ACPI-Compliant System	OK
IRQ 18	Dell PERC 4e/DC RAID Controller	OK
IRQ 18	Dell PERC 4e/DC RAID Controller	OK

IRQ 18	Dell PERC 4e/DC RAID Controller	OK
IRQ 18	Dell PERC 4e/DC RAID Controller	OK
IRQ 18	Intel(R) 82801EB USB Universal Host Controller - 24D7	OK
IRQ 64	Broadcom NetXtreme Gigabit Ethernet #2	OK
IRQ 110	Dell PERC 4e/Di RAID Controller	OK
IRQ 16	Intel(R) 82801EB USB Universal Host Controller - 24D2	OK
IRQ 16	Radeon 7000 / RADEON VE Family (Microsoft Corporation)	OK
IRQ 19	Intel(R) 82801EB USB Universal Host Controller - 24D4	OK
IRQ 23	Intel(R) 82801EB USB2 Enhanced Host Controller - 24DD	OK
IRQ 13	Numeric data processor	OK
IRQ 8	System CMOS/real time clock	OK
IRQ 0	System timer	OK
IRQ 6	Standard floppy disk controller	OK
IRQ 4	Communications Port (COM1)	OK
IRQ 14	Primary IDE Channel	OK
IRQ 15	Secondary IDE Channel	OK

[Memory]

Resource	Device	Status
0xA0000-0xBFFFF	PCI bus	OK
0xA0000-0xBFFFF	Radeon 7000 / RADEON VE Family (Microsoft Corporation)	OK
0x80000000-0xFEBFFFFF	PCI bus	OK
0xDFC00000-0xDFEFFFFF	PCI standard PCI-to-PCI bridge	OK
0xD8400000-0xD84FFFFF	PCI standard PCI-to-PCI bridge	OK
0xD8400000-0xD84FFFFF	PCI standard PCI-to-PCI bridge	OK
0xDFD00000-0xDFEFFFFF	PCI standard PCI-to-PCI bridge	OK
0xD84F0000-0xD84FFFFF	Dell PERC 4e/DC RAID Controller	OK
0xDFDC0000-0xDFDFFFFF	Dell PERC 4e/DC RAID Controller	OK
0xDF900000-0xDFBFFFFF	PCI standard PCI-to-PCI bridge	OK
0xD8300000-0xD83FFFFF	PCI standard PCI-to-PCI bridge	OK
0xD8300000-0xD83FFFFF	PCI standard PCI-to-PCI bridge	OK
0xDFA00000-0xDFBFFFFF	PCI standard PCI-to-PCI bridge	OK
0xD83F0000-0xD83FFFFF	Dell PERC 4e/DC RAID Controller	OK
0xDFAC0000-0xDFAFFFFF	Dell PERC 4e/DC RAID Controller	OK
0xDF600000-0xDF8FFFFF	PCI standard PCI-to-PCI bridge	OK
0xD8200000-0xD82FFFFF	PCI standard PCI-to-PCI bridge	OK
0xD8200000-0xD82FFFFF	PCI standard PCI-to-PCI bridge	OK
0xDF700000-0xDF8FFFFF	PCI standard PCI-to-PCI bridge	OK
0xD82F0000-0xD82FFFFF	Dell PERC 4e/DC RAID Controller	OK
0xDF7C0000-0xDF7FFFFF	Dell PERC 4e/DC RAID Controller	OK
0xDF300000-0xDF5FFFFF	PCI standard PCI-to-PCI bridge	OK
0xD8100000-0xD81FFFFF	PCI standard PCI-to-PCI bridge	OK
0xD8100000-0xD81FFFFF	PCI standard PCI-to-PCI bridge	OK
0xDF400000-0xDF5FFFFF	PCI standard PCI-to-PCI bridge	OK
0xD81F0000-0xD81FFFFF	Dell PERC 4e/DC RAID Controller	OK
0xDF4C0000-0xDF4FFFFF	Dell PERC 4e/DC RAID Controller	OK
0xDF000000-0xDF2FFFFF	PCI standard PCI-to-PCI bridge	OK
0xDF100000-0xDF2FFFFF	Intel(R) 6700PXH PCI Express-to-PCI Bridge B - 032A	OK
0xDF1F0000-0xDF1FFFFF	Broadcom NetXtreme Gigabit Ethernet #2	OK
0xDEDED0000-0xDEDEFFFFF	PCI standard PCI-to-PCI bridge	OK
0xD8000000-0xD80FFFFF	PCI standard PCI-to-PCI bridge	OK
0xD8000000-0xD80FFFFF	PCI standard PCI-to-PCI bridge	OK
0xDEE00000-0xDEEFFFFF	PCI standard PCI-to-PCI bridge	OK
0xD80F0000-0xD80FFFFF	Dell PERC 4e/Di RAID Controller	OK

```

0xDEEC0000-0xDEFFFFFF Dell PERC 4e/Di RAID Controller
OK
0xDFF00000-0xDFF003FF Intel(R) 82801EB USB2 Enhanced Host
Controller - 24DD OK
0xD0000000-0xD7FFFFFF Radeon 7000 / RADEON VE Family
(Microsoft Corporation) OK
0xDEBF0000-0xDEBFFFFFF Radeon 7000 / RADEON VE Family
(Microsoft Corporation) OK
0xFEBFFC00-0xFEBFFFFFF Intel(R) 82801EB Ultra ATA Storage
Controllers - 24DB OK
0xE0000000-0xEFFFFFFF Motherboard resources OK
0xFE60C000-0xFE60FCFF Motherboard resources OK
0xFED00000-0xFED003FF High precision event timer OK

```

[Components]

[Multimedia]

[Audio Codecs]

CODEC	Manufacturer	Description	Status	File
	Version	Size	Creation Date	
c:\windows\system32\msg711.acm	Microsoft Corporation			
OK	C:\WINDOWS\system32\MSG711.ACM			
5.2.3790.1830 (srv03_sp1_rtm.050324-1447)		13.50 KB		
(13,824 bytes)	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)	3/25/2005 6:00 AM			
c:\windows\system32\msgsm32.acm	Microsoft Corporation			
OK	C:\WINDOWS\system32\MSGSM32.ACM			
5.2.3790.1830 (srv03_sp1_rtm.050324-1447)		34.50 KB		
(35,328 bytes)	3/25/2005 6:00 AM			
c:\windows\system32\imaadp32.acm	Microsoft Corporation			
OK	C:\WINDOWS\system32\IMAADP32.ACM			
5.2.3790.1830 (srv03_sp1_rtm.050324-1447)		24.00 KB		
(24,576 bytes)	3/25/2005 6:00 AM			
c:\windows\system32\msadp32.acm	Microsoft Corporation			
OK	C:\WINDOWS\system32\MSADP32.ACM			
5.2.3790.1830 (srv03_sp1_rtm.050324-1447)		23.50 KB		
(24,064 bytes)	3/25/2005 6:00 AM			

[Video Codecs]

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

[CD-ROM]

Item	Value
Drive D:	
Description	CD-ROM Drive
Media Loaded	No
Media Type	CD-ROM
Name	SAMSUNG CD-ROM SN-124
Manufacturer	(Standard CD-ROM drives)
Status	OK
Transfer Rate	Not Available
SCSI Target ID	0
PNP Device ID	IDE\CDROMSAMSUNG_CD-ROM_SN-124_N103_5&31A9A455&0&0.0.0
Driver	c:\windows\system32\drivers\cdrom.sys (5.2.3790.1830 (srv03_sp1_rtm.050324-1447), 75.50 KB (77,312 bytes), 3/25/2005 6:00 AM)

[Sound Device]

Item	Value
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[Display]

Item	Value
Name	Radeon 7000 / RADEON VE Family (Microsoft Corporation)
PNP Device ID	PCI\VEN_1002&DEV_5159&SUBSYS_016F1028&REV_004&1F7DBC9F&0&00F0
Adapter Type	ATI display adapter (0x5159), ATI Technologies Inc. compatible
Adapter Description	Radeon 7000 / RADEON VE Family (Microsoft Corporation)
Adapter RAM	16.00 MB (16,777,216 bytes)
Installed Drivers	ati2dvag.dll
Driver Version	6.14.10.6509
INF File	atiixpag.inf (ati2mtag_RV100 section)
Color Planes	1
Color Table Entries	4294967296
Resolution	1024 x 768 x 85 hertz
Bits/Pixel	32
Memory Address	0xD0000000-0xD7FFFFFFF
I/O Port	0x0000DC00-0x0000DCFF
Memory Address	0xDEBF0000-0xDEBFFFFFFF
IRQ Channel	IRQ 16
I/O Port	0x000003B0-0x000003BB
I/O Port	0x000003C0-0x000003DF
Memory Address	0xA0000-0xBFFFF
Driver	c:\windows\system32\drivers\ati2mtag.sys (6.14.10.6509, 1.39 MB (1,452,544 bytes), 1/24/2006 7:27 PM)

[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&6&111E0DBA&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&COL017&35583EE6&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

[Network]

[Adapter]

Item Value
Name [00000001] Broadcom NetXtreme Gigabit Ethernet
Adapter Type Not Available
Product Type Broadcom NetXtreme Gigabit Ethernet
Installed Yes
PNP Device ID
PCI\VEN_14E4&DEV_1648&SUBSYS_016F1028&REV_105&3BFB1AC&0&110230
Last Reset 2/10/2006 7:40 AM
Index 1
Service Name b57nd
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\b57amd64.sys (7.98.0.0 built by: WinDDK, 187.00 KB (191,488 bytes), 1/24/2006 7:27 PM)

Name [00000002] Broadcom NetXtreme Gigabit Ethernet
Adapter Type Ethernet 802.3
Product Type Broadcom NetXtreme Gigabit Ethernet
Installed Yes
PNP Device ID
PCI\VEN_14E4&DEV_1648&SUBSYS_016F1028&REV_105&3BFB1AC&0&100230
Last Reset 2/10/2006 7:40 AM
Index 2
Service Name b57nd
IP Address 192.2.2.68
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 00:12:3F:FF:2B:91
Memory Address 0xDF1F0000-0xDF1FFFFF
IRQ Channel IRQ 64
Driver c:\windows\system32\drivers\b57amd64.sys (7.98.0.0 built by: WinDDK, 187.00 KB (191,488 bytes), 1/24/2006 7:27 PM)

Name [00000003] RAS Async Adapter
Adapter Type Not Available
Product Type RAS Async Adapter
Installed Yes
PNP Device ID Not Available
Last Reset 2/10/2006 7:40 AM
Index 3

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 [00000004] WAN Miniport (L2TP)
Adapter Type Not Available
Product Type WAN Miniport (L2TP)
Installed Yes
PNP Device ID ROOT\MS_L2TPMINIPOINT\0000
Last Reset 2/10/2006 7:40 AM
Index 4
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 [00000005] 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 2/10/2006 7:40 AM
Index 5
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 [00000006] 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 2/10/2006 7:40 AM
Index 6
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 [00000007] Direct Parallel
Adapter Type Not Available
Product Type Direct Parallel
Installed Yes

PNP Device ID ROOT\MS_PTIMINIPOINT\0000
 Last Reset 2/10/2006 7:40 AM
 Index 7
 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 [00000008] WAN Miniport (IP)
 Adapter Type Not Available
 Product Type WAN Miniport (IP)
 Installed Yes
 PNP Device ID ROOT\MS_NDISWANIP\0000
 Last Reset 2/10/2006 7:40 AM
 Index 8
 Service Name NdisWan
 IP Address Not Available
 IP Subnet Not Available
 Default IP Gateway Not Available
 DHCP Enabled No
 DHCP Server Not Available
 DHCP Lease Expires Not Available
 DHCP Lease Obtained Not Available
 MAC Address Not Available
 Driver c:\windows\system32\drivers\ndiswan.sys (5.2.3790.1830 (srv03_sp1_rtm.050324-1447), 157.50 KB (161,280 bytes), 3/25/2005 6:00 AM)

[Protocol]

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

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

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

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

[WinSock]

Item Value
 File c:\windows\system32\wssock32.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)

[Parallel]

Item Value

[Storage]

[Drives]

Item Value

Drive A:
Description 3 1/2 Inch Floppy Drive

Drive B:
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 C:
Description Local Fixed Disk
Compressed No
File System NTFS
Size 40.00 GB (42,952,376,320 bytes)
Free Space 32.09 GB (34,454,532,096 bytes)
Volume Name
Volume Serial Number E4EE59CF

Drive D:
Description CD-ROM Disc

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

Drive F:
Description Local Fixed Disk
Compressed No
File System NTFS
Size 379.86 GB (407,875,158,016 bytes)

Free Space 267.80 GB (287,552,176,128 bytes)

Volume Name
Volume Serial Number F4A60253

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

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

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

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

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

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

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

Drive N:
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 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 No
File System NTFS
Size 377.86 GB (405,728,329,728 bytes)
Free Space 234.67 GB (251,975,892,992 bytes)
Volume Name
Volume Serial Number C4022086

Drive U:
Description Local Fixed Disk
Compressed No
File System NTFS
Size 379.87 GB (407,883,350,016 bytes)
Free Space 238.35 GB (255,926,534,144 bytes)
Volume Name
Volume Serial Number 60C6D6F0

Drive V:
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 W:
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 X:
Description Local Fixed Disk
Compressed No
File System NTFS
Size 379.86 GB (407,875,158,016 bytes)
Free Space 346.75 GB (372,316,438,528 bytes)
Volume Name
Volume Serial Number 64209067

Drive Y:
Description Local Fixed Disk
Compressed No
File System NTFS
Size 2.01 GB (2,155,020,288 bytes)
Free Space 232.50 MB (243,793,920 bytes)
Volume Name
Volume Serial Number 00BB2002

Drive Z:
Description Local Fixed Disk
Compressed No
File System NTFS
Size 379.87 GB (407,883,350,016 bytes)
Free Space 265.22 GB (284,778,364,928 bytes)
Volume Name
Volume Serial Number E851D486

[Disks]

Item	Value
Description	Disk drive
Manufacturer	(Standard disk drives)
Model	PERC LD 0 PERC RAID SCSI Disk Device
Bytes/Sector	512
Media Loaded	Yes
Media Type	Fixed hard disk
Partitions	2
SCSI Bus	3
SCSI Logical Unit	0
SCSI Port	2
SCSI Target ID	0
Sectors/Track	63
Size	474.14 GB (509,103,705,600 bytes)
Total Cylinders	61,895
Total Sectors	994,343,175
Total Tracks	15,783,225
Tracks/Cylinder	255
Partition Disk #0, Partition #0	
Partition Size	47.75 GB (51,276,363,264 bytes)
Partition Starting Offset	32,256 bytes
Partition Disk #0, Partition #1	
Partition Size	23.00 GB (24,700,515,840 bytes)
Partition Starting Offset	51,276,395,520 bytes

Description	Disk drive
Manufacturer	(Standard disk drives)
Model	PERC LD 0 PERC RAID SCSI Disk Device
Bytes/Sector	512
Media Loaded	Yes
Media Type	Fixed hard disk
Partitions	3
SCSI Bus	3

SCSI Logical Unit 0
 SCSI Port 5
 SCSI Target ID 0
 Sectors/Track 63
 Size 474.14 GB (509,103,705,600 bytes)
 Total Cylinders 61,895
 Total Sectors 994,343,175
 Total Tracks 15,783,225
 Tracks/Cylinder 255
 Partition Disk #5, Partition #0
 Partition Size 47.75 GB (51,276,363,264 bytes)
 Partition Starting Offset 32,256 bytes
 Partition Disk #5, Partition #1
 Partition Size 23.00 GB (24,700,515,840 bytes)
 Partition Starting Offset 51,276,395,520 bytes
 Partition Disk #5, Partition #2
 Partition Size 379.86 GB (407,875,184,640 bytes)
 Partition Starting Offset 101,220,295,680 bytes

Description Disk drive
 Manufacturer (Standard disk drives)
 Model PERC LD 0 PERCRAID SCSI Disk Device
 Bytes/Sector 512
 Media Loaded Yes
 Media Type Fixed hard disk
 Partitions 2
 SCSI Bus 3
 SCSI Logical Unit 0
 SCSI Port 3
 SCSI Target ID 0
 Sectors/Track 63
 Size 272.96 GB (293,091,402,240 bytes)
 Total Cylinders 35,633
 Total Sectors 572,444,145
 Total Tracks 9,086,415
 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 45.00 GB (48,323,520,000 bytes)
 Partition Starting Offset 42,952,412,160 bytes

Description Disk drive
 Manufacturer (Standard disk drives)
 Model PERC LD 0 PERCRAID SCSI Disk Device
 Bytes/Sector 512
 Media Loaded Yes
 Media Type Fixed hard disk
 Partitions 3
 SCSI Bus 3
 SCSI Logical Unit 0
 SCSI Port 6
 SCSI Target ID 0
 Sectors/Track 63
 Size 474.14 GB (509,103,705,600 bytes)
 Total Cylinders 61,895
 Total Sectors 994,343,175
 Total Tracks 15,783,225
 Tracks/Cylinder 255
 Partition Disk #7, Partition #0
 Partition Size 47.75 GB (51,276,363,264 bytes)
 Partition Starting Offset 32,256 bytes
 Partition Disk #7, Partition #1
 Partition Size 23.00 GB (24,700,515,840 bytes)
 Partition Starting Offset 51,276,395,520 bytes
 Partition Disk #7, Partition #2
 Partition Size 2.01 GB (2,155,023,360 bytes)
 Partition Starting Offset 75,976,911,360 bytes

Description Disk drive
 Manufacturer (Standard disk drives)
 Model PERC LD 0 PERCRAID SCSI Disk Device

Bytes/Sector 512
 Media Loaded Yes
 Media Type Fixed hard disk
 Partitions 3
 SCSI Bus 3
 SCSI Logical Unit 0
 SCSI Port 4
 SCSI Target ID 0
 Sectors/Track 63
 Size 474.14 GB (509,103,705,600 bytes)
 Total Cylinders 61,895
 Total Sectors 994,343,175
 Total Tracks 15,783,225
 Tracks/Cylinder 255
 Partition Disk #3, Partition #0
 Partition Size 47.75 GB (51,276,363,264 bytes)
 Partition Starting Offset 32,256 bytes
 Partition Disk #3, Partition #1
 Partition Size 23.00 GB (24,700,515,840 bytes)
 Partition Starting Offset 51,276,395,520 bytes
 Partition Disk #3, Partition #2
 Partition Size 377.86 GB (405,728,386,560 bytes)
 Partition Starting Offset 103,367,093,760 bytes

Description Disk drive
 Manufacturer (Standard disk drives)
 Model PERC LD 1 PERCRAID SCSI Disk Device
 Bytes/Sector 512
 Media Loaded Yes
 Media Type Fixed hard disk
 Partitions 2
 SCSI Bus 3
 SCSI Logical Unit 0
 SCSI Port 2
 SCSI Target ID 1
 Sectors/Track 63
 Size 474.14 GB (509,103,705,600 bytes)
 Total Cylinders 61,895
 Total Sectors 994,343,175
 Total Tracks 15,783,225
 Tracks/Cylinder 255
 Partition Disk #1, Partition #0
 Partition Size 47.75 GB (51,276,363,264 bytes)
 Partition Starting Offset 32,256 bytes
 Partition Disk #1, Partition #1
 Partition Size 23.00 GB (24,700,515,840 bytes)
 Partition Starting Offset 51,276,395,520 bytes

Description Disk drive
 Manufacturer (Standard disk drives)
 Model PERC LD 1 PERCRAID SCSI Disk Device
 Bytes/Sector 512
 Media Loaded Yes
 Media Type Fixed hard disk
 Partitions 3
 SCSI Bus 3
 SCSI Logical Unit 0
 SCSI Port 5
 SCSI Target ID 1
 Sectors/Track 63
 Size 474.14 GB (509,103,705,600 bytes)
 Total Cylinders 61,895
 Total Sectors 994,343,175
 Total Tracks 15,783,225
 Tracks/Cylinder 255
 Partition Disk #6, Partition #0
 Partition Size 47.75 GB (51,276,363,264 bytes)
 Partition Starting Offset 32,256 bytes
 Partition Disk #6, Partition #1
 Partition Size 23.00 GB (24,700,515,840 bytes)
 Partition Starting Offset 51,276,395,520 bytes
 Partition Disk #6, Partition #2
 Partition Size 379.87 GB (407,883,409,920 bytes)

Partition Starting Offset 101,212,070,400 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model PERC LD 1 PERCRAID SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 3
SCSI Bus 3
SCSI Logical Unit 0
SCSI Port 6
SCSI Target ID 1
Sectors/Track 63
Size 474.14 GB (509,103,705,600 bytes)
Total Cylinders 61,895
Total Sectors 994,343,175
Total Tracks 15,783,225
Tracks/Cylinder 255
Partition Disk #8, Partition #0
Partition Size 47.75 GB (51,276,363,264 bytes)
Partition Starting Offset 32,256 bytes
Partition Disk #8, Partition #1
Partition Size 23.00 GB (24,700,515,840 bytes)
Partition Starting Offset 51,276,395,520 bytes
Partition Disk #8, Partition #2
Partition Size 379.86 GB (407,875,184,640 bytes)
Partition Starting Offset 101,220,295,680 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model PERC LD 1 PERCRAID SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 3
SCSI Bus 3
SCSI Logical Unit 0
SCSI Port 4
SCSI Target ID 1
Sectors/Track 63
Size 474.14 GB (509,103,705,600 bytes)
Total Cylinders 61,895
Total Sectors 994,343,175
Total Tracks 15,783,225
Tracks/Cylinder 255
Partition Disk #4, Partition #0
Partition Size 47.75 GB (51,276,363,264 bytes)
Partition Starting Offset 32,256 bytes
Partition Disk #4, Partition #1
Partition Size 23.00 GB (24,700,515,840 bytes)
Partition Starting Offset 51,276,395,520 bytes
Partition Disk #4, Partition #2
Partition Size 379.87 GB (407,883,409,920 bytes)
Partition Starting Offset 101,212,070,400 bytes

[SCSI]

Item Value
Name Dell PERC 4e/DC RAID Controller
Manufacturer Dell
Status OK
PNP Device ID
PCI\VEN_1000&DEV_0408&SUBSYS_00021028&REV_07\5&
1F90FA0D&0&700008
Memory Address 0xD84F0000-0xD84FFFFF
Memory Address 0xDFDC0000-0xDFDFFFFF
IRQ Channel IRQ 18
Driver c:\windows\system32\drivers\mraid35x.sys (6.44.3.64
(NT.040809-2325), 35.50 KB (36,352 bytes), 3/25/2005 6:00 AM)

Name Dell PERC 4e/DC RAID Controller
Manufacturer Dell

Status OK
PNP Device ID
PCI\VEN_1000&DEV_0408&SUBSYS_00021028&REV_07\5&
230D0D0F&0&700010
Memory Address 0xD83F0000-0xD83FFFFF
Memory Address 0xDFAC0000-0xDFAFFFFF
IRQ Channel IRQ 18
Driver c:\windows\system32\drivers\mraid35x.sys (6.44.3.64
(NT.040809-2325), 35.50 KB (36,352 bytes), 3/25/2005 6:00 AM)

Name Dell PERC 4e/DC RAID Controller
Manufacturer Dell
Status OK
PNP Device ID
PCI\VEN_1000&DEV_0408&SUBSYS_00021028&REV_07\5&
266C47C5&0&700020
Memory Address 0xD82F0000-0xD82FFFFF
Memory Address 0xDF7C0000-0xDF7FFFFF
IRQ Channel IRQ 18
Driver c:\windows\system32\drivers\mraid35x.sys (6.44.3.64
(NT.040809-2325), 35.50 KB (36,352 bytes), 3/25/2005 6:00 AM)

Name Dell PERC 4e/DC RAID Controller
Manufacturer Dell
Status OK
PNP Device ID
PCI\VEN_1000&DEV_0408&SUBSYS_00021028&REV_07\5&
6E1FF5D&0&700028
Memory Address 0xD81F0000-0xD81FFFFF
Memory Address 0xDF4C0000-0xDF4FFFFF
IRQ Channel IRQ 18
Driver c:\windows\system32\drivers\mraid35x.sys (6.44.3.64
(NT.040809-2325), 35.50 KB (36,352 bytes), 3/25/2005 6:00 AM)

Name Dell PERC 4e/Di RAID Controller
Manufacturer Dell
Status OK
PNP Device ID
PCI\VEN_1028&DEV_0013&SUBSYS_016F1028&REV_06\5&
18D0E4AD&0&700038
Memory Address 0xD80F0000-0xD80FFFFF
Memory Address 0xDEEC0000-0xDEEFFFFF
IRQ Channel IRQ 110
Driver c:\windows\system32\drivers\mraid35x.sys (6.44.3.64
(NT.040809-2325), 35.50 KB (36,352 bytes), 3/25/2005 6:00 AM)

[IDE]

Item Value
Name Intel(R) 82801EB Ultra ATA Storage Controllers - 24DB
Manufacturer Intel
Status OK
PNP Device ID
PCI\VEN_8086&DEV_24DB&SUBSYS_016F1028&REV_02\3
&13C0B0C5&0&F9
I/O Port 0x0000FC00-0x0000FC0F
Memory Address 0xFEBFFC00-0xFEBFFFFF
Driver c:\windows\system32\drivers\intelide.sys (5.2.3790.1830
(srv03_sp1_rtm.050324-1447), 9.00 KB (9,216 bytes), 1/24/2006 7:26 PM)

Name Primary IDE Channel
Manufacturer (Standard IDE ATA/ATAPI controllers)
Status OK
PNP Device ID PCI\IDE\IDECHANNEL\4&16A8F7F1&0&0
I/O Port 0x000001F0-0x000001F7
I/O Port 0x000003F6-0x000003F6
IRQ Channel IRQ 14
Driver c:\windows\system32\drivers\atapi.sys (5.2.3790.1830
(srv03_sp1_rtm.050324-1447), 145.00 KB (148,480 bytes), 3/25/2005 6:00
AM)

Name Secondary IDE Channel
Manufacturer (Standard IDE ATA/ATAPI controllers)

Status	OK					No	Manual	Stopped	OK	Normal	No
PNP Device ID	PCI\IDE\IDECHANNEL\4&16A8F7F1&0&1					No					
I/O Port	0x00000170-0x00000177										
I/O Port	0x00000376-0x00000376					atapi		Standard IDE/ESDI Hard Disk Controller			
IRQ Channel	IRQ 15							c:\windows\system32\drivers\atapi.sys	Kernel Driver		
Driver	c:\windows\system32\drivers\atapi.sys (5.2.3790.1830 (srv03_sp1_rtm.050324-1447), 145.00 KB (148,480 bytes), 3/25/2005 6:00 AM)							Yes	Boot	Running	OK
								Yes			Normal
						atdisk		Atdisk	Not Available		Kernel Driver
								Disabled	Stopped	OK	Ignore
											No
						ati2mtag		ati2mtag	c:\windows\system32\drivers\ati2mtag.sys	Kernel	
						Driver		Yes	Manual	Running	OK
								Yes			Ignore
								Yes			No
						atmarpc		ATM ARP Client Protocol			
								c:\windows\system32\drivers\atmarpc.sys	Kernel Driver		
								No	Manual	Stopped	OK
								No			Normal
								No			No
						audstub		Audio Stub Driver	c:\windows\system32\drivers\audstub.sys		
								Kernel Driver	Yes	Manual	Running
								Normal	No	Yes	OK
						b57nd		Broadcom NetXtreme Gigabit Ethernet			
								c:\windows\system32\drivers\b57amd64.sys	Kernel Driver		
								Yes	Manual	Running	OK
								Yes			Normal
								Yes			No
						beep		Beep	c:\windows\system32\drivers\beep.sys	Kernel	
						Driver		Yes	System	Running	OK
								Yes			Normal
								Yes			No
						cdac15ba		CdaC15BA	c:\windows\system32\drivers\cdac15ba.sys		
								Kernel Driver	Yes	Auto	Running
								Normal	No	Yes	OK
						cdad10ba		CdaD10BA	c:\windows\system32\drivers\cdad10ba.sys		
								Kernel Driver	Yes	Auto	Running
								Normal	No	Yes	OK
						cdfs		Cdfs	c:\windows\system32\drivers\cdfs.sys	File	
						System Driver		Yes	Disabled	Running	OK
								No	Yes		Normal
						cdrom		CD-ROM Driver	c:\windows\system32\drivers\cdrom.sys		
								Kernel Driver	Yes	System	Running
								Normal	No	Yes	OK
						changer		Changer	Not Available		Kernel Driver
								System	Stopped	OK	Ignore
											No
						clusdisk		Cluster Disk Driver	c:\windows\system32\drivers\clusdisk.sys		
								Kernel Driver	No	Disabled	Stopped
								Normal	No	No	OK
						cmdide		CmdIde	Not Available		Kernel Driver
								Disabled	Stopped	OK	Normal
											No
						cpqccissm		cpqccissm	Not Available		Kernel Driver
								Disabled	Stopped	OK	Normal
											No
						credisk		CRC Disk Filter Driver	c:\windows\system32\drivers\credisk.sys	Kernel Driver	
								Yes	Boot	Running	OK
								Yes			Normal
								Yes			No
						dfsdriver		DfsDriver	c:\windows\system32\drivers\dfs.sys	File	
						System Driver		Yes	Boot	Running	OK
								No	Yes		Normal
						disk		Disk Driver	c:\windows\system32\drivers\disk.sys		
								Kernel Driver	Yes	Boot	Running
								Normal	No	Yes	OK
						dmboot		dmboot	c:\windows\system32\drivers\dmboot.sys	Kernel	
						Driver		No	Disabled	Stopped	OK
											Normal
											No
						dmio		Logical Disk Manager Driver			
								c:\windows\system32\drivers\dmio.sys	Kernel Driver		
								Yes	Boot	Running	OK
								Yes			Normal
								Yes			No
						dmload		dmload	c:\windows\system32\drivers\dmload.sys	Kernel	
						Driver		Yes	Boot	Running	OK
								Yes			Normal
								Yes			No
						dpti2o		dpti2o	Not Available		Kernel Driver
								Disabled	Stopped	OK	Normal
											No
						elxstor		elxstor	Not Available		Kernel Driver
								Disabled	Stopped	OK	Normal
											No
						fastfat		Fastfat	c:\windows\system32\drivers\fastfat.sys	File	
						System Driver		No	Disabled	Stopped	OK
								No	No		Normal

fdc	Floppy Disk Controller Driver	c:\windows\system32\drivers\fdc.sys	Kernel Driver	Yes	Manual	Running	OK	Normal	No
fips	Fips	c:\windows\system32\drivers\fips.sys	Kernel Driver	Yes	System	Running	OK	Normal	No
flpydisk	Floppy Disk Driver	c:\windows\system32\drivers\flpydisk.sys	Kernel Driver	Yes	Manual	Running	OK	Normal	No
fltmgr	FltMgr	c:\windows\system32\drivers\fltmgr.sys	File System Driver	Yes	Boot	Running	OK	Normal	No
ftdisk	Volume Manager Driver	c:\windows\system32\drivers\ftdisk.sys	Kernel Driver	Yes	Boot	Running	OK	Normal	No
gpc	Generic Packet Classifier	c:\windows\system32\drivers\msgpc.sys	Kernel Driver	Yes	Manual	Running	OK	Normal	No
hidusb	Microsoft HID Class Driver	c:\windows\system32\drivers\hidusb.sys	Kernel Driver	Yes	Manual	Running	OK	Ignore	No
hpciss	hpciss	Not Available	Kernel Driver	Disabled	Stopped	OK	Normal	No	No
http	HTTP	c:\windows\system32\drivers\http.sys	Kernel Driver	Yes	Manual	Running	OK	Normal	No
i2omgmt	i2omgmt	Not Available	Kernel Driver	System	Stopped	OK	Normal	No	No
i8042prt	i8042prt	c:\windows\system32\drivers\i8042prt.sys	Kernel Driver	No	System	Stopped	OK	Ignore	No
iirsp	iirsp	Not Available	Kernel Driver	Disabled	Stopped	OK	Normal	No	No
imapi	CD-Burning Filter Driver	c:\windows\system32\drivers\imapi.sys	Kernel Driver	No	System	Stopped	OK	Normal	No
intelide	IntelIde	c:\windows\system32\drivers\intelide.sys	Kernel Driver	Yes	Boot	Running	OK	Normal	No
intelppm	Intel Processor Driver	c:\windows\system32\drivers\intelppm.sys	Kernel Driver	Yes	Manual	Running	OK	Normal	No
ip6fw	IPv6 Windows Firewall Driver	c:\windows\system32\drivers\ip6fw.sys	Kernel Driver	No	Manual	Stopped	OK	Normal	No
ipfilterdriver	IP Traffic Filter Driver	c:\windows\system32\drivers\ipfltdrv.sys	Kernel Driver	No	Manual	Stopped	OK	Normal	No
ipinip	IP in IP Tunnel Driver	c:\windows\system32\drivers\ipinip.sys	Kernel Driver	No	Manual	Stopped	OK	Normal	No
ipnat	IP Network Address Translator	c:\windows\system32\drivers\ipnat.sys	Kernel Driver	No	Manual	Stopped	OK	Normal	No
ipsec	IPSEC driver	c:\windows\system32\drivers\ipsec.sys	Kernel Driver	Yes	System	Running	OK	Normal	No
isapnp	PnP ISA/EISA Bus Driver	c:\windows\system32\drivers\isapnp.sys	Kernel Driver	Yes	Boot	Running	OK	Critical	No
kbdclass	Keyboard Class Driver	c:\windows\system32\drivers\kbdclass.sys	Kernel Driver	Yes	System	Running	OK	Normal	No
kbdhid	Keyboard HID Driver	c:\windows\system32\drivers\kbdhid.sys	Kernel Driver	Yes	System	Running	OK	Normal	No
ksecdd	KSecDD	c:\windows\system32\drivers\ksecdd.sys	Kernel Driver	Yes	Boot	Running	OK	Normal	No
ksthunk	Kernel Streaming WOW64 Thunk Service	c:\windows\system32\drivers\ksthunk.sys	Kernel Driver	Yes	Manual	Running	OK	Normal	No
lp6nds35	lp6nds35	Not Available	Kernel Driver	Disabled	Stopped	OK	Normal	No	No
mmdd	mmdd	c:\windows\system32\drivers\mmdd.sys	Kernel Driver	Yes	System	Running	OK	Ignore	No
modem	Modem	c:\windows\system32\drivers\modem.sys	Kernel Driver	No	Manual	Stopped	OK	Ignore	No
mouclass	Mouse Class Driver	c:\windows\system32\drivers\mouclass.sys	Kernel Driver	Yes	System	Running	OK	Normal	No
mouhid	Mouse HID Driver	c:\windows\system32\drivers\mouhid.sys	Kernel Driver	Yes	Manual	Running	OK	Ignore	No
mountmgr	Mount Point Manager	c:\windows\system32\drivers\mountmgr.sys	Kernel Driver	Yes	Boot	Running	OK	Normal	No
mraid35x	mraid35x	c:\windows\system32\drivers\mraid35x.sys	Kernel Driver	Yes	Boot	Running	OK	Normal	No
mrxdav	WebDav Client Redirector	c:\windows\system32\drivers\mrxdav.sys	File System Driver	No	Manual	Stopped	OK	Normal	No
mrxsm	MRXSMB	c:\windows\system32\drivers\mrxsm.sys	File System Driver	Yes	System	Running	OK	Normal	No
msfs	Msfs	c:\windows\system32\drivers\msfs.sys	File System Driver	Yes	System	Running	OK	Normal	No
mssmbios	Microsoft System Management BIOS Driver	c:\windows\system32\drivers\mssmbios.sys	Kernel Driver	Yes	Manual	Running	OK	Normal	No
mup	Mup	c:\windows\system32\drivers\mup.sys	File System Driver	Yes	Boot	Running	OK	Normal	No
ndis	NDIS System Driver	c:\windows\system32\drivers\ndis.sys	Kernel Driver	Yes	Boot	Running	OK	Normal	No
ndistapi	Remote Access NDIS TAPI Driver	c:\windows\system32\drivers\ndistapi.sys	Kernel Driver	Yes	Manual	Running	OK	Normal	No
ndisui	NDIS Usermode I/O Protocol	c:\windows\system32\drivers\ndisui.sys	Kernel Driver	No	Manual	Stopped	OK	Normal	No
ndiswan	Remote Access NDIS WAN Driver	c:\windows\system32\drivers\ndiswan.sys	Kernel Driver	Yes	Manual	Running	OK	Normal	No
ndproxy	NDIS Proxy	c:\windows\system32\drivers\ndproxy.sys	Kernel Driver	Yes	Manual	Running	OK	Normal	No
netbios	NetBIOS Interface	c:\windows\system32\drivers\netbios.sys	File System Driver	Yes	System	Running	OK	Normal	No
netbt	NetBios over Tcpip	c:\windows\system32\drivers\netbt.sys	Kernel Driver	Yes	System	Running	OK	Normal	No
nfrd960	nfrd960	Not Available	Kernel Driver	Disabled	Stopped	OK	Normal	No	No

npfs	Npfs	c:\windows\system32\drivers\npfs.sys	File				redbook	Digital CD Audio Playback Filter Driver									
System Driver	Yes	System	Running	OK	Normal			c:\windows\system32\drivers\redbook.sys	Kernel Driver								
	No	Yes						Yes	System	Running	OK	Normal	No				
ntfs	Ntfs	c:\windows\system32\drivers\ntfs.sys	File				secdrv	Security Driver	c:\windows\system32\drivers\secdrv.sys								
System Driver	Yes	Disabled	Running	OK	Normal			Kernel Driver	Yes	Auto	Running	OK					
	No	Yes						Normal	No	Yes							
null	Null	c:\windows\system32\drivers>null.sys	Kernel				serenum	Serenum Filter Driver	c:\windows\system32\drivers\serenum.sys								
Driver	Yes	System	Running	OK	Normal	No		Kernel Driver	Yes	Manual	Running	OK					
	Yes							Normal	No	Yes							
parport	Parport	c:\windows\system32\drivers\parport.sys	Kernel				serial	Serial port driver	c:\windows\system32\drivers\serial.sys								
Driver	No	Manual	Stopped	OK	Ignore	No		Kernel Driver	Yes	System	Running	OK					
	No							Ignore	No	Yes							
partmgr	Partition Manager	c:\windows\system32\drivers\partmgr.sys					sfloppy	Sfloppy	c:\windows\system32\drivers\sfloppy.sys	Kernel							
	Kernel Driver	Yes	Boot	Running	OK		Driver	No	System	Stopped	OK	Ignore	No				
	Normal	No	Yes					No									
pci	PCI Bus Driver	c:\windows\system32\drivers\pci.sys					simbad	Simbad	Not Available	Kernel Driver							
	Kernel Driver	Yes	Boot	Running	OK			Disabled	Stopped	OK	Normal	No	No				
	Critical	No	Yes				srv	Srv	c:\windows\system32\drivers\srv.sys	File							
pciide	PCIIde	c:\windows\system32\drivers\pciide.sys	Kernel				System Driver	No	Manual	Stopped	OK	Normal					
Driver	Yes	Boot	Running	OK	Normal	No		No	No								
	Yes																
pemcia	Pemcia	c:\windows\system32\drivers\pemcia.sys	Kernel				swenum	Software Bus Driver	c:\windows\system32\drivers\swenum.sys								
Driver	No	Disabled	Stopped	OK	Normal	No		Kernel Driver	Yes	Manual	Running	OK					
	No							Normal	No	Yes							
pdcomp	PDCOMP	Not Available	Kernel Driver			No	symc8xx	symc8xx	Not Available	Kernel Driver							
	Manual	Stopped	OK	Ignore	No	No		Disabled	Stopped	OK	Normal	No	No				
pdframe	PDFRAME	Not Available	Kernel Driver			No	symmpi	symmpi	Not Available	Kernel Driver							
	No	Manual	Stopped	OK	Ignore	No		Disabled	Stopped	OK	Normal	No	No				
	No						sym_hi	sym_hi	Not Available	Kernel Driver							
pdreli	PDRELI	Not Available	Kernel Driver			No		Disabled	Stopped	OK	Normal	No	No				
	Manual	Stopped	OK	Ignore	No	No	sym_u3	sym_u3	Not Available	Kernel Driver							
pdrrframe	PDRFRAME	Not Available	Kernel Driver			No		Disabled	Stopped	OK	Normal	No	No				
	No	Manual	Stopped	OK	Ignore	No	tcpip	TCP/IP Protocol Driver									
	No							c:\windows\system32\drivers\tcpip.sys	Kernel Driver								
pptpminiport	WAN Miniport (PPTP)							Yes	System	Running	OK	Normal	No				
		c:\windows\system32\drivers\rasppptp.sys	Kernel Driver				tdpipe	TDPIPE	c:\windows\system32\drivers\tdpipe.sys	Kernel							
	Yes	Manual	Running	OK	Normal	No	Driver	No	Manual	Stopped	OK	Ignore	No				
	Yes							No									
ptilink	Direct Parallel Link Driver						tdtcp	TDTCP	c:\windows\system32\drivers\tdtcp.sys	Kernel							
		c:\windows\system32\drivers\ptilink.sys	Kernel Driver				Driver	Yes	Manual	Running	OK	Ignore	No				
	Yes	Manual	Running	OK	Normal	No		Yes									
	Yes						termdd	Terminal Device Driver									
ql2300	ql2300	Not Available	Kernel Driver			No		c:\windows\system32\drivers\termdd.sys	Kernel Driver								
	Disabled	Stopped	OK	Normal	No	No		Yes	System	Running	OK	Normal	No				
rasacd	Remote Access Auto Connection Driver						toside	TosIde	Not Available	Kernel Driver							
		c:\windows\system32\drivers\rasacd.sys	Kernel Driver					Disabled	Stopped	OK	Normal	No	No				
	Yes	System	Running	OK	Normal	No		Udfs	c:\windows\system32\drivers\udfs.sys	File							
	Yes						udfs	System Driver	No	Disabled	Stopped	OK	Normal				
rasl2tp	WAN Miniport (L2TP)							No	No								
		c:\windows\system32\drivers\rasl2tp.sys	Kernel Driver				ultra	ultra	Not Available	Kernel Driver							
	Yes	Manual	Running	OK	Normal	No		Disabled	Stopped	OK	Normal	No	No				
	Yes						update	Microcode Update Driver									
raspppoe	Remote Access PPPOE Driver							c:\windows\system32\drivers\update.sys	Kernel Driver								
		c:\windows\system32\drivers\raspppoe.sys	Kernel Driver					Yes	Manual	Running	OK	Normal	No				
	Yes	Manual	Running	OK	Normal	No		Yes									
	Yes						usbccgp	Microsoft USB Generic Parent Driver									
raspti	Direct Parallel	c:\windows\system32\drivers\raspti.sys						c:\windows\system32\drivers\usbccgp.sys	Kernel Driver								
	Kernel Driver	Yes	Manual	Running	OK			Yes	Manual	Running	OK	Normal	No				
	Normal	No	Yes					Yes									
rdbss	Rdbss	c:\windows\system32\drivers\rdbss.sys	File				usbhcsi	Microsoft USB 2.0 Enhanced Host Controller Miniport Driver									
System Driver	Yes	System	Running	OK	Normal			c:\windows\system32\drivers\usbhcsi.sys	Kernel Driver								
	No	Yes						Yes	Manual	Running	OK	Normal	No				
	Yes							Yes									
rdpcdd	RDPCDD	c:\windows\system32\drivers\rdpcdd.sys	Kernel				usbhub	USB2 Enabled Hub	c:\windows\system32\drivers\usbhub.sys								
Driver	Yes	System	Running	OK	Ignore	No		Kernel Driver	Yes	Manual	Running	OK					
	Yes							Normal	No	Yes							
rdpdr	Terminal Server Device Redirector Driver						usbstor	USB Mass Storage Driver									
		c:\windows\system32\drivers\rdpdr.sys	Kernel Driver					c:\windows\system32\drivers\usbstor.sys	Kernel Driver								
	Yes	Manual	Running	OK	Normal	No		No	Manual	Stopped	OK	Normal	No				
	Yes							No									
rdpwd	RDPWD	c:\windows\system32\drivers\rdpwd.sys	Kernel					No									
Driver	Yes	Manual	Running	OK	Ignore	No		No									
	Yes																

usbuhci	Microsoft USB Universal Host Controller Miniport Driver	c:\windows\system32\drivers\usbuhci.sys	Kernel Driver	Yes	Manual	Running	OK	Normal	No
vgasave	VGA Display Controller.	c:\windows\system32\drivers\vga.sys	Kernel Driver	Yes	System	Running	OK	Ignore	No
viaide	Vialde	Not Available	Kernel Driver	No	Disabled	Stopped	OK	Normal	No
volsnap	Storage volumes	c:\windows\system32\drivers\volsnap.sys	Kernel Driver	Yes	Boot	Running	OK	Normal	No
wanarp	Remote Access IP ARP Driver	c:\windows\system32\drivers\wanarp.sys	Kernel Driver	Yes	Manual	Running	OK	Normal	No
wdica	WDICA	Not Available	Kernel Driver	No	Manual	Stopped	OK	Ignore	No
wlbs	Network Load Balancing	c:\windows\system32\drivers\wlbs.sys	Kernel Driver	No	Manual	Stopped	OK	Normal	No

[Signed Drivers]

Device Name	Signed	Device Class	Driver Version
Name	Device ID	Manufacturer	INF Name Driver
Microsoft System Management BIOS Driver	Yes	SYSTEM	5.2.3790.1830
	10/1/2002 (Standard system devices)	machine.inf	ROOT\SYSTEM\0002
Microcode Update Device	Yes	SYSTEM	5.2.3790.1830
	10/1/2002 (Standard system devices)	machine.inf	ROOT\SYSTEM\0001
Plug and Play Software Device Enumerator	Yes	SYSTEM	5.2.3790.1830
	10/1/2002 (Standard system devices)	machine.inf	ROOT\SYSTEM\0000
Terminal Server Mouse Driver	Yes	SYSTEM	5.2.3790.1830
	10/1/2002 (Standard system devices)	machine.inf	ROOT\RDP_MOUSE\0000
Terminal Server Keyboard Driver	Yes	SYSTEM	5.2.3790.1830
	10/1/2002 (Standard system devices)	machine.inf	ROOT\RDP_KEYBOARD\0000
Terminal Server Device Redirector	Yes	SYSTEM	5.2.3790.1830
	10/1/2002 (Standard system devices)	machine.inf	ROOT\RDPDR\0000
Direct Parallel	Yes	NET	5.2.3790.1830
	10/1/2002	Microsoft netrasa.inf	ROOT\MS_PTMINIPORT\0000
WAN Miniport (PPTP)	Yes	NET	5.2.3790.1830
	10/1/2002	Microsoft netrasa.inf	ROOT\MS_PPTPMINIPORT\0000
WAN Miniport (PPPOE)	Yes	NET	5.2.3790.1830
	10/1/2002	Microsoft netrasa.inf	ROOT\MS_PPPOEMINIPORT\0000
WAN Miniport (IP)	Yes	NET	5.2.3790.1830
	10/1/2002	Microsoft netrasa.inf	ROOT\MS_NDISWANIP\0000
WAN Miniport (L2TP)	Yes	NET	5.2.3790.1830
	10/1/2002	Microsoft netrasa.inf	ROOT\MS_L2TPMINIPORT\0000
Video Codecs	Yes	MEDIA	5.2.3790.1830
	10/1/2002	(Standard system devices)	wave.inf
		ROOT\MEDIA\MS_MMVID	Not Available
Legacy Video Capture Devices	Yes	MEDIA	5.2.3790.1830
	10/1/2002 (Standard system devices)	wave.inf	Not Available
		ROOT\MEDIA\MS_MMVCD	Not Available

Media Control Devices	Yes	MEDIA	5.2.3790.1830
	10/1/2002 (Standard system devices)	wave.inf	Not Available
		ROOT\MEDIA\MS_MMMCI	Not Available
Legacy Audio Drivers	Yes	MEDIA	5.2.3790.1830
	10/1/2002	(Standard system devices)	wave.inf
		ROOT\MEDIA\MS_MMDRV	Not Available
Audio Codecs	Yes	MEDIA	5.2.3790.1830
	10/1/2002	(Standard system devices)	wave.inf
		ROOT\MEDIA\MS_MMACM	Not Available
Remote Access IP ARP Driver	Not Available	LEGACYDRIVER	LEGACYDRIVER
	Not Available	Not Available	Not Available
	Not Available	Not Available	Not Available
		ROOT\LEGACY_WANARP\0000	Not Available
volsnap	Not Available	LEGACYDRIVER	LEGACYDRIVER
	Not Available	Not Available	Not Available
	Not Available	Not Available	Not Available
		ROOT\LEGACY_VOLSnap\0000	Not Available
VGA Display Controller.	Not Available	LEGACYDRIVER	LEGACYDRIVER
	Not Available	Not Available	Not Available
	Not Available	Not Available	Not Available
		ROOT\LEGACY_VGASAVE\0000	Not Available
TDTCP	Not Available	LEGACYDRIVER	LEGACYDRIVER
	Not Available	Not Available	Not Available
	Not Available	Not Available	Not Available
		ROOT\LEGACY_TDTCP\0000	Not Available
TCP/IP Protocol Driver	Not Available	LEGACYDRIVER	LEGACYDRIVER
	Not Available	Not Available	Not Available
	Not Available	Not Available	Not Available
		ROOT\LEGACY_TCPIP\0000	Not Available
Security Driver	Not Available	LEGACYDRIVER	LEGACYDRIVER
	Not Available	Not Available	Not Available
	Not Available	Not Available	Not Available
		ROOT\LEGACY_SECDRV\0000	Not Available
RDPWD	Not Available	LEGACYDRIVER	LEGACYDRIVER
	Not Available	Not Available	Not Available
	Not Available	Not Available	Not Available
		ROOT\LEGACY_RDPWD\0000	Not Available
RDPcdd	Not Available	LEGACYDRIVER	LEGACYDRIVER
	Not Available	Not Available	Not Available
	Not Available	Not Available	Not Available
		ROOT\LEGACY_RDPcdd\0000	Not Available
Remote Access Auto Connection Driver	Not Available	LEGACYDRIVER	LEGACYDRIVER
	Not Available	Not Available	Not Available
	Not Available	Not Available	Not Available
		ROOT\LEGACY_RASACD\0000	Not Available
PCIide	Not Available	LEGACYDRIVER	LEGACYDRIVER
	Not Available	Not Available	Not Available
	Not Available	Not Available	Not Available
		ROOT\LEGACY_PCIIDE\0000	Not Available
Partition Manager	Not Available	LEGACYDRIVER	LEGACYDRIVER
	Not Available	Not Available	Not Available
	Not Available	Not Available	Not Available
		ROOT\LEGACY_PARTMGR\0000	Not Available
Null	Not Available	LEGACYDRIVER	LEGACYDRIVER
	Not Available	Not Available	Not Available
	Not Available	Not Available	Not Available
		ROOT\LEGACY_NULL\0000	Not Available
NetBios over Tcpip	Not Available	LEGACYDRIVER	LEGACYDRIVER
	Not Available	Not Available	Not Available
	Not Available	Not Available	Not Available
		ROOT\LEGACY_NETBT\0000	Not Available
NDProxy	Not Available	LEGACYDRIVER	LEGACYDRIVER
	Not Available	Not Available	Not Available
	Not Available	Not Available	Not Available
		ROOT\LEGACY_NDPROXY\0000	Not Available
NDIS Usermode I/O Protocol	Not Available	LEGACYDRIVER	LEGACYDRIVER
	Not Available	Not Available	Not Available
	Not Available	Not Available	Not Available
		ROOT\LEGACY_NDISUIO\0000	Not Available
Remote Access NDIS TAPI Driver	Not Available	LEGACYDRIVER	LEGACYDRIVER
	Not Available	Not Available	Not Available
	Not Available	Not Available	Not Available
		ROOT\LEGACY_NDISTAPI\0000	Not Available
NDIS System Driver	Not Available	LEGACYDRIVER	LEGACYDRIVER
	Not Available	Not Available	Not Available
	Not Available	Not Available	Not Available
		ROOT\LEGACY_NDIS\0000	Not Available
mountmgr	Not Available	LEGACYDRIVER	LEGACYDRIVER
	Not Available	Not Available	Not Available
	Not Available	Not Available	Not Available
		ROOT\LEGACY_MOUNTMGR\0000	Not Available
mnmd	Not Available	LEGACYDRIVER	LEGACYDRIVER
	Not Available	Not Available	Not Available
	Not Available	Not Available	Not Available
		ROOT\LEGACY_MNMD\0000	Not Available

ksecdd	Not Available	LEGACYDRIVER	Not Available	STORAGE\VOLUME\1&30A96598&0&SIGNATURE58913C5E
	Not Available	Not Available	Not Available	OFFSET7E00LENGTHBHF04F3600
	Not Available	ROOT\LEGACY_KSECDD\0000		Generic volume Yes VOLUME 5.2.3790.1830 10/1/2002
IPSEC driver	Not Available	LEGACYDRIVER	Not Available	Microsoft volume.inf Not Available
Available	Not Available	Not Available	Not Available	STORAGE\VOLUME\1&30A96598&0&SIGNATUREDE29EBF
	Not Available	ROOT\LEGACY_IPSEC\0000		10FFSET1791332400LENGTH5EF7416800
IP Network Address Translator	Not Available	LEGACYDRIVER	Not Available	Generic volume Yes VOLUME 5.2.3790.1830 10/1/2002
	Not Available	Not Available	Not Available	Microsoft volume.inf Not Available
	Not Available	Not Available	Not Available	STORAGE\VOLUME\1&30A96598&0&SIGNATUREDE29EBF
	Not Available	ROOT\LEGACY_IPNAT\0000		10FFSETBF04FB400LENGTH5C043F600
HTTP	Not Available	LEGACYDRIVER	Not Available	Generic volume Yes VOLUME 5.2.3790.1830 10/1/2002
	Not Available	Not Available	Not Available	Microsoft volume.inf Not Available
	Not Available	ROOT\LEGACY_HTTP\0000		STORAGE\VOLUME\1&30A96598&0&SIGNATUREDE29EBF
Generic Packet Classifier	Not Available	LEGACYDRIVER	Not Available	10FFSET7E00LENGTHBHF04F3600
	Not Available	Not Available	Not Available	Generic volume Yes VOLUME 5.2.3790.1830 10/1/2002
	Not Available	Not Available	Not Available	Microsoft volume.inf Not Available
	Not Available	ROOT\LEGACY_GPC\0000		STORAGE\VOLUME\1&30A96598&0&SIGNATURE66F437B9
Fips	Not Available	LEGACYDRIVER	Not Available	OFFSET11B093AA00LENGTH80730C00
	Not Available	Not Available	Not Available	Generic volume Yes VOLUME 5.2.3790.1830 10/1/2002
	Not Available	ROOT\LEGACY_FIPS\0000		Microsoft volume.inf Not Available
dmload	Not Available	LEGACYDRIVER	Not Available	STORAGE\VOLUME\1&30A96598&0&SIGNATURE66F437B9
	Not Available	Not Available	Not Available	OFFSETBF04FB400LENGTH5C043F600
	Not Available	ROOT\LEGACY_DMLOAD\0000		Generic volume Yes VOLUME 5.2.3790.1830 10/1/2002
dmboot	Not Available	LEGACYDRIVER	Not Available	Microsoft volume.inf Not Available
	Not Available	Not Available	Not Available	STORAGE\VOLUME\1&30A96598&0&SIGNATURE66F437B9
	Not Available	ROOT\LEGACY_DMBOOT\0000		OFFSET7E00LENGTHBHF04F3600
CRC Disk Filter Driver	Not Available	LEGACYDRIVER	Not Available	Generic volume Yes VOLUME 5.2.3790.1830 10/1/2002
	Not Available	Not Available	Not Available	Microsoft volume.inf Not Available
	Not Available	Not Available	Not Available	STORAGE\VOLUME\1&30A96598&0&SIGNATUREB52C4B0
	Not Available	ROOT\LEGACY_CRCDISK\0000		10FFSET1790B5A200LENGTH5EF7BEEA00
CdaD10BA	Not Available	LEGACYDRIVER	Not Available	Generic volume Yes VOLUME 5.2.3790.1830 10/1/2002
Available	Not Available	Not Available	Not Available	Microsoft volume.inf Not Available
	Not Available	ROOT\LEGACY_CDAD10BA\0000		STORAGE\VOLUME\1&30A96598&0&SIGNATUREB52C4B0
CdaC15BA	Not Available	LEGACYDRIVER	Not Available	10FFSETBF04FB400LENGTH5C043F600
Available	Not Available	Not Available	Not Available	Generic volume Yes VOLUME 5.2.3790.1830 10/1/2002
	Not Available	ROOT\LEGACY_CDAC15BA\0000		Microsoft volume.inf Not Available
Beep	Not Available	LEGACYDRIVER	Not Available	STORAGE\VOLUME\1&30A96598&0&SIGNATUREB52C4B0
	Not Available	Not Available	Not Available	10FFSET7E00LENGTHBHF04F3600
	Not Available	ROOT\LEGACY_BEEP\0000		Generic volume Yes VOLUME 5.2.3790.1830 10/1/2002
AFD	Not Available	LEGACYDRIVER	Not Available	Microsoft volume.inf Not Available
	Not Available	Not Available	Not Available	STORAGE\VOLUME\1&30A96598&0&SIGNATUREB52C4B0
	Not Available	ROOT\LEGACY_AFD\0000		00FFSET181128AE00LENGTH5E774BDE00
Generic volume	Yes	VOLUME 5.2.3790.1830	10/1/2002	Generic volume Yes VOLUME 5.2.3790.1830 10/1/2002
	Microsoft volume.inf	Not Available		Microsoft volume.inf Not Available
	STORAGE\VOLUME\1&30A96598&0&SIGNATURE	EEF00EF00		STORAGE\VOLUME\1&30A96598&0&SIGNATUREB52C4B0
OFFSETA0029CC00LENGTHB404E6600				00FFSETBF04FB400LENGTH5C043F600
Generic volume	Yes	VOLUME 5.2.3790.1830	10/1/2002	Generic volume Yes VOLUME 5.2.3790.1830 10/1/2002
	Microsoft volume.inf	Not Available		Microsoft volume.inf Not Available
	STORAGE\VOLUME\1&30A96598&0&SIGNATURE	EEF00EF00		STORAGE\VOLUME\1&30A96598&0&SIGNATUREB52C4B0
OFFSET7E00LENGTHA00294E00				00FFSET7E00LENGTHBHF04F3600
Generic volume	Yes	VOLUME 5.2.3790.1830	10/1/2002	Generic volume Yes VOLUME 5.2.3790.1830 10/1/2002
	Microsoft volume.inf	Not Available		Microsoft volume.inf Not Available
	STORAGE\VOLUME\1&30A96598&0&SIGNATURE	58913C5		STORAGE\VOLUME\1&30A96598&0&SIGNATUREE88AAFEE
DOFFSET1790B5A200LENGTH5EF7BEEA00				BOFFSETBF04FB400LENGTH5C043F600
Generic volume	Yes	VOLUME 5.2.3790.1830	10/1/2002	Generic volume Yes VOLUME 5.2.3790.1830 10/1/2002
	Microsoft volume.inf	Not Available		Microsoft volume.inf Not Available
	STORAGE\VOLUME\1&30A96598&0&SIGNATURE	58913C5		STORAGE\VOLUME\1&30A96598&0&SIGNATUREE88AAFEE
DOFFSETBF04FB400LENGTH5C043F600				BOFFSET7E00LENGTHBHF04F3600
Generic volume	Yes	VOLUME 5.2.3790.1830	10/1/2002	Generic volume Yes VOLUME 5.2.3790.1830 10/1/2002
	Microsoft volume.inf	Not Available		Microsoft volume.inf Not Available
	STORAGE\VOLUME\1&30A96598&0&SIGNATURE	58913C5		STORAGE\VOLUME\1&30A96598&0&SIGNATUREE88AAFEE
DOFFSET7E00LENGTHBHF04F3600				40FFSETBF04FB400LENGTH5C043F600
Generic volume	Yes	VOLUME 5.2.3790.1830	10/1/2002	Generic volume Yes VOLUME 5.2.3790.1830 10/1/2002
	Microsoft volume.inf	Not Available		Microsoft volume.inf Not Available
	STORAGE\VOLUME\1&30A96598&0&SIGNATURE	58913C5E		STORAGE\VOLUME\1&30A96598&0&SIGNATUREE88AAFEE
OFFSET1791332400LENGTH5EF7416800				40FFSET7E00LENGTHBHF04F3600
Generic volume	Yes	VOLUME 5.2.3790.1830	10/1/2002	Volume Manager Yes SYSTEM 5.2.3790.1830 10/1/2002
	Microsoft volume.inf	Not Available		(Standard system devices) machine.inf Not
	STORAGE\VOLUME\1&30A96598&0&SIGNATURE	58913C5E		Available ROOT\FTDISK\0000
OFFSETBF04FB400LENGTH5C043F600				Logical Disk Manager Yes SYSTEM 5.2.3790.1830 10/1/2002
Generic volume	Yes	VOLUME 5.2.3790.1830	10/1/2002	(Standard system devices) machine.inf Not
	Microsoft volume.inf	Not Available		Available ROOT\DMIO\0000

ACPI Fixed Feature Button	Yes	SYSTEM	5.2.3790.1830		PCI\VEN_1002&DEV_5159&SUBSYS_016F1028&REV_00\4&1F7DBC9F&0&00F0
10/1/2002 (Standard system devices)			machine.inf		
Not Available			ACPI\FIXEDBUTTON\2&DABA3FF&0		
High precision event timer	Yes	SYSTEM	5.2.3790.1830		Intel(R) 82801 PCI Bridge - 244E Yes SYSTEM
10/1/2002 (Standard system devices)			machine.inf		5.2.3790.1830 10/1/2002 Intel machine.inf
Not Available			ACPI\PNP0103\0		PCI\VEN_8086&DEV_244E&SUBSYS_00000000&REV_C2\3&13C0B0C5&0&F0
Motherboard resources	Yes	SYSTEM	5.2.3790.1830		Generic USB Hub Yes USB 5.2.3790.1830 10/1/2002
10/1/2002 (Standard system devices)			machine.inf		(Generic USB Hub) usb.inf Not Available
Not Available			ACPI\PNP0C02\1		USB\VID_413C&PID_A001\5&227234D6&0&3
Motherboard resources	Yes	SYSTEM	5.2.3790.1830		USB Root Hub Yes USB 5.2.3790.1830 10/1/2002
10/1/2002 (Standard system devices)			machine.inf		(Standard USB Host Controller) usbport.inf Not Available
Not Available			ACPI\PNP0C02\0		USB\ROOT_HUB20\4&36AC53BE&0
Secondary IDE Channel	Yes	HDC	5.2.3790.1830		Intel(R) 82801EB USB2 Enhanced Host Controller - 24DD Yes
10/1/2002 (Standard IDE ATA/ATAPI controllers)			mshdc.inf		USB 5.2.3790.1830 10/1/2002 Intel usbport.inf
Not Available			PCI\IDE\IDECHANNEL\4&16A8F7F1&0&1		Not Available
CD-ROM Drive	Yes	CDROM	5.2.3790.1830	10/1/2002	PCI\VEN_8086&DEV_24DD&SUBSYS_016F1028&REV_02\3&13C0B0C5&0&EF
(Standard CD-ROM drives)			cdrom.inf		HID-compliant consumer control device Yes HIDCLASS
Not Available			IDE\CDROMSAMSUNG_CD-ROM_SN-124_____N103_____5&31A9A455&0&0.0.0		5.2.3790.1830 10/1/2002 Microsoft hidserv.inf Not Available
Primary IDE Channel	Yes	HDC	5.2.3790.1830	10/1/2002	HID\VID_0518&PID_0001&MI_01&COL03\7&35583EE6&0&002
(Standard IDE ATA/ATAPI controllers)			mshdc.inf		HID-compliant device Yes HIDCLASS 5.2.3790.1830
Available			PCI\IDE\IDECHANNEL\4&16A8F7F1&0&0		10/1/2002 (Standard system devices) input.inf Not Available
Intel(R) 82801EB Ultra ATA Storage Controllers - 24DB	Yes				Available
HDC	5.2.3790.1830	10/1/2002	Intel	mshdc.inf	HID\VID_0518&PID_0001&MI_01&COL02\7&35583EE6&0&001
Not Available					HID-compliant mouse Yes MOUSE 5.2.3790.1830 10/1/2002
PCI\VEN_8086&DEV_24DB&SUBSYS_016F1028&REV_02\3&13C0B0C5&0&F9					Microsoft msmouse.inf Not Available
System board	Yes	SYSTEM	5.2.3790.1830	10/1/2002	HID\VID_0518&PID_0001&MI_01&COL01\7&35583EE6&0&000
(Standard system devices)			machine.inf		USB Human Interface Device Yes HIDCLASS
Available			ACPI\PNP0C01\4&26DD0F47&0		5.2.3790.1830 10/1/2002 (Standard system devices) input.inf Not Available
Communications Port	Yes	PORTS	5.2.3790.1830	10/1/2002	USB\VID_0518&PID_0001&MI_01\6&111E0DBA&0&0001
(Standard port types)			msports.inf		HID Keyboard Device Yes KEYBOARD
Not Available			ACPI\PNP0501\1		5.2.3790.1830 10/1/2002 (Standard keyboards) keyboard.inf Not Available
Floppy disk drive	Yes	FLOPPYDISK	5.2.3790.1830		HID\VID_0518&PID_0001&MI_00\7&11810124&0&0000
10/1/2002 (Standard floppy disk drives)			flpydisk.inf		USB Human Interface Device Yes HIDCLASS
Not Available			FDC\GENERIC_FLOPPY_DRIVE\5&14BBD7CB&0&0		5.2.3790.1830 10/1/2002 (Standard system devices) input.inf Not Available
Standard floppy disk controller	Yes	FDC	5.2.3790.1830		USB\VID_0518&PID_0001&MI_00\6&111E0DBA&0&0000
10/1/2002 (Standard floppy disk controllers)			fdc.inf		USB Composite Device Yes USB 5.2.3790.1830
Not Available			ACPI\PNP0700\4&26DD0F47&0		10/1/2002 (Standard USB Host Controller) usb.inf Not Available
System timer	Yes	SYSTEM	5.2.3790.1830	10/1/2002	Available
(Standard system devices)			machine.inf		USB\VID_0518&PID_0001&MI_00\5&12282430&0&1
Available			ACPI\PNP0100\4&26DD0F47&0		USB Root Hub Yes USB 5.2.3790.1830 10/1/2002
System CMOS/real time clock	Yes	SYSTEM	5.2.3790.1830		(Standard USB Host Controller) usbport.inf Not Available
10/1/2002 (Standard system devices)			machine.inf		USB\ROOT_HUB\4&56E8D8E&0
Not Available			ACPI\PNP0B00\4&26DD0F47&0		Intel(R) 82801EB USB Universal Host Controller - 24D7 Yes
System speaker	Yes	SYSTEM	5.2.3790.1830	10/1/2002	USB 5.2.3790.1830 10/1/2002 Intel usbport.inf
(Standard system devices)			machine.inf		Not Available
Available			ACPI\PNP0800\4&26DD0F47&0		PCI\VEN_8086&DEV_24D7&SUBSYS_016F1028&REV_02\3&13C0B0C5&0&EA
Programmable interrupt controller	Yes	SYSTEM	5.2.3790.1830		USB Root Hub Yes USB 5.2.3790.1830 10/1/2002
5.2.3790.1830	10/1/2002 (Standard system devices)		machine.inf		(Standard USB Host Controller) usbport.inf Not Available
Not Available			ACPI\PNP0000\4&26DD0F47&0		USB\ROOT_HUB\4&2978E436&0
Numeric data processor	Yes	SYSTEM	5.2.3790.1830		Intel(R) 82801EB USB Universal Host Controller - 24D4 Yes
10/1/2002 (Standard system devices)			machine.inf		USB 5.2.3790.1830 10/1/2002 Intel usbport.inf
Not Available			ACPI\PNP0C04\4&26DD0F47&0		Not Available
Direct memory access controller	Yes	SYSTEM	5.2.3790.1830		PCI\VEN_8086&DEV_24D4&SUBSYS_016F1028&REV_02\3&13C0B0C5&0&E9
10/1/2002 (Standard system devices)			machine.inf		USB Root Hub Yes USB 5.2.3790.1830 10/1/2002
Not Available			ACPI\PNP0200\4&26DD0F47&0		(Standard USB Host Controller) usbport.inf Not Available
Intel(R) 82801EB LPC Interface Controller - 24D0	Yes	SYSTEM	5.2.3790.1830		USB\ROOT_HUB\4&39104496&0
5.2.3790.1830	10/1/2002	Intel	machine.inf		Intel(R) 82801EB USB Universal Host Controller - 24D2 Yes
Not Available			PCI\VEN_8086&DEV_24D0&SUBSYS_00000000&REV_02\3&13C0B0C5&0&F8		USB 5.2.3790.1830 10/1/2002 Intel usbport.inf
Default Monitor	Yes	MONITOR	5.2.3790.1830		Not Available
10/1/2002 (Standard monitor types)			monitor.inf		PCI\VEN_8086&DEV_24D2&SUBSYS_016F1028&REV_02\3&13C0B0C5&0&E8
Not Available			DISPLAY\DEFAULT_MONITOR\5&199D9B00&0&10000000&1C&00		PCI standard host CPU bridge Yes SYSTEM 5.2.3790.1830
Radeon 7000 / RADEON VE Family (Microsoft Corporation)	Yes				10/1/2002 (Standard system devices) machine.inf
DISPLAY 6.14.10.6508	12/3/2004	ATI Technologies			
Inc.	atiixpag.inf	Not Available			

13C0B0C5&0&69	PCI standard RAM Controller	Yes	SYSTEM	5.2.3790.1830	10/1/2002 (Standard system devices)	machine.inf	Not Available	PCI\VEN_8086&DEV_2621&SUBSYS_016F1028&REV_00\3&
13C0B0C5&0&68	PCI standard host CPU bridge	Yes	SYSTEM	5.2.3790.1830	10/1/2002 (Standard system devices)	machine.inf	Not Available	PCI\VEN_8086&DEV_2620&SUBSYS_016F1028&REV_00\3&
13C0B0C5&0&60	PCI standard RAM Controller	Yes	SYSTEM	5.2.3790.1830	10/1/2002 (Standard system devices)	machine.inf	Not Available	PCI\VEN_8086&DEV_260C&SUBSYS_00000000&REV_00\3&
13C0B0C5&0&5F	PCI standard RAM Controller	Yes	SYSTEM	5.2.3790.1830	10/1/2002 (Standard system devices)	machine.inf	Not Available	PCI\VEN_8086&DEV_2627&SUBSYS_016F1028&REV_00\3&
13C0B0C5&0&5E	PCI standard RAM Controller	Yes	SYSTEM	5.2.3790.1830	10/1/2002 (Standard system devices)	machine.inf	Not Available	PCI\VEN_8086&DEV_2626&SUBSYS_016F1028&REV_00\3&
13C0B0C5&0&5D	PCI standard RAM Controller	Yes	SYSTEM	5.2.3790.1830	10/1/2002 (Standard system devices)	machine.inf	Not Available	PCI\VEN_8086&DEV_2625&SUBSYS_016F1028&REV_00\3&
13C0B0C5&0&5C	PCI standard RAM Controller	Yes	SYSTEM	5.2.3790.1830	10/1/2002 (Standard system devices)	machine.inf	Not Available	PCI\VEN_8086&DEV_2624&SUBSYS_016F1028&REV_00\3&
13C0B0C5&0&5B	PCI standard RAM Controller	Yes	SYSTEM	5.2.3790.1830	10/1/2002 (Standard system devices)	machine.inf	Not Available	PCI\VEN_8086&DEV_2623&SUBSYS_016F1028&REV_00\3&
13C0B0C5&0&5A	PCI standard RAM Controller	Yes	SYSTEM	5.2.3790.1830	10/1/2002 (Standard system devices)	machine.inf	Not Available	PCI\VEN_8086&DEV_2622&SUBSYS_016F1028&REV_00\3&
13C0B0C5&0&59	PCI standard RAM Controller	Yes	SYSTEM	5.2.3790.1830	10/1/2002 (Standard system devices)	machine.inf	Not Available	PCI\VEN_8086&DEV_2621&SUBSYS_016F1028&REV_00\3&
13C0B0C5&0&58	PCI standard host CPU bridge	Yes	SYSTEM	5.2.3790.1830	10/1/2002 (Standard system devices)	machine.inf	Not Available	PCI\VEN_8086&DEV_2620&SUBSYS_016F1028&REV_00\3&
13C0B0C5&0&50	PCI standard RAM Controller	Yes	SYSTEM	5.2.3790.1830	10/1/2002 (Standard system devices)	machine.inf	Not Available	PCI\VEN_8086&DEV_260C&SUBSYS_00000000&REV_00\3&
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13C0B0C5&0&4D	PCI standard RAM Controller	Yes	SYSTEM	5.2.3790.1830	10/1/2002 (Standard system devices)	machine.inf	Not Available	PCI\VEN_8086&DEV_2625&SUBSYS_016F1028&REV_00\3&
	PCI standard RAM Controller	Yes	SYSTEM	5.2.3790.1830	10/1/2002 (Standard system devices)	machine.inf	Not Available	PCI\VEN_8086&DEV_2624&SUBSYS_016F1028&REV_00\3&
	PCI standard RAM Controller	Yes	SYSTEM	5.2.3790.1830	10/1/2002 (Standard system devices)	machine.inf	Not Available	PCI\VEN_8086&DEV_2623&SUBSYS_016F1028&REV_00\3&
	PCI standard RAM Controller	Yes	SYSTEM	5.2.3790.1830	10/1/2002 (Standard system devices)	machine.inf	Not Available	PCI\VEN_8086&DEV_2622&SUBSYS_016F1028&REV_00\3&
	PCI standard RAM Controller	Yes	SYSTEM	5.2.3790.1830	10/1/2002 (Standard system devices)	machine.inf	Not Available	PCI\VEN_8086&DEV_2621&SUBSYS_016F1028&REV_00\3&
	PCI standard RAM Controller	Yes	SYSTEM	5.2.3790.1830	10/1/2002 (Standard system devices)	machine.inf	Not Available	PCI\VEN_8086&DEV_2620&SUBSYS_016F1028&REV_00\3&
	PCI standard host CPU bridge	Yes	SYSTEM	5.2.3790.1830	10/1/2002 (Standard system devices)	machine.inf	Not Available	PCI\VEN_8086&DEV_260C&SUBSYS_00000000&REV_00\3&
	PCI standard PCI-to-PCI bridge	Yes	SYSTEM	5.2.3790.1830	10/1/2002 (Standard system devices)	machine.inf	Not Available	PCI\VEN_8086&DEV_0332&SUBSYS_00000000&REV_06\4&
	Disk drive	Yes	DISKDRIVE	5.2.3790.1830	10/1/2002	(Standard disk drives) disk.inf	Not Available	SCSI\DISK&VEN_PERC&PROD_LD_0_PERCRAID&REV_\6&2A7F8708&0&300
	RAID Virtual Device	Yes	SYSTEM	5.2.3790.1830	10/1/2002	American Megatrends, Inc.	scsidev.inf	Not Available
	PE 1x5 Backplane	Yes	SYSTEM	5.2.3790.1830	10/1/2002	SCSI\OTHER&VEN_RAID&PROD_DUMMYDEVICE&REV_0000\6&2A7F8708&0&2390	scsidev.inf	Not Available
	PE 1x5 Backplane	Yes	SYSTEM	5.2.3790.1830	10/1/2002	SCSI\PROCESSOR&VEN_PE/PV&PROD_1X5_SCSI_BP&REV_1_0\6&2A7F8708&0&160	scsidev.inf	Not Available
	Dell PERC 4e/Di RAID Controller	Yes	SCSIADAPTER	5.2.3790.1830	10/1/2002	Dell	pnpscsi.inf	Not Available
	PCI standard PCI-to-PCI bridge	Yes	SYSTEM	5.2.3790.1830	10/1/2002 (Standard system devices)	machine.inf	Not Available	PCI\VEN_1028&DEV_0013&SUBSYS_016F1028&REV_06\5&
	PCI standard PCI-to-PCI bridge	Yes	SYSTEM	5.2.3790.1830	10/1/2002 (Standard system devices)	machine.inf	Not Available	18D0E4AD&0&700038
	PCI standard PCI-to-PCI bridge	Yes	SYSTEM	5.2.3790.1830	10/1/2002 (Standard system devices)	machine.inf	Not Available	PCI\VEN_8086&DEV_0330&SUBSYS_00000000&REV_06\4&
	PCI standard PCI-to-PCI bridge	Yes	SYSTEM	5.2.3790.1830	10/1/2002 (Standard system devices)	machine.inf	Not Available	35432062&0&0038
	Broadcom NetXtreme Gigabit Ethernet	Yes	NET	7.98.0.0	10/1/2002	Broadcom net57amd.inf	Not Available	PCI\VEN_14E4&DEV_1648&SUBSYS_016F1028&REV_10\5&
	Broadcom NetXtreme Gigabit Ethernet	Yes	NET	7.98.0.0	10/1/2002	Broadcom net57amd.inf	Not Available	3BFB1AC&0&110230

PCI\VEN_14E4&DEV_1648&SUBSYS_016F1028&REV_10\5&
3BFB1AC&0&100230
Intel(R) 6700PXH PCI Express-to-PCI Bridge B - 032A Yes
SYSTEM 5.2.3790.1830 10/1/2002 Intel
machine.inf Not Available
PCI\VEN_8086&DEV_032A&SUBSYS_00000000&REV_09\4&
2BB21864&0&0230
Intel(R) 6700PXH PCI Express-to-PCI Bridge A - 0329 Yes SYSTEM
5.2.3790.1830 10/1/2002 Intel machine.inf
Not Available
PCI\VEN_8086&DEV_0329&SUBSYS_00000000&REV_09\4&
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PCI standard PCI-to-PCI bridge Yes SYSTEM 5.2.3790.1830
10/1/2002 (Standard system devices) machine.inf
Not Available
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PCI standard PCI-to-PCI bridge Yes SYSTEM 5.2.3790.1830
10/1/2002 (Standard system devices) machine.inf
Not Available
PCI\VEN_8086&DEV_0332&SUBSYS_00000000&REV_07\4&
229221FD&0&0228
Disk drive Yes DISKDRIVE 5.2.3790.1830 10/1/2002
(Standard disk drives) disk.inf Not Available
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Disk drive Yes DISKDRIVE 5.2.3790.1830 10/1/2002
(Standard disk drives) disk.inf Not Available
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6&25BA32A&0&300
RAID Virtual Device Yes SYSTEM 5.2.3790.1830 10/1/2002
American Megatrends, Inc. scsidev.inf Not Available
SCSI\OTHER&VEN__RAID&PROD_DUMMYDEVICE&RE
V_0000\6&25BA32A&0&2390
DELL PV22XS Backplane Yes SYSTEM 5.2.3790.1830
10/1/2002 Dell scsidev.inf Not Available
SCSI\PROCESSOR&VEN_DELL&PROD_PV22XS&REV_E.17\
6&25BA32A&0&160
DELL PV22XS Backplane Yes SYSTEM 5.2.3790.1830
10/1/2002 Dell scsidev.inf Not Available
SCSI\PROCESSOR&VEN_DELL&PROD_PV22XS&REV_E.17\
6&25BA32A&0&060
Dell PERC 4e/DC RAID Controller Yes SCSIADAPTER
5.2.3790.1830 10/1/2002 Dell pnpscsi.inf Not
Available
PCI\VEN_1000&DEV_0408&SUBSYS_00021028&REV_07\5&
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PCI standard PCI-to-PCI bridge Yes SYSTEM 5.2.3790.1830
10/1/2002 (Standard system devices) machine.inf
Not Available
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PCI standard PCI-to-PCI bridge Yes SYSTEM 5.2.3790.1830
10/1/2002 (Standard system devices) machine.inf
Not Available
PCI\VEN_8086&DEV_2605&SUBSYS_00000000&REV_00\3&
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PCI standard PCI-to-PCI bridge Yes SYSTEM 5.2.3790.1830
10/1/2002 (Standard system devices) machine.inf
Not Available
PCI\VEN_8086&DEV_0332&SUBSYS_00000000&REV_07\4&
190119FF&0&0220
Disk drive Yes DISKDRIVE 5.2.3790.1830 10/1/2002
(Standard disk drives) disk.inf Not Available
SCSI\DISK&VEN_PERC&PROD_LD_1_PERCRAID&REV_\
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Disk drive Yes DISKDRIVE 5.2.3790.1830 10/1/2002
(Standard disk drives) disk.inf Not Available
SCSI\DISK&VEN_PERC&PROD_LD_0_PERCRAID&REV_\
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RAID Virtual Device Yes SYSTEM 5.2.3790.1830 10/1/2002
American Megatrends, Inc. scsidev.inf Not Available

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V_0000\6&3484200D&0&2390
DELL PV22XS Backplane Yes SYSTEM 5.2.3790.1830
10/1/2002 Dell scsidev.inf Not Available
SCSI\PROCESSOR&VEN_DELL&PROD_PV22XS&REV_E.17\
6&3484200D&0&160
DELL PV22XS Backplane Yes SYSTEM 5.2.3790.1830
10/1/2002 Dell scsidev.inf Not Available
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Dell PERC 4e/DC RAID Controller Yes SCSIADAPTER
5.2.3790.1830 10/1/2002 Dell pnpscsi.inf Not
Available
PCI\VEN_1000&DEV_0408&SUBSYS_00021028&REV_07\5&
266C47C5&0&700020
PCI standard PCI-to-PCI bridge Yes SYSTEM 5.2.3790.1830
10/1/2002 (Standard system devices) machine.inf
Not Available
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190119FF&0&0020
PCI standard PCI-to-PCI bridge Yes SYSTEM 5.2.3790.1830
10/1/2002 (Standard system devices) machine.inf
Not Available
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PCI standard PCI-to-PCI bridge Yes SYSTEM 5.2.3790.1830
10/1/2002 (Standard system devices) machine.inf
Not Available
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PCI standard PCI-to-PCI bridge Yes SYSTEM 5.2.3790.1830
10/1/2002 (Standard system devices) machine.inf
Not Available
PCI\VEN_8086&DEV_0332&SUBSYS_00000000&REV_07\4&
6501B9A&0&0210
Disk drive Yes DISKDRIVE 5.2.3790.1830 10/1/2002
(Standard disk drives) disk.inf Not Available
SCSI\DISK&VEN_PERC&PROD_LD_1_PERCRAID&REV_\
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(Standard disk drives) disk.inf Not Available
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American Megatrends, Inc. scsidev.inf Not Available
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DELL PV22XS Backplane Yes SYSTEM 5.2.3790.1830
10/1/2002 Dell scsidev.inf Not Available
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Dell PERC 4e/DC RAID Controller Yes SCSIADAPTER
5.2.3790.1830 10/1/2002 Dell pnpscsi.inf Not
Available
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PCI standard PCI-to-PCI bridge Yes SYSTEM 5.2.3790.1830
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PCI\VEN_8086&DEV_0332&SUBSYS_00000000&REV_07\4&
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(Standard disk drives) disk.inf      Not Available
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Disk drive Yes      DISKDRIVE      5.2.3790.1830      10/1/2002
(Standard disk drives) disk.inf      Not Available
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6&24290062&0&300
RAID Virtual Device Yes      SYSTEM      5.2.3790.1830      10/1/2002
American Megatrends, Inc.      scsidev.inf Not Available
SCSI\OTHER&VEN_RAID&PROD_DUMMYDEVICE&RE
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DELL PV22XS Backplane Yes      SYSTEM      5.2.3790.1830
10/1/2002 Dell      scsidev.inf Not Available
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DELL PV22XS Backplane Yes      SYSTEM      5.2.3790.1830
10/1/2002 Dell      scsidev.inf Not Available
SCSI\PROCESSOR&VEN_DELL&PROD_PV22XS&REV_E.17\
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Dell PERC 4e/DC RAID Controller Yes      SCSIADAPTER
5.2.3790.1830      10/1/2002 Dell      pnpscsi.inf Not
Available
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10/1/2002 (Standard system devices)      machine.inf
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PCI standard host CPU bridge Yes      SYSTEM      5.2.3790.1830
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Not Available
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PCI bus Yes      SYSTEM      5.2.3790.1830      10/1/2002 (Standard
system devices)      machine.inf      Not Available
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Intel Processor Yes      PROCESSOR      5.2.3790.1830
10/1/2002 Intel      cpu.inf      Not Available
ACPI\GENUINEINTEL_-_EM64T_FAMILY_15_MODEL_4\15
Intel Processor Yes      PROCESSOR      5.2.3790.1830
10/1/2002 Intel      cpu.inf      Not Available
ACPI\GENUINEINTEL_-_EM64T_FAMILY_15_MODEL_4\14
Intel Processor Yes      PROCESSOR      5.2.3790.1830
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10/1/2002 Intel      cpu.inf      Not Available
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10/1/2002 Intel      cpu.inf      Not Available
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Intel Processor Yes      PROCESSOR      5.2.3790.1830
10/1/2002 Intel      cpu.inf      Not Available
ACPI\GENUINEINTEL_-_EM64T_FAMILY_15_MODEL_4\8
Intel Processor Yes      PROCESSOR      5.2.3790.1830
10/1/2002 Intel      cpu.inf      Not Available
ACPI\GENUINEINTEL_-_EM64T_FAMILY_15_MODEL_4\7

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10/1/2002 Intel      cpu.inf      Not Available
ACPI\GENUINEINTEL_-_EM64T_FAMILY_15_MODEL_4\4
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10/1/2002 Intel      cpu.inf      Not Available
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Intel Processor Yes      PROCESSOR      5.2.3790.1830
10/1/2002 Intel      cpu.inf      Not Available
ACPI\GENUINEINTEL_-_EM64T_FAMILY_15_MODEL_4\1
Intel Processor Yes      PROCESSOR      5.2.3790.1830
10/1/2002 Intel      cpu.inf      Not Available
ACPI\GENUINEINTEL_-_EM64T_FAMILY_15_MODEL_4\0
Microsoft ACPI-Compliant System Yes      SYSTEM
5.2.3790.1830      10/1/2002 Microsoft acpi.inf      Not
Available
ACPI_HAL\PNP0C08\0
ACPI Multiprocessor x64-based PC Yes      COMPUTER
5.2.3790.1830      10/1/2002 (Standard computers) hal.inf
Not Available
ROOT\ACPI_HAL\0000
Not Available      Not Available      Not Available      Not
Available
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
ComSpec %SystemRoot%\system32\cmd.exe <SYSTEM>
FP_NO_HOST_CHECK NO <SYSTEM>
lib C:\Program Files\SQLXML 4.0\bin\ <SYSTEM>
NUMBER_OF_PROCESSORS 16 <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
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PROCESSOR_ARCHITECTURE AMD64 <SYSTEM>
PROCESSOR_IDENTIFIER EM64T Family 15 Model 4 Stepping 8,
GenuineIntel <SYSTEM>
PROCESSOR_LEVEL 15 <SYSTEM>
PROCESSOR_REVISION 0408 <SYSTEM>
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TMP %SystemRoot%\TEMP <SYSTEM>
windir %SystemRoot% <SYSTEM>
TEMP %USERPROFILE%\Local Settings\Temp NT
AUTHORITY\SYSTEM
TMP %USERPROFILE%\Local Settings\Temp NT
AUTHORITY\SYSTEM
TEMP %USERPROFILE%\Local Settings\Temp NT
AUTHORITY\LOCAL SERVICE
TMP %USERPROFILE%\Local Settings\Temp NT
AUTHORITY\LOCAL SERVICE
TEMP %USERPROFILE%\Local Settings\Temp NT
AUTHORITY\NETWORK SERVICE
TMP %USERPROFILE%\Local Settings\Temp NT
AUTHORITY\NETWORK SERVICE

```

TEMP %USERPROFILE%\Local Settings\Temp
PE6800\Administrator
TMP %USERPROFILE%\Local Settings\Temp
PE6800\Administrator

[Print Jobs]

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

[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
system	Not Available	Not Available	4	8	0 1413120
smss.exe	Not Available	416	11	204800	1413120
csrss.exe	Not Available	604	13	Not Available	Not Available
winlogon.exe	c:\windows\system32\winlogon.exe	13	204800	1413120	2/10/2006 7:41 AM
(922,624 bytes)	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	3/25/2005 6:00 AM			901.00 KB
services.exe	c:\windows\system32\services.exe	9	204800	1413120	2/10/2006 7:41 AM
(221,696 bytes)	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	3/25/2005 6:00 AM			216.50 KB
lsass.exe	c:\windows\system32\lsass.exe	1413120	2/10/2006 7:41 AM	5.2.3790.1830	204800
(srv03_sp1_rtm.050324-1447)	14.00 KB (14,336 bytes)	3/25/2005 6:00 AM			
svchost.exe	c:\windows\system32\svchost.exe	8	204800	1413120	2/10/2006 7:41 AM
(25,088 bytes)	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	3/25/2005 6:00 AM			24.50 KB
svchost.exe	Not Available	Not Available	1008	8	Not Available
Available	Not Available	2/10/2006 7:41 AM	Not Available		
svchost.exe	Not Available	Not Available	280	8	Not Available
Available	Not Available	2/10/2006 7:41 AM	Not Available		
svchost.exe	c:\windows\system32\svchost.exe	8	204800	1413120	2/10/2006 7:41 AM
(25,088 bytes)	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	3/25/2005 6:00 AM			24.50 KB
msdtc.exe	Not Available	Not Available	584	8	Not Available
Not Available	2/10/2006 7:41 AM	Not Available			
svchost.exe	c:\windows\system32\svchost.exe	8	204800	1413120	2/10/2006 7:41 AM
(25,088 bytes)	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	3/25/2005 6:00 AM			24.50 KB
inetinfo.exe	c:\windows\system32\inetrv\inetinfo.exe	8	204800	1413120	2/10/2006 7:41 AM
(17,920 bytes)	6.0.3790.1830 (srv03_sp1_rtm.050324-1447)	1/25/2006 2:33 AM			17.50 KB
svchost.exe	Not Available	Not Available	1284	8	Not Available
Available	Not Available	2/10/2006 7:41 AM	Not Available		
Not Available	Not Available				

svchost.exe	Not Available	1368	8	Not Available	
Available	Not Available	2/10/2006 7:41 AM	Not Available		
svchost.exe	c:\windows\system32\svchost.exe	8	204800	1413120	2/10/2006 7:41 AM
(25,088 bytes)	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	3/25/2005 6:00 AM			24.50 KB
svchost.exe	c:\windows\system32\svchost.exe	8	204800	1413120	2/10/2006 7:41 AM
(25,088 bytes)	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	3/25/2005 6:00 AM			24.50 KB
wmiprvse.exe	Not Available	1696	8	Not Available	
Available	Not Available	2/10/2006 7:42 AM	Not Available		
csrss.exe	Not Available	296	13	Not Available	
Not Available	2/10/2006 7:46 AM	Not Available			
winlogon.exe	c:\windows\system32\winlogon.exe	13	204800	1413120	2/10/2006 7:46 AM
(922,624 bytes)	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	3/25/2005 6:00 AM			901.00 KB
rdpclip.exec	c:\windows\system32\rdpclip.exe	1413120	2/10/2006 7:46 AM	5.2.3790.1830	204800
(srv03_sp1_rtm.050324-1447)	99.00 KB (101,376 bytes)	1/25/2006 2:10 AM			
explorer.exe	c:\windows\explorer.exe	204800	1413120	2/10/2006 7:46 AM	8
(srv03_sp1_rtm.050324-1447)	1.30 MB (1,364,480 bytes)	3/25/2005 6:00 AM			
cmd.exe	c:\windows\system32\cmd.exe	1413120	2/10/2006 7:46 AM	5.2.3790.1830	204800
(srv03_sp1_rtm.050324-1447)	538.50 KB (551,424 bytes)	3/25/2005 6:00 AM			
sqlservr.exe	c:\program files\microsoft sql server\mssql.1\mssql\bin\sqlservr.exe	1413120	2/10/2006 7:46 AM	2005.090.1399.00	204800
(39,379,672 bytes)	10/14/2005 3:37 PM				37.56 MB
logon.scr	Not Available	2284	4	Not Available	
Not Available	2/10/2006 7:51 AM	Not Available			
wpabaln.exe	c:\windows\system32\wpabaln.exe	8	204800	1413120	2/13/2006 7:48 AM
(34,304 bytes)	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	3/25/2005 6:00 AM			2012
helpctr.exe	c:\windows\pchealth\helpctr\binaries\helpctr.exe	8	204800	1413120	2/14/2006 5:24 AM
(1,363,456 bytes)	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	1/25/2006 2:11 AM			2556
helpsvc.exe	c:\windows\pchealth\helpctr\binaries\helpsvc.exe	1828	8	204800	1413120
(1,591,296 bytes)	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	1/25/2006 2:11 AM			1.30 MB
wmiprvse.exe	Not Available	2824	8	Not Available	
Available	Not Available	2/14/2006 5:24 AM	Not Available		
Not Available	Not Available				

[Loaded Modules]

Name	Version	Size	File Date	Manufacturer	Path
winlogon	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	(922,624 bytes)	3/25/2005 6:00 AM	Microsoft Corporation	901.00 KB
ntdll	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	(1,257,472 bytes)	3/25/2005 6:00 AM	Microsoft Corporation	1.20 MB
kernel32	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	(1,500,160 bytes)	3/25/2005 6:00 AM	Microsoft Corporation	1.43 MB
advapi32	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	(1,051,136 bytes)	3/25/2005 6:00 AM	Microsoft Corporation	1.00 MB

rpert4	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	1.63 MB	imagehlp	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	57.50 KB
(1,714,176 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(58,880 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\rpert4.dll			c:\windows\system32\imagehlp.dll	
crypt32	5.131.3790.1830 (srv03_sp1_rtm.050324-1447)	1.36 MB	ole32	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	2.43 MB
(1,428,992 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(2,543,616 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\crypt32.dll			c:\windows\system32\ole32.dll	
msasn1	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	152.50 KB	comctl32	6.0 (srv03_sp1_rtm.050324-1447)	1.51 MB (1,584,128 bytes)
(156,160 bytes)	3/25/2005 6:00 AM Microsoft Corporation			1/24/2006 7:21 PM Microsoft Corporation	
	c:\windows\system32\msasn1.dll			c:\windows\winsxs\amd64_microsoft.windows.common-controls_6595b64144ccf1df_6.0.3790.1830_x-ww_aced72af\comctl32.dll	
msvcrt	7.0.3790.1830 (srv03_sp1_rtm.050324-1447)	508.00 KB	winscard	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	230.00 KB
(520,192 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(235,520 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\msvcrt.dll			c:\windows\system32\winscard.dll	
user32	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	1.04 MB	wtsapi32	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	29.00 KB
(1,085,952 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(29,696 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\user32.dll			c:\windows\system32\wtsapi32.dll	
gdi32	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	592.00 KB	winmm	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	303.50 KB
(606,208 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(310,784 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\gdi32.dll			c:\windows\system32\winmm.dll	
nddeapi	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	25.00 KB	shell32	6.0.3790.1830 (srv03_sp1_rtm.050324-1447)	10.01 MB
(25,600 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(10,492,416 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\nddeapi.dll			c:\windows\system32\shell32.dll	
profmap	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	36.00 KB	sxs	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	1.91 MB
(36,864 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(2,003,968 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\profmap.dll			c:\windows\system32\sxs.dll	
netapi32	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	589.00 KB	rsaenh	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	241.96 KB
(603,136 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(247,768 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\netapi32.dll			c:\windows\system32\rsaenh.dll	
userenv	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	1.02 MB	wldap32	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	390.00 KB
(1,069,056 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(399,360 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\userenv.dll			c:\windows\system32\wldap32.dll	
psapi	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	29.00 KB	csdll	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	151.50 KB
(29,696 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(155,136 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\psapi.dll			c:\windows\system32\csdll.dll	
regapi	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	108.50 KB	dimsntfy	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	28.00 KB
(111,104 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(28,672 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\regapi.dll			c:\windows\system32\dimsntfy.dll	
secur32	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	120.00 KB	wlnotify	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	148.00 KB
(122,880 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(151,552 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\secur32.dll			c:\windows\system32\wlnotify.dll	
setupapi	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	1.45 MB	mpr	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	115.00 KB
(1,523,200 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(117,760 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\setupapi.dll			c:\windows\system32\mpr.dll	
version	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	28.00 KB	oleaut32	5.2.3790.1830	1.06 MB (1,116,160 bytes)
(28,672 bytes)	3/25/2005 6:00 AM Microsoft Corporation			6:00 AM Microsoft Corporation	
	c:\windows\system32\version.dll			c:\windows\system32\oleaut32.dll	
winsta	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	89.00 KB	winspool	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	247.00 KB
(91,136 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(252,928 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\winsta.dll			c:\windows\system32\winspool.drv	
ws2_32	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	176.50 KB	comctl32	5.82 (srv03_sp1_rtm.050324-1447)	934.50 KB (956,928 bytes)
(180,736 bytes)	3/25/2005 6:00 AM Microsoft Corporation			1/24/2006 7:21 PM Microsoft Corporation	
	c:\windows\system32\ws2_32.dll			c:\windows\winsxs\amd64_microsoft.windows.common-controls_6595b64144ccf1df_5.82.3790.1830_x-ww_4d792d2a\comctl32.dll	
ws2help	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	30.50 KB	uxtheme	6.00.3790.1830 (srv03_sp1_rtm.050324-1447)	494.50 KB
(31,232 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(506,368 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\ws2help.dll			c:\windows\system32\uxtheme.dll	
msgina	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	1.14 MB	mprapi	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	154.50 KB
(1,193,472 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(158,208 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\msgina.dll			c:\windows\system32\mprapi.dll	
shsvcs	6.00.3790.1830 (srv03_sp1_rtm.050324-1447)	193.50 KB	activeds	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	348.50 KB
(198,144 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(356,864 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\shsvcs.dll			c:\windows\system32\activeds.dll	
shlwapi	6.00.3790.1830 (srv03_sp1_rtm.050324-1447)	606.50 KB	adslstp	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	240.50 KB
(621,056 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(246,272 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\shlwapi.dll			c:\windows\system32\adslstp.dll	
sfc	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	6.00 KB	credui	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	202.00 KB
(6,144 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(206,848 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\sfc.dll			c:\windows\system32\credui.dll	
sfc_os	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	183.50 KB	atl	3.05.2284 96.50 KB (98,816 bytes)	3/25/2005 6:00 AM
(187,904 bytes)	3/25/2005 6:00 AM Microsoft Corporation			Microsoft Corporation	
	c:\windows\system32\sfc_os.dll			c:\windows\system32\atl.dll	
wintrust	5.131.3790.1830 (srv03_sp1_rtm.050324-1447)	297.50 KB	rtutils	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	66.00 KB
(304,640 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(67,584 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\wintrust.dll			c:\windows\system32\rtutils.dll	

samlib	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	69.00 KB	iphlpapi	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	177.00 KB
(70,656 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(181,248 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\samlib.dll			c:\windows\system32\iphlpapi.dll	
clbcatq	2001.12.4720.1830 (srv03_sp1_rtm.050324-1447)	865.00 KB	netlogon	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	666.00 KB
(885,760 bytes)	1/25/2006 2:10 AM Microsoft Corporation		(681,984 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\clbcatq.dll			c:\windows\system32\netlogon.dll	
comres	2001.12.4720.1830 (srv03_sp1_rtm.050324-1447)	779.50 KB	w32time	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	400.50 KB
(798,208 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(410,112 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\comres.dll			c:\windows\system32\w32time.dll	
wbemprox	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	38.00 KB	schannel	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	248.00 KB
(38,912 bytes)	1/25/2006 2:10 AM Microsoft Corporation		(253,952 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\wbem\wbemprox.dll			c:\windows\system32\schannel.dll	
wbemcomn	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)		wdigest	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	130.50 KB
524.00 KB (536,576 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(133,632 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\wbem\wbemcomn.dll			c:\windows\system32\wdigest.dll	
xpsp2res	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	2.77 MB	rassfm	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	36.00 KB
(2,899,456 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(36,864 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\xpsp2res.dll			c:\windows\system32\rassfm.dll	
wbemsvc	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	58.00 KB	kdcsvc	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	409.00 KB
(59,392 bytes)	1/25/2006 2:10 AM Microsoft Corporation		(418,816 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\wbem\wbemsvc.dll			c:\windows\system32\kdcsvc.dll	
fastprox	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	866.50 KB	ntdsa	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	2.81 MB
(887,296 bytes)	1/25/2006 2:10 AM Microsoft Corporation		(2,948,096 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\wbem\fastprox.dll			c:\windows\system32\ntdsa.dll	
msvcp60	7.0.3790.1830 (srv03_sp1_rtm.050324-1447)	919.50 KB	esent	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	2.26 MB
(941,568 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(2,366,976 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\msvcp60.dll			c:\windows\system32\esent.dll	
ntdsapi	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	127.50 KB	ntdsatq	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	51.00 KB
(130,560 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(52,224 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\ntdsapi.dll			c:\windows\system32\ntdsatq.dll	
dnsapi	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	297.50 KB	mswsock	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	478.00 KB
(304,640 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(489,472 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\dnsapi.dll			c:\windows\system32\mswsock.dll	
services	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	216.50 KB	scecli	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	308.00 KB
(221,696 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(315,392 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\services.exe			c:\windows\system32\scecli.dll	
ncobjapi	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	80.00 KB	ws03res	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	794.00 KB
(81,920 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(813,056 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\ncobjapi.dll			c:\windows\system32\ws03res.dll	
scesrv	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	594.50 KB	ipsecsvc	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	358.50 KB
(608,768 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(367,104 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\scesrv.dll			c:\windows\system32\ipsecsvc.dll	
authz	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	167.00 KB	oakley	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	372.50 KB
(171,008 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(381,440 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\authz.dll			c:\windows\system32\oakley.dll	
umpnpgmr	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	205.00 KB	winpipsec	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	52.50 KB
(209,920 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(53,760 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\umpnpgmr.dll			c:\windows\system32\winpipsec.dll	
eventlog	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	127.00 KB	hnetcfg	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	561.00 KB
(130,048 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(574,464 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\eventlog.dll			c:\windows\system32\hnetcfg.dll	
lsass	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	14.00 KB	wshtcpip	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	29.00 KB
(14,336 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(29,696 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\lsass.exe			c:\windows\system32\wshtcpip.dll	
lsasrv	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	1.50 MB	dssenh	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	226.96 KB
(1,568,256 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(232,408 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\lsasrv.dll			c:\windows\system32\dssenh.dll	
samsrv	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	1.01 MB	wlbsctrl	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	137.50 KB
(1,059,328 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(140,800 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\samsrv.dll			c:\windows\system32\wlbsctrl.dll	
cryptdll	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	47.00 KB	w3ssl	6.0.3790.1830 (srv03_sp1_rtm.050324-1447)	21.00 KB
(48,128 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(21,504 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\cryptdll.dll			c:\windows\system32\w3ssl.dll	
msprivs	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	47.50 KB	strmfilt	6.0.3790.1830 (srv03_sp1_rtm.050324-1447)	131.50 KB
(48,640 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(134,656 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\msprivs.dll			c:\windows\system32\strmfilt.dll	
kerberos	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	698.00 KB	httpapi	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	36.50 KB
(714,752 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(37,376 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\kerberos.dll			c:\windows\system32\httpapi.dll	
msv1_0	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	253.00 KB	svchost	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	24.50 KB
(259,072 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(25,088 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\msv1_0.dll			c:\windows\system32\svchost.exe	

rpsess	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	672.00 KB	netman	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	457.00 KB
(688,128 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(467,968 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\rpsess.dll			c:\windows\system32\netman.dll	
ntmarta	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	222.50 KB	netshell	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	2.32 MB
(227,840 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(2,437,120 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\ntmarta.dll			c:\windows\system32\netshell.dll	
wkssvc	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	221.00 KB	clusapi	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	127.00 KB
(226,304 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(130,048 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\wkssvc.dll			c:\windows\system32\clusapi.dll	
wiarpc	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	57.00 KB	rasapi32	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	410.00 KB
(58,368 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(419,840 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\wiarpc.dll			c:\windows\system32\rasapi32.dll	
aelupsvc	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	31.50 KB	rasman	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	95.50 KB
(32,256 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(97,792 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\aelupsvc.dll			c:\windows\system32\rasman.dll	
apphelp	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	241.00 KB	tapi32	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	332.50 KB
(246,784 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(340,480 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\apphelp.dll			c:\windows\system32\tapi32.dll	
cryptsvc	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	114.00 KB	wininet	6.00.3790.1830 (srv03_sp1_rtm.050324-1447)	1.13 MB
(116,736 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(1,186,304 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\cryptsvc.dll			c:\windows\system32\wininet.dll	
certcli	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	372.00 KB	wzcsapi	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	49.00 KB
(380,928 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(50,176 bytes)	3/24/2005 11:35 AM Microsoft Corporation	
	c:\windows\system32\certcli.dll			c:\windows\system32\wzcsapi.dll	
vssapi	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	1.26 MB	wzcsvc	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	492.00 KB
(1,320,960 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(503,808 bytes)	3/24/2005 11:35 AM Microsoft Corporation	
	c:\windows\system32\vssapi.dll			c:\windows\system32\wzcsvc.dll	
es	2001.12.4720.1830 (srv03_sp1_rtm.050324-1447)	357.00 KB	wmi	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	5.50 KB
(365,568 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(5,632 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\es.dll			c:\windows\system32\wmi.dll	
hidserv	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	24.00 KB	dhcpcsvc	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	219.00 KB
(24,576 bytes)	1/24/2006 7:28 PM Microsoft Corporation		(224,256 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\hidserv.dll			c:\windows\system32\dhcpcsvc.dll	
hid	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	33.00 KB	rasdlg	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	859.50 KB
(33,792 bytes)	3/24/2005 11:18 AM Microsoft Corporation		(880,128 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\hid.dll			c:\windows\system32\rasdlg.dll	
dmserver	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	36.50 KB	netcfgx	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	1.29 MB
(37,376 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(1,354,240 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\dmserver.dll			c:\windows\system32\netcfgx.dll	
sens	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	63.50 KB	pchsvc	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	76.00 KB
(65,024 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(77,824 bytes)	1/25/2006 2:11 AM Microsoft Corporation	
	c:\windows\system32\sens.dll			c:\windows\system32\pchsvc.dll	
comsvcs	2001.12.4720.1830 (srv03_sp1_rtm.050324-1447)	2.06 MB	wbemcons	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	65.50 KB
(2,156,544 bytes)	1/25/2006 2:10 AM Microsoft Corporation		(67,072 bytes)	1/25/2006 2:10 AM Microsoft Corporation	
	c:\windows\system32\comsvcs.dll			c:\windows\system32\wbem\wbemcons.dll	
trkwks	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	177.50 KB	ersvc	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	31.00 KB
(181,760 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(31,744 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\trkwks.dll			c:\windows\system32\ersvc.dll	
wmisvc	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	227.00 KB	inetinfo	6.0.3790.1830 (srv03_sp1_rtm.050324-1447)	17.50 KB
(232,448 bytes)	1/25/2006 2:10 AM Microsoft Corporation		(17,920 bytes)	1/25/2006 2:33 AM Microsoft Corporation	
	c:\windows\system32\wbem\wmisvc.dll			c:\windows\system32\inetinfo.exe	
wbemcore	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	1.24 MB	iisutil	6.0.3790.1830 (srv03_sp1_rtm.050324-1447)	316.50 KB
(1,299,968 bytes)	1/25/2006 2:10 AM Microsoft Corporation		(324,096 bytes)	1/25/2006 2:33 AM Microsoft Corporation	
	c:\windows\system32\wbem\wbemcore.dll			c:\windows\system32\inetinfo\iisutil.dll	
esscli	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	626.50 KB	rpref	6.0.3790.1830 (srv03_sp1_rtm.050324-1447)	4.50 KB
(641,536 bytes)	1/25/2006 2:10 AM Microsoft Corporation		(4,608 bytes)	1/25/2006 2:33 AM Microsoft Corporation	
	c:\windows\system32\wbem\esscli.dll			c:\windows\system32\inetinfo\rpref.dll	
wmiutils	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	171.00 KB	iisrtl	6.0.3790.1830 (srv03_sp1_rtm.050324-1447)	225.00 KB
(175,104 bytes)	1/25/2006 2:10 AM Microsoft Corporation		(230,400 bytes)	1/25/2006 2:33 AM Microsoft Corporation	
	c:\windows\system32\wbem\wmiutils.dll			c:\windows\system32\iisrtl.dll	
repdrvfs	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	353.50 KB	iisadmin	6.0.3790.1830 (srv03_sp1_rtm.050324-1447)	30.00 KB
(361,984 bytes)	1/25/2006 2:10 AM Microsoft Corporation		(30,720 bytes)	1/25/2006 2:33 AM Microsoft Corporation	
	c:\windows\system32\wbem\repdrvfs.dll			c:\windows\system32\inetinfo\iisadmin.dll	
wmiprvsd	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	743.00 KB	coadmin	6.0.3790.1830 (srv03_sp1_rtm.050324-1447)	100.50 KB
(760,832 bytes)	1/25/2006 2:10 AM Microsoft Corporation		(102,912 bytes)	1/25/2006 2:33 AM Microsoft Corporation	
	c:\windows\system32\wbem\wmiprvsd.dll			c:\windows\system32\inetinfo\coadmin.dll	
wbemess	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	532.50 KB	admwprox	6.0.3790.1830 (srv03_sp1_rtm.050324-1447)	66.00 KB
(545,280 bytes)	1/25/2006 2:10 AM Microsoft Corporation		(67,584 bytes)	1/25/2006 2:33 AM Microsoft Corporation	
	c:\windows\system32\wbem\wbemess.dll			c:\windows\system32\admwprox.dll	
ncprov	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	73.00 KB	iisfcg	6.0.3790.1830 (srv03_sp1_rtm.050324-1447)	1.24 MB
(74,752 bytes)	1/25/2006 2:10 AM Microsoft Corporation		(1,298,432 bytes)	1/25/2006 2:33 AM Microsoft Corporation	
	c:\windows\system32\wbem\ncprov.dll			c:\windows\system32\inetinfo\iisfcg.dll	

metadata	6.0.3790.1830 (srv03_sp1_rtm.050324-1447)	342.00 KB	rdpclip	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	99.00 KB
(350,208 bytes)	1/25/2006 2:33 AM Microsoft Corporation		(101,376 bytes)	1/25/2006 2:10 AM Microsoft Corporation	
	c:\windows\system32\inetsrv\metadata.dll			c:\windows\system32\rdpclip.exe	
msxml3	8.70.1104.0 2.04 MB (2,141,184 bytes)	3/25/2005	wsock32	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	24.50 KB
6:00 AM	Microsoft Corporation		(25,088 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\msxml3.dll			c:\windows\system32\wsock32.dll	
svcxext	6.0.3790.1830 (srv03_sp1_rtm.050324-1447)	60.50 KB	urlmon	6.00.3790.1830 (srv03_sp1_rtm.050324-1447)	1.02 MB
(61,952 bytes)	1/25/2006 2:33 AM Microsoft Corporation		(1,074,176 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\inetsrv\svcxext.dll			c:\windows\system32\urlmon.dll	
security	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	6.00 KB	explorer	6.00.3790.1830 (srv03_sp1_rtm.050324-1447)	1.30 MB
(6,144 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(1,364,480 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\security.dll			c:\windows\explorer.exe	
iismap	6.0.3790.1830 (srv03_sp1_rtm.050324-1447)	97.00 KB	browseui	6.00.3790.1830 (srv03_sp1_rtm.050324-1447)	1.53 MB
(99,328 bytes)	1/25/2006 2:33 AM Microsoft Corporation		(1,601,536 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\iismap.dll			c:\windows\system32\browseui.dll	
wamreg	6.0.3790.1830 (srv03_sp1_rtm.050324-1447)	78.50 KB	shdocvw	6.00.3790.1830 (srv03_sp1_rtm.050324-1447)	2.30 MB
(80,384 bytes)	1/25/2006 2:33 AM Microsoft Corporation		(2,416,128 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\inetsrv\wamreg.dll			c:\windows\system32\shdocvw.dll	
iisw3adm	6.0.3790.1830 (srv03_sp1_rtm.050324-1447)	305.00 KB	cryptui	5.131.3790.1830 (srv03_sp1_rtm.050324-1447)	705.50 KB
(312,320 bytes)	1/25/2006 2:33 AM Microsoft Corporation		(722,432 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\inetsrv\iisw3adm.dll			c:\windows\system32\cryptui.dll	
w3cache	6.0.3790.1830 (srv03_sp1_rtm.050324-1447)	27.50 KB	themeui	6.00.3790.1830 (srv03_sp1_rtm.050324-1447)	530.50 KB
(28,160 bytes)	1/25/2006 2:33 AM Microsoft Corporation		(543,232 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\inetsrv\w3cache.dll			c:\windows\system32\themeui.dll	
w3tp	6.0.3790.1830 (srv03_sp1_rtm.050324-1447)	16.00 KB	msimg32	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	6.50 KB
(16,384 bytes)	1/25/2006 2:33 AM Microsoft Corporation		(6,656 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\inetsrv\w3tp.dll			c:\windows\system32\msimg32.dll	
lonsint	6.0.3790.1830 (srv03_sp1_rtm.050324-1447)	17.50 KB	actxprxy	6.00.3790.1830 (srv03_sp1_rtm.050324-1447)	220.50 KB
(17,920 bytes)	1/25/2006 2:33 AM Microsoft Corporation		(225,792 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\inetsrv\lonsint.dll			c:\windows\system32\actxprxy.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)	1/25/2006 2:10 AM 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	ntshui	6.00.3790.1830 (srv03_sp1_rtm.050324-1447)	184.00 KB
(28,160 bytes)	1/25/2006 2:10 AM Microsoft Corporation		(188,416 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\icaapi.dll			c:\windows\system32\ntshui.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)	1/25/2006 2:10 AM Microsoft Corporation		(145,920 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\rdpwsx.dll			c:\windows\system32\stobject.dll	
rdpsnd	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	25.00 KB	batmeter	6.00.3790.1830 (srv03_sp1_rtm.050324-1447)	41.50 KB
(25,600 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(42,496 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\rdpsnd.dll			c:\windows\system32\batmeter.dll	
scredir	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	38.50 KB	powrprof	6.00.3790.1830 (srv03_sp1_rtm.050324-1447)	32.50 KB
(39,424 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(33,280 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\scredir.dll			c:\windows\system32\powrprof.dll	
cscui	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	441.00 KB	browseui	6.00.3790.1830 (srv03_sp1_rtm.050324-1447)	63.00 KB
(451,584 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(64,512 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\cscui.dll			c:\windows\system32\browseui.dll	
msacm32	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	31.00 KB	shdoclc	6.00.3790.1830 (srv03_sp1_rtm.050324-1447)	589.50 KB
(31,744 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(603,648 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\msacm32.drv			c:\windows\system32\shdoclc.dll	
msacm32	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	112.00 KB	mydocs	6.00.3790.1830 (srv03_sp1_rtm.050324-1447)	101.00 KB
(114,688 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(103,424 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\msacm32.dll			c:\windows\system32\mydocs.dll	
imaadp32	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	24.00 KB	drprov	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	24.00 KB
(24,576 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(24,576 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\imaadp32.acm			c:\windows\system32\drprov.dll	
msadp32	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	23.50 KB	ntlanman	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	71.50 KB
(24,064 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(73,216 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\msadp32.acm			c:\windows\system32\ntlanman.dll	
msg711	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	13.50 KB	netui0	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	130.00 KB
(13,824 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(133,120 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\msg711.acm			c:\windows\system32\netui0.dll	
msgsm32	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	34.50 KB	netui1	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	338.50 KB
(35,328 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(346,624 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\msgsm32.acm			c:\windows\system32\netui1.dll	
tssoft32	1.01 13.50 KB (13,824 bytes)	3/25/2005 6:00 AM	davclnt	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	38.00 KB
	DSP GROUP, INC.		(38,912 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
	c:\windows\system32\tssoft32.acm			c:\windows\system32\davclnt.dll	
tsd32	1.03 24.50 KB (25,088 bytes)	3/25/2005 6:00 AM			
	DSP GROUP, INC.				
	c:\windows\system32\tsd32.dll				

zipfldr	6.00.3790.1830 (srv03_sp1_rtm.050324-1447)	449.50 KB	hcapres	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	7.50 KB
(460,288 bytes)	3/25/2005 6:00 AM Microsoft Corporation	c:\windows\system32\zipfldr.dll	(7,680 bytes)	1/25/2006 2:11 AM Microsoft Corporation	c:\windows\pchealth\helpctr\binaries\hcapres.dll
cmd	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	538.50 KB	itss	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	208.00 KB
(551,424 bytes)	3/25/2005 6:00 AM Microsoft Corporation	c:\windows\system32\cmd.exe	(212,992 bytes)	3/25/2005 6:00 AM Microsoft Corporation	c:\windows\system32\itss.dll
sqlservr	2005.090.1399.00 37.56 MB (39,379,672 bytes)	10/14/2005 3:37 PM Microsoft Corporation	pchshell	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	155.00 KB
files\microsoft sql server\mssql.1\mssql\bin\sqlservr.exe		c:\program	(158,720 bytes)	1/25/2006 2:11 AM Microsoft Corporation	c:\windows\pchealth\helpctr\binaries\pchshell.dll
msvcr80	8.00.50727.42 803.50 KB (822,784 bytes)	9/23/2005	mlang	6.00.3790.1830 (srv03_sp1_rtm.050324-1447)	686.00 KB
12:26 AM Microsoft Corporation		c:\windows\winsxs\amd64_microsoft.vc80.crt_1fc8b3b9a1e18e3b	(702,464 bytes)	3/25/2005 6:00 AM Microsoft Corporation	c:\windows\system32\mlang.dll
_8.0.50727.42_x-ww_3fea50ad\msvcr80.dll			mshtml	6.00.3790.1830 (srv03_sp1_rtm.050324-1447)	5.65 MB
msvcp80	8.00.50727.42 1.05 MB (1,097,728 bytes)	9/23/2005	(5,928,448 bytes)	3/25/2005 6:00 AM Microsoft Corporation	c:\windows\system32\mshtml.dll
12:28 AM Microsoft Corporation		c:\windows\winsxs\amd64_microsoft.vc80.crt_1fc8b3b9a1e18e3b	msls31	3.10.349.0 357.00 KB (365,568 bytes)	3/25/2005 6:00 AM
_8.0.50727.42_x-ww_3fea50ad\msvcp80.dll			Microsoft Corporation	c:\windows\system32\msls31.dll	
opends60	2005.090.1399.00 22.21 KB (22,744 bytes)	10/14/2005 3:31 PM Microsoft Corporation	msimf	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	380.50 KB
files\microsoft sql server\mssql.1\mssql\bin\opends60.dll		c:\program	(389,632 bytes)	3/25/2005 6:00 AM Microsoft Corporation	c:\windows\system32\msimf.dll
instapi	2005.090.1399.00 40.71 KB (41,688 bytes)	10/14/2005 3:23 PM Microsoft Corporation	msctf	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	617.50 KB
files\microsoft sql server\90\shared\instapi.dll		c:\program	(632,320 bytes)	3/25/2005 6:00 AM Microsoft Corporation	c:\windows\system32\msctf.dll
sqllevn70	2005.090.1399.00 1.57 MB (1,642,712 bytes)	10/14/2005 3:32 PM Microsoft Corporation	jscrip	5.6.0.8827 974.50 KB (997,888 bytes)	3/25/2005 6:00 AM
files\microsoft sql server\mssql.1\mssql\bin\resources\1033\sqllevn70.rll		c:\program	Microsoft Corporation	c:\windows\system32\jscrip.dll	
sqlqs	2005.090.1399.00 15.71 KB (16,088 bytes)	10/14/2005 3:35 PM Microsoft Corporation	imm32	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	208.00 KB
files\microsoft sql server\mssql.1\mssql\bin\sqlqs.dll		c:\program	(212,992 bytes)	3/25/2005 6:00 AM Microsoft Corporation	c:\windows\system32\imm32.dll
mscoree	2.0.50727.42 (RTM.050727-4200)	441.00 KB (451,584 bytes)	mshtml	6.00.3790.1830 (srv03_sp1_rtm.050324-1447)	905.50 KB
9/23/2005 12:37 AM Microsoft Corporation		c:\windows\system32\mscoree.dll	(927,232 bytes)	3/25/2005 6:00 AM Microsoft Corporation	c:\windows\system32\mshtml.dll
xolehlp	2001.12.4720.1830 (srv03_sp1_rtm.050324-1447)	10.50 KB	vbscript	5.6.0.8827 646.50 KB (662,016 bytes)	3/25/2005 6:00 AM
(10,752 bytes)	1/25/2006 2:10 AM Microsoft Corporation	c:\windows\system32\xolehlp.dll	Microsoft Corporation	c:\windows\system32\vbscript.dll	
msdteprx	2001.12.4720.1830 (srv03_sp1_rtm.050324-1447)	805.50 KB	msinfo	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	636.00 KB
(824,832 bytes)	1/25/2006 2:10 AM Microsoft Corporation	c:\windows\system32\msdteprx.dll	(651,264 bytes)	1/25/2006 2:11 AM Microsoft Corporation	c:\windows\pchealth\helpctr\binaries\msinfo.dll
mtxclu	2001.12.4720.1830 (srv03_sp1_rtm.050324-1447)	141.50 KB	mfc42u	6.50.9146.0 1.39 MB (1,462,272 bytes)	3/25/2005
(144,896 bytes)	3/25/2005 6:00 AM Microsoft Corporation	c:\windows\system32\mtxclu.dll	6:00 AM Microsoft Corporation	c:\windows\system32\mfc42u.dll	
resutils	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	98.50 KB	riched32	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	7.00 KB
(100,864 bytes)	3/25/2005 6:00 AM Microsoft Corporation	c:\windows\system32\resutils.dll	(7,168 bytes)	3/25/2005 6:00 AM Microsoft Corporation	c:\windows\system32\riched32.dll
winmr	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	30.00 KB	riched20	5.31.23.1224 1.10 MB (1,157,120 bytes)	3/25/2005
(30,720 bytes)	3/25/2005 6:00 AM Microsoft Corporation	c:\windows\system32\winmr.dll	6:00 AM Microsoft Corporation	c:\windows\system32\riched20.dll	
rasadhlp	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	12.00 KB	helpsvc	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	1.52 MB
(12,288 bytes)	3/25/2005 6:00 AM Microsoft Corporation	c:\windows\system32\rasadhlp.dll	(1,591,296 bytes)	1/25/2006 2:11 AM Microsoft Corporation	c:\windows\pchealth\helpctr\binaries\helpsvc.exe
msfte	12.0.5626.1 3.63 MB (3,803,344 bytes)	8/26/2005			
6:17 PM Microsoft Corporation		c:\program files\microsoft sql	[Services]		
server\mssql.1\mssql\bin\msfte.dll			Display Name	Name	State
dbghelp	6.4.0004.3 (vbl_core(jshay).041001-1326)	1.37 MB (1,434,328 bytes)	Path	Error Control	Start ModeService Type
files\microsoft sql server\90\shared\dbghelp.dll		c:\program	Application Experience Lookup Service	AeLookupSvc	Running
sqlncli	2005.090.1399.00 3.01 MB (3,152,144 bytes)	10/14/2005 3:37 PM Microsoft Corporation	Auto	Share Process	
c:\windows\system32\sqlncli.dll			c:\windows\system32\svchost.exe -k netsvcs	Normal	
comdlg32	6.00.3790.1830 (srv03_sp1_rtm.050324-1447)	446.50 KB	LocalSystem	0	
(457,216 bytes)	3/25/2005 6:00 AM Microsoft Corporation	c:\windows\system32\comdlg32.dll	Alerter	Alerter	Stopped Disabled Share Process
sqlnclir	2005.090.1399.00 201.21 KB (206,040 bytes)	10/14/2005 3:31 PM Microsoft Corporation	c:\windows\system32\svchost.exe -k localservice	Normal	
c:\windows\system32\sqlnclir.rll			NT AUTHORITY\LocalService	0	
wpabaln	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	33.50 KB	Application Layer Gateway Service	ALG	Stopped Manual
(34,304 bytes)	3/25/2005 6:00 AM Microsoft Corporation	c:\windows\system32\wpabaln.exe	Own Process	c:\windows\system32\alg.exe	Normal
helpctr	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	1.30 MB	NT AUTHORITY\LocalService	0	
(1,363,456 bytes)	1/25/2006 2:11 AM Microsoft Corporation	c:\windows\pchealth\helpctr\binaries\helpctr.exe	Application Management	AppMgmt	Stopped Manual Share
			Process	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.ex		
			e	Normal	NT AUTHORITY\NetworkService
			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	Intersite Messaging	IsmServ	Stopped	Disabled	Own Process	c:\windows\system32\ismserv.exe	Normal	LocalSystem	0
Computer Browser	Browser	Stopped	Manual	Share Process	c:\windows\system32\svchost.exe -k netsvcs	Normal	LocalSystem	0	Kerberos Key Distribution Center			kdc	Stopped	Disabled	Normal	LocalSystem	0
Indexing Service	CiSvc	Stopped	Disabled	Share Process	c:\windows\system32\cisvc.exe	Normal	LocalSystem	0	Server	lanmanserver	Stopped	Manual	Share Process	c:\windows\system32\svchost.exe -k netsvcs	Normal	LocalSystem	0
ClipBook	ClipSrv	Stopped	Disabled	Own Process	c:\windows\system32\clipsrv.exe	Normal	LocalSystem	0	Workstation	lanmanworkstation	Running	Auto	Share Process	c:\windows\system32\svchost.exe -k netsvcs	Normal	LocalSystem	0
.NET Runtime Optimization Service v2.0.50727_X86	clr_optimization_v2.0.50727_32	Stopped	Manual	Own Process	c:\windows\microsoft.net\framework\v2.0.50727\mscorsvw.exe	Ignore	LocalSystem	0	License Logging	LicenseService	Stopped	Disabled	Own Process	c:\windows\system32\llssrv.exe	Normal	NT	
.NET Runtime Optimization Service v2.0.50727_x64	clr_optimization_v2.0.50727_64	Stopped	Manual	Own Process	c:\windows\microsoft.net\framework\v2.0.50727\mscorsvw.exe	Ignore	LocalSystem	0	AUTHORITY\NetworkService								
COM+ System Application	COMSysApp	Stopped	Manual	Own Process	c:\windows\system32\dlhhost.exe	Normal	LocalSystem	0	TCP/IP NetBIOS Helper	LmHosts	Stopped	Manual	Share Process	c:\windows\system32\svchost.exe -k localservice	Normal	NT AUTHORITY\LocalService	
/processid:{02d4b3f1-fd88-11d1-960d-00805fc79235}									Messenger	Stopped	Disabled	Share Process	c:\windows\system32\svchost.exe -k netsvcs	Normal	LocalSystem	0	
Cryptographic Services	CryptSvc	Running	Auto	Share Process	c:\windows\system32\svchost.exe -k netsvcs	Normal	LocalSystem	0	NetMeeting Remote Desktop Sharing	mnmsrvc	Stopped	Disabled	Own Process	c:\windows\system32\mnmsrvc.exe	Normal	LocalSystem	0
DCOM Server Process Launcher	DcomLaunch	Running	Auto	Share Process	c:\windows\system32\svchost.exe -k dcomlaunch	Normal	LocalSystem	0	Distributed Transaction Coordinator	MSDTC	Running	Auto	Own Process	c:\windows\system32\msdtc.exe	Normal	NT AUTHORITY\NetworkService	
Distributed File System	Dfs	Stopped	Manual	Own Process	c:\windows\system32\dfsvc.exe	Normal	LocalSystem	0	SQL Server FullText Search (MSSQLSERVER)	msftesql	Stopped	Manual	Own Process	"c:\program files\microsoft sql server\mssql.1\mssql\bin\msftesql.exe" -s:mssql.1 -f:mssqlserver	Normal	LocalSystem	0
DHCP Client	Dhcp	Running	Auto	Share Process	c:\windows\system32\svchost.exe -k networkservice	Normal	NT AUTHORITY\NetworkService	0	Windows Installer	MSIServer	Stopped	Manual	Share Process	c:\windows\system32\msiexec.exe /v	Normal	LocalSystem	0
Logical Disk Manager Administrative Service	dmadmin	Stopped	Manual	Share Process	c:\windows\system32\dmadmin.exe /com	Normal	LocalSystem	0	SQL Server (MSSQLSERVER)	MSSQLSERVER	Stopped	Manual	Own Process	"c:\program files\microsoft sql server\mssql.1\mssql\bin\sqlservr.exe" -smssqlserver	Normal	LocalSystem	0
Logical Disk Managerdmsrver	dmsrver	Running	Auto	Share Process	c:\windows\system32\svchost.exe -k netsvcs	Normal	LocalSystem	0	SQL Server Active Directory Helper	MSSQLServerADHelper	Stopped	Disabled	Own Process	"c:\program files\microsoft sql server\90\shared\sqladhlp90.exe"	Normal	NT AUTHORITY\NetworkService	
DNS Client	Dnscache	Running	Auto	Share Process	c:\windows\system32\svchost.exe -k networkservice	Normal	NT AUTHORITY\NetworkService	0	Network DDE	NetDDE	Stopped	Disabled	Share Process	c:\windows\system32\netdde.exe	Normal	LocalSystem	0
Error Reporting Service	ERSvc	Running	Auto	Share Process	c:\windows\system32\svchost.exe -k winerr	Ignore	LocalSystem	0	Network DDE DSDM	NetDDEdsdm	Stopped	Disabled	Share Process	c:\windows\system32\netdde.exe	Normal	LocalSystem	0
Event Log	Eventlog	Running	Auto	Share Process	c:\windows\system32\services.exe	Normal	LocalSystem	0	Net Logon	Netlogon	Stopped	Manual	Share Process	c:\windows\system32\lsass.exe	Normal	LocalSystem	0
COM+ Event System	EventSystem	Running	Auto	Share Process	c:\windows\system32\svchost.exe -k netsvcs	Normal	LocalSystem	0	Network Connections	Netman	Running	Manual	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	Network Location Awareness (NLA)	Nla	Stopped	Disabled	Share Process	c:\windows\system32\svchost.exe -k netsvcs	Normal	LocalSystem	0
HID Input Service	HidServ	Running	Auto	Share Process	c:\windows\system32\svchost.exe -k netsvcs	Normal	LocalSystem	0	File Replication	NtFrs	Stopped	Manual	Own Process	c:\windows\system32\ntfrs.exe	Ignore	LocalSystem	0
HTTP SSLHTTPFilter		Running	Manual	Share Process	c:\windows\system32\lsass.exe	Normal	LocalSystem	0	NT LM Security Support Provider			NtLmSsp	Stopped	Manual	Share Process	c:\windows\system32\lsass.exe	Normal
IAS Jet Database Access	IASJet	Stopped	Manual	Share Process	c:\windows\syswow64\svchost.exe -k iasjet	Normal	LocalSystem	0	Removable Storage	NtmsSvc	Stopped	Manual	Share Process	c:\windows\system32\svchost.exe -k netsvcs	Normal	LocalSystem	0
IIS Admin Service	IISADMIN	Running	Auto	Share Process	c:\windows\system32\inetrv\inetinfo.exe	Normal	LocalSystem	0	Office Source Engine	ose	Stopped	Manual	Own Process	"c:\program files (x86)\common files\microsoft shared\source engine\ose.exe"	Normal	LocalSystem	0
IMAPI CD-Burning COM Service	ImapiService	Stopped	Manual	Share Process	c:\windows\system32\imapi.exe	Normal	LocalSystem	0	Plug and Play	PlugPlay	Running	Auto	Share Process	c:\windows\system32\services.exe	Normal	LocalSystem	0

IPSEC Services	PolicyAgent	Running	Auto	Share	Microsoft Software Shadow Copy Provider	swprv	Stopped	Manual
Process	c:\windows\system32\lsass.exe	Normal	LocalSystem	0	Own Process	c:\windows\system32\svchost.exe -k swprv	Normal	LocalSystem
Protected Storage	ProtectedStorage	Stopped	Manual	Share	Performance Logs and Alerts	SysmonLog	Stopped	Auto
Process	c:\windows\system32\lsass.exe	Normal	LocalSystem	0	Own Process	c:\windows\system32\smlogsvc.exe	Normal	NT Authority\NetworkService
Remote Access Auto Connection Manager	RasAuto	Stopped	Manual	Share Process	Telephony	TapiSrv	Stopped	Manual
Share Process	c:\windows\system32\svchost.exe -k netsvcs	Normal	LocalSystem	0	Share Process	c:\windows\system32\svchost.exe -k tapisrv	Normal	LocalSystem
Remote Access Connection Manager	RasMan	Stopped	Manual	Share Process	Terminal Services	TermService	Running	Manual
Share Process	c:\windows\system32\svchost.exe -k netsvcs	Normal	LocalSystem	0	Process	c:\windows\system32\svchost.exe -k termsvcs	LocalSystem	0
Remote Desktop Help Session Manager	RDSessMgr	Stopped	Manual	Share Process	Themes	Themes	Stopped	Disabled
Manual Own Process	c:\windows\system32\sessmgr.exe	Normal	LocalSystem	0	Process	c:\windows\system32\svchost.exe -k netsvcs	LocalSystem	0
Routing and Remote Access	RemoteAccess	Stopped	Disabled	Share Process	Telnet	TlntSvr	Stopped	Disabled
Share Process	c:\windows\system32\svchost.exe -k netsvcs	Normal	LocalSystem	0	Process	c:\windows\system32\tlntsvr.exe	Normal	NT
Remote Registry	RemoteRegistry	Running	Auto	Share	AUTHORITY\LocalService	0	Distributed Link Tracking Server	TrkSvr
Process	c:\windows\system32\svchost.exe -k regsvc	Normal	NT	AUTHORITY\LocalService	0	Process	c:\windows\system32\svchost.exe -k netsvcs	LocalSystem
Remote Procedure Call (RPC) Locator	RpcLocator	Stopped	Manual	Own Process	Distributed Link Tracking Client	TrkWks	Running	Auto
Normal NT AUTHORITY\NetworkService	c:\windows\system32\locator.exe	0	Process	c:\windows\system32\svchost.exe -k rpsvc	Normal	NT	Process	c:\windows\system32\svchost.exe -k netsvcs
Remote Procedure Call (RPC)	RpcSs	Running	Auto	Share	Terminal Services Session Directory	Tssdis	Stopped	Disabled
Process	c:\windows\system32\svchost.exe -k rpsvc	Normal	NT	AUTHORITY\NetworkService	0	Own Process	c:\windows\system32\tssdis.exe	LocalSystem
Resultant Set of Policy Provider	RSOPProv	Stopped	Manual	Share	Windows User Mode Driver Framework	UMWdf	Stopped	Manual
Process	c:\windows\system32\rsopprov.exe	Normal	LocalSystem	0	Own Process	c:\windows\system32\wdmfr.exe	Normal	NT AUTHORITY\LocalService
Special Administration Console Helper	sacsrv	Stopped	Manual	Share Process	Uninterruptible Power Supply	UPS	Stopped	Manual
Share Process	c:\windows\system32\svchost.exe -k netsvcs	Normal	LocalSystem	0	Process	c:\windows\system32\ups.exe	Normal	NT
Security Accounts Manager	SamSs	Running	Auto	Share	AUTHORITY\LocalService	0	Virtual Disk Service	vds
Process	c:\windows\system32\lsass.exe	Normal	LocalSystem	0	Process	c:\windows\system32\svchost.exe -k vds	Normal	LocalSystem
Smart Card	SCardSvr	Stopped	Manual	Share Process	Volume Shadow Copy	VSS	Stopped	Manual
c:\windows\system32\scardsvr.exe	Ignore	NT	AUTHORITY\LocalService	0	Process	c:\windows\system32\vssvc.exe	Normal	LocalSystem
Task Scheduler	Schedule	Stopped	Manual	Share Process	Windows Time	W32Time	Running	Auto
c:\windows\system32\svchost.exe -k netsvcs	Normal	LocalSystem	0	Process	c:\windows\system32\svchost.exe -k localservice	Normal	NT AUTHORITY\LocalService	0
Secondary Logon	seclogon	Stopped	Manual	Share Process	World Wide Web Publishing Service	W3SVC	Running	Auto
c:\windows\system32\svchost.exe -k netsvcs	Ignore	LocalSystem	0	Share Process	Share Process	c:\windows\system32\svchost.exe -k iissvc	Normal	LocalSystem
System Event Notification	SENS	Running	Auto	Share	WebClient	WebClient	Stopped	Disabled
Process	c:\windows\system32\svchost.exe -k netsvcs	Normal	LocalSystem	0	Process	c:\windows\system32\svchost.exe -k localservice	Normal	NT AUTHORITY\LocalService
Windows Firewall/Internet Connection Sharing (ICS)	SharedAccess	Stopped	Disabled	Share Process	WinHTTP	Web Proxy Auto-Discovery Service	WinHttpAutoProxySvc	Stopped
c:\windows\system32\svchost.exe -k netsvcs	Normal	LocalSystem	0	Process	c:\windows\system32\svchost.exe -k localservice	Normal	NT AUTHORITY\LocalService	0
Shell Hardware Detection	ShellHWDetection	Running	Auto	Share Process	Windows Management Instrumentation	wimgmt	Running	Auto
Ignore LocalSystem	0	Share Process	c:\windows\system32\svchost.exe -k netsvcs	Ignore	LocalSystem	0	Process	c:\windows\system32\svchost.exe -k netsvcs
Print Spooler	Spooler	Stopped	Manual	Own Process	Portable Media Serial Number Service	WmdmPmSN	Stopped	Manual
c:\windows\system32\spoolsv.exe	Normal	LocalSystem	0	Process	c:\windows\system32\svchost.exe -k netsvcs	Normal	LocalSystem	0
SQL Server Browser	SQLBrowser	Stopped	Disabled	Own	Windows Management Instrumentation Driver Extensions	Wmi	Stopped	Manual
Process	"c:\program files (x86)\microsoft sql server\90\shared\sqlbrowser.exe"	Normal	LocalSystem	0	Process	c:\windows\system32\svchost.exe -k netsvcs	LocalSystem	0
SQL Server Agent (MSSQLSERVER)	SQLSERVERAGENT	Stopped	Manual	Own Process	WMI Performance Adapter	WmiApSrv	Stopped	Manual
files\microsoft sql server\mssql.1\mssql\bin\sqlagent90.exe" -i mssqlserver	Normal	LocalSystem	0	Process	Own Process	c:\windows\system32\wbem\wmiapsrv.exe	Normal	LocalSystem
SQL Server VSS Writer	SQLWriter	Stopped	Manual	Own	Automatic Updates	wuauerv	Stopped	Manual
Process	"c:\program files\microsoft sql server\90\shared\sqlwriter.exe"	Normal	LocalSystem	0	Process	c:\windows\system32\svchost.exe -k netsvcs	LocalSystem	0
Windows Image Acquisition (WIA)	stisvc	Stopped	Disabled	Share Process	Wireless Configuration	WZCSVC	Stopped	Manual
Share Process	c:\windows\system32\svchost.exe -k imgsvc	Normal	NT AUTHORITY\LocalService	0	Process	c:\windows\system32\svchost.exe -k netsvcs	LocalSystem	0

Network Provisioning Service xmlprov Stopped Manual Share
 Process c:\windows\system32\svchost.exe -k netsvcs Normal
 LocalSystem 0

WordPad Document "%programfiles%\windows
 nt\accessories\wordpad.exe"
 Bitmap Image mspaint.exe

[Program Groups]

Group Name	Name	User Name	Default User
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	
Hewlett-Packard Company	All Users:Hewlett-Packard Company	All Users	
Microsoft SQL Server 2005	All Users:Microsoft SQL Server 2005	All Users	
Microsoft SQL Server 2005\Analysis Services	All Users:Microsoft SQL Server 2005\Analysis Services	All Users	
Microsoft SQL Server 2005\Configuration Tools	All Users:Microsoft SQL Server 2005\Configuration Tools	All Users	
Microsoft SQL Server 2005\Performance Tools	All Users:Microsoft SQL Server 2005\Performance Tools	All Users	
Startup	All Users:Startup	All Users	
Accessories	NT AUTHORITY\SYSTEM:Accessories	NT AUTHORITY\SYSTEM	
Accessories\Accessibility	NT AUTHORITY\SYSTEM:Accessories\Accessibility	NT AUTHORITY\SYSTEM	
Accessories\Entertainment	NT AUTHORITY\SYSTEM:Accessories\Entertainment	NT AUTHORITY\SYSTEM	
Startup	NT AUTHORITY\SYSTEM:Startup	NT AUTHORITY\SYSTEM	
Accessories	PE6800\Administrator:Accessories	PE6800\Administrator	
Accessories\Accessibility	PE6800\Administrator:Accessories\Accessibility	PE6800\Administrator	
Accessories\Entertainment	PE6800\Administrator:Accessories\Entertainment	PE6800\Administrator	
Administrative Tools	PE6800\Administrator:Administrative Tools	PE6800\Administrator	
Startup	PE6800\Administrator:Startup	PE6800\Administrator	

[Startup Programs]

Program	Command	User Name	Location
desktop	desktop.ini	NT AUTHORITY\SYSTEM	Startup
desktop	desktop.ini	PE6800\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

[Windows Error Reporting]

Time	Type	Details
1/26/2006 1:12 AM	Application Error	Faulting application dbgen.exe, version 0.0.0.0, faulting module dbgen.exe, version 0.0.0.0, fault address 0x0000000000009ad3.

[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 6:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
actxprxy.dll	6.0.3790.1830	221 KB	3/25/2005 6:00:00 AM	.	Microsoft Corporation
advpack.dll	6.0.3790.1830	146 KB	3/25/2005 6:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
advpack.dll	6.0.3790.1830	146 KB	3/25/2005 6:00:00 AM	.	Microsoft Corporation
asctrls.ocx	6.0.3790.1830	147 KB	3/25/2005 6:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
asctrls.ocx	6.0.3790.1830	147 KB	3/25/2005 6:00:00 AM	.	Microsoft Corporation
browsecl.dll	6.0.3790.1830	63 KB	3/25/2005 6:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
browsecl.dll	6.0.3790.1830	63 KB	3/25/2005 6:00:00 AM	.	Microsoft Corporation
browseui.dll	6.0.3790.1830	1,564 KB	3/25/2005 6:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
browseui.dll	6.0.3790.1830	1,564 KB	3/25/2005 6:00:00 AM	.	Microsoft Corporation
cdfview.dll	6.0.3790.1830	216 KB	3/25/2005 6:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
cdfview.dll	6.0.3790.1830	216 KB	3/25/2005 6:00:00 AM	.	Microsoft Corporation
comctl32.dll	5.82.3790.1830	935 KB	3/25/2005 6:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
comctl32.dll	5.82.3790.1830	935 KB	3/25/2005 6:00:00 AM	.	Microsoft Corporation
dxtrans.dll	6.3.3790.1830	320 KB	3/25/2005 6:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
dxtrans.dll	6.3.3790.1830	320 KB	3/25/2005 6:00:00 AM	.	Microsoft Corporation
dxtmsft.dll	6.3.3790.1830	549 KB	3/25/2005 6:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
dxtmsft.dll	6.3.3790.1830	549 KB	3/25/2005 6:00:00 AM	.	Microsoft Corporation
iecont.dll	<File Missing>	Not Available	Not Available		Not Available
	Not Available	Not Available	Not Available		

iecontlc.dll	<File Missing>	Not Available	Not Available	msieftp.dll	6.0.3790.1830	369 KB	3/25/2005 6:00:00 AM
	Not Available	Not Available					Microsoft Corporation
iedkcs32.dll	16.0.3790.1830	417 KB	3/25/2005 6:00:00 AM	msrating.dll	6.0.3790.1830	240 KB	3/25/2005 6:00:00 AM
AM	C:\WINDOWS\system32	Microsoft Corporation		AM	C:\WINDOWS\system32	Microsoft Corporation	
iedkcs32.dll	16.0.3790.1830	417 KB	3/25/2005 6:00:00 AM	msrating.dll	6.0.3790.1830	240 KB	3/25/2005 6:00:00 AM
AM	Microsoft Corporation			AM	Microsoft Corporation		
iepeers.dll	6.0.3790.1830	361 KB	3/25/2005 6:00:00 AM	mstime.dll	6.0.3790.1830	878 KB	3/25/2005 6:00:00 AM
	C:\WINDOWS\system32	Microsoft Corporation			C:\WINDOWS\system32	Microsoft Corporation	
iepeers.dll	6.0.3790.1830	361 KB	3/25/2005 6:00:00 AM	mstime.dll	6.0.3790.1830	878 KB	3/25/2005 6:00:00 AM
	Microsoft Corporation				Microsoft Corporation		
iesetup.dll	6.0.3790.1830	71 KB	3/25/2005 6:00:00 AM	occache.dll	6.0.3790.1830	126 KB	3/25/2005 6:00:00 AM
	C:\WINDOWS\system32	Microsoft Corporation		AM	C:\WINDOWS\system32	Microsoft Corporation	
iesetup.dll	6.0.3790.1830	71 KB	3/25/2005 6:00:00 AM	occache.dll	6.0.3790.1830	126 KB	3/25/2005 6:00:00 AM
	Microsoft Corporation			AM	Microsoft Corporation		
ieuinit.inf	Not Available	24 KB	3/25/2005 6:00:00 AM	proctexe.ocx	<File Missing>	Not Available	Not Available
	C:\WINDOWS\system32	Not Available		Available	Not Available	Not Available	
ieuinit.inf	Not Available	24 KB	3/25/2005 6:00:00 AM	sendmail.dll	6.0.3790.1830	64 KB	3/25/2005 6:00:00 AM
	Not Available			AM	C:\WINDOWS\system32	Microsoft Corporation	
ieexplore.exe	6.0.3790.1830	94 KB	3/25/2005 6:00:00 AM	sendmail.dll	6.0.3790.1830	64 KB	3/25/2005 6:00:00 AM
AM	C:\Program Files\Internet Explorer	Microsoft Corporation		AM	Microsoft Corporation		
imgutil.dll	6.0.3790.1830	61 KB	3/25/2005 6:00:00 AM	shdoclc.dll	6.0.3790.1830	590 KB	3/25/2005 6:00:00 AM
	C:\WINDOWS\system32	Microsoft Corporation			C:\WINDOWS\system32	Microsoft Corporation	
imgutil.dll	6.0.3790.1830	61 KB	3/25/2005 6:00:00 AM	shdoclc.dll	6.0.3790.1830	590 KB	3/25/2005 6:00:00 AM
	Microsoft Corporation				Microsoft Corporation		
inetpl.cpl	6.0.3790.1830	428 KB	3/25/2005 6:00:00 AM	shdocvw.dll	6.0.3790.1830	2,360 KB	3/25/2005 6:00:00 AM
	C:\WINDOWS\system32	Microsoft Corporation		AM	C:\WINDOWS\system32	Microsoft Corporation	
inetpl.cpl	6.0.3790.1830	428 KB	3/25/2005 6:00:00 AM	shdocvw.dll	6.0.3790.1830	2,360 KB	3/25/2005 6:00:00 AM
	Microsoft Corporation			AM	Microsoft Corporation		
inetplc.dll	6.0.3790.1830	110 KB	3/25/2005 6:00:00 AM	shfolder.dll	6.0.3790.1830	34 KB	3/25/2005 6:00:00 AM
	C:\WINDOWS\system32	Microsoft Corporation		AM	C:\WINDOWS\system32	Microsoft Corporation	
inetplc.dll	6.0.3790.1830	110 KB	3/25/2005 6:00:00 AM	shfolder.dll	6.0.3790.1830	34 KB	3/25/2005 6:00:00 AM
	Microsoft Corporation			AM	Microsoft Corporation		
inseng.dll	6.0.3790.1830	147 KB	3/25/2005 6:00:00 AM	shlwapi.dll	6.0.3790.1830	607 KB	3/25/2005 6:00:00 AM
	C:\WINDOWS\system32	Microsoft Corporation			C:\WINDOWS\system32	Microsoft Corporation	
inseng.dll	6.0.3790.1830	147 KB	3/25/2005 6:00:00 AM	shlwapi.dll	6.0.3790.1830	607 KB	3/25/2005 6:00:00 AM
	Microsoft Corporation				Microsoft Corporation		
mlang.dll	6.0.3790.1830	686 KB	3/25/2005 6:00:00 AM	tdc.ocx	1.3.0.3130 91 KB	3/25/2005 6:00:00 AM	
	C:\WINDOWS\system32	Microsoft Corporation			C:\WINDOWS\system32	Microsoft Corporation	
mlang.dll	6.0.3790.1830	686 KB	3/25/2005 6:00:00 AM	tdc.ocx	1.3.0.3130 91 KB	3/25/2005 6:00:00 AM	
	Microsoft Corporation				Microsoft Corporation		
msencode.dll	<File Missing>	Not Available	Not Available	url.dll	6.0.3790.1830	40 KB	3/25/2005 6:00:00 AM
Available	Not Available	Not Available			C:\WINDOWS\system32	Microsoft Corporation	
mshta.exe	6.0.3790.1830	38 KB	3/25/2005 6:00:00 AM	url.dll	6.0.3790.1830	40 KB	3/25/2005 6:00:00 AM
	C:\WINDOWS\system32	Microsoft Corporation			Microsoft Corporation		
mshta.exe	6.0.3790.1830	38 KB	3/25/2005 6:00:00 AM	urlmon.dll	6.0.3790.1830	1,049 KB	3/25/2005 6:00:00 AM
	Microsoft Corporation				C:\WINDOWS\system32	Microsoft Corporation	
mshtml.dll	6.0.3790.1830	5,790 KB	3/25/2005 6:00:00 AM	urlmon.dll	6.0.3790.1830	1,049 KB	3/25/2005 6:00:00 AM
	C:\WINDOWS\system32	Microsoft Corporation			Microsoft Corporation		
mshtml.dll	6.0.3790.1830	5,790 KB	3/25/2005 6:00:00 AM	webcheck.dll	6.0.3790.1830	439 KB	3/25/2005 6:00:00 AM
	Microsoft Corporation			AM	C:\WINDOWS\system32	Microsoft Corporation	
mshtml.tlb	6.0.3790.1830	1,320 KB	3/25/2005 6:00:00 AM	webcheck.dll	6.0.3790.1830	439 KB	3/25/2005 6:00:00 AM
	C:\WINDOWS\system32	Microsoft Corporation		AM	Microsoft Corporation		
mshtml.tlb	6.0.3790.1830	1,320 KB	3/25/2005 6:00:00 AM	wininet.dll	6.0.3790.1830	1,159 KB	3/25/2005 6:00:00 AM
	Microsoft Corporation				C:\WINDOWS\system32	Microsoft Corporation	
mshtmlmed.dll	6.0.3790.1830	906 KB	3/25/2005 6:00:00 AM	wininet.dll	6.0.3790.1830	1,159 KB	3/25/2005 6:00:00 AM
AM	C:\WINDOWS\system32	Microsoft Corporation			Microsoft Corporation		
mshtmlmed.dll	6.0.3790.1830	906 KB	3/25/2005 6:00:00 AM				
AM	Microsoft Corporation						
mshtmlr.dll	6.0.3790.1830	56 KB	3/25/2005 6:00:00 AM				
AM	C:\WINDOWS\system32	Microsoft Corporation					
mshtmlr.dll	6.0.3790.1830	56 KB	3/25/2005 6:00:00 AM				
AM	Microsoft Corporation						
msident.dll	6.0.3790.1830	69 KB	3/25/2005 6:00:00 AM				
	C:\WINDOWS\system32	Microsoft Corporation					
msident.dll	6.0.3790.1830	69 KB	3/25/2005 6:00:00 AM				
	Microsoft Corporation						
msidntld.dll	6.0.3790.1830	16 KB	3/25/2005 6:00:00 AM				
AM	C:\WINDOWS\system32	Microsoft Corporation					
msidntld.dll	6.0.3790.1830	16 KB	3/25/2005 6:00:00 AM				
AM	Microsoft Corporation						
msieftp.dll	6.0.3790.1830	369 KB	3/25/2005 6:00:00 AM				
	C:\WINDOWS\system32	Microsoft Corporation					

[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

[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

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 = "G:",
  SIZE = 48762MB,
  FILEGROWTH = 0),
```

```
( NAME = %DBNAME%_li_2,
  FILENAME = "H:",
  SIZE = 48762MB,
  FILEGROWTH = 0),
```

```
( NAME = %DBNAME%_li_3,
  FILENAME = "I:",
  SIZE = 48762MB,
  FILEGROWTH = 0),
```

```
( NAME = %DBNAME%_li_4,
  FILENAME = "J:",
  SIZE = 48762MB,
  FILEGROWTH = 0),
```

```
( NAME = %DBNAME%_li_5,
  FILENAME = "K:",
  SIZE = 48762MB,
  FILEGROWTH = 0),
```

```
( NAME = %DBNAME%_li_6,
  FILENAME = "L:",
  SIZE = 48762MB,
  FILEGROWTH = 0),
```

```
( NAME = %DBNAME%_li_7,
  FILENAME = "B:",
  SIZE = 48762MB,
  FILEGROWTH = 0),
```

```
( NAME = %DBNAME%_li_8,
  FILENAME = "M:",
  SIZE = 48762MB,
  FILEGROWTH = 0),
```

```
FILEGROUP GENERAL_FG
```

```
( NAME = %DBNAME%_gen_1,
  FILENAME = "N:",
  SIZE = 23478MB,
```

```
FILEGROWTH = 0),
( NAME = %DBNAME%_gen_2,
  FILENAME = "O:",
  SIZE = 23478MB,
  FILEGROWTH = 0),
```

```
( NAME = %DBNAME%_gen_3,
  FILENAME = "P:",
  SIZE = 23478MB,
  FILEGROWTH = 0),
```

```
( NAME = %DBNAME%_gen_4,
  FILENAME = "Q:",
  SIZE = 23478MB,
  FILEGROWTH = 0),
```

```
( NAME = %DBNAME%_gen_5,
  FILENAME = "R:",
  SIZE = 23478MB,
  FILEGROWTH = 0),
```

```
( NAME = %DBNAME%_gen_6,
  FILENAME = "S:",
  SIZE = 23478MB,
  FILEGROWTH = 0),
```

```
( NAME = %DBNAME%_gen_7,
  FILENAME = "V:",
  SIZE = 23478MB,
  FILEGROWTH = 0),
```

```
( NAME = %DBNAME%_gen_8,
  FILENAME = "W:",
  SIZE = 23478MB,
  FILEGROWTH = 0)
```

```
LOG ON
```

```
( NAME = %DBNAME%_log,
  FILENAME = "E:",
  SIZE = 46000MB,
  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,
```

Appendix B

```

S_ACCTBAL float not null,
S_COMMENT varchar(101) not null,)
on GENERAL_FG

create table PARTSUPP
(P_S_PARTKEY int not null,
P_S_SUPPKEY int not null,
P_S_SUPPLYCOST float not null,
P_S_AVAILQTY int not null,
P_S_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)
on GENERAL_FG

-- 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, P_S_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

```

Appendix B

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

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

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

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

create index 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
```

Appendix B

```
ALTER DATABASE %DBNAME% REMOVE FILE -- Copyright Microsoft, 1999
%DBNAME%_load15 --
go
ALTER DATABASE %DBNAME% REMOVE FILE restore database tpch from BackupDev1, BackupDev2,
%DBNAME%_load16 BackupDev3 with replace, stats=1
go
ALTER DATABASE %DBNAME% REMOVE
FILEGROUP LOAD_FG
Go --
-- Copyright (c) 1999-2000 Intel Corporation
--
-- File: CREATEBACKUPDEVICES.SQL -- MoveTemp.sql
-- Microsoft TPC-H Benchmark Kit Ver. 2.00
-- Copyright Microsoft, 1999 alter database tempdb modify file
-- (name='tempdev',filename='T:\TempdB.mdf')

if exists (select name from sysdevices where name = alter database tempdb modify file
'BackupDev1') (name='templog',filename='T:\Templog.ldf')
exec sp_dropdevice BackupDev1
GO

if exists (select name from sysdevices where name = --
'BackupDev2') -- Copyright (c) 1999-2000 Intel Corporation
exec sp_dropdevice BackupDev2 --
GO -- AddTemp.sql

if exists (select name from sysdevices where name = alter database tempdb modify file
'BackupDev3') (name=tempdev, filename='T:\TempdB.mdf',size=30000mb)
exec sp_dropdevice BackupDev3 alter database tempdb modify file
GO (name=templog, filename='T:\Templog.ldf',size=30000mb)
alter database tempdb add file
if exists (select name from sysdevices where name = (name=tempdev2, filename='U:\tempdev_2',size=15000mb),
'BackupDev4') (name=tempdev3, filename='U:\tempdev_3',size=15000mb),
exec sp_dropdevice BackupDev4 (name=tempdev4, filename='U:\tempdev_4',size=15000mb),
GO (name=tempdev5, filename='U:\tempdev_5',size=15000mb),
(nam=tempdev6, filename='X:\tempdev_6',size=15000mb),
sp_addumpdevice 'disk', 'BackupDev1', 'T:\TPCHbackup1' (name=tempdev7, filename='X:\tempdev_7',size=15000mb),
GO (name=tempdev8, filename='F:\tempdev_8',size=15000mb),
sp_addumpdevice 'disk', 'BackupDev2', 'U:\TPCHbackup2' (name=tempdev9, filename='F:\tempdev_9',size=15000mb),
GO (name=tempdev10,
sp_addumpdevice 'disk', 'BackupDev3', 'F:\TPCHbackup3' filename='Z:\tempdev_10',size=15000mb),
GO (name=tempdev11, filename='Z:\tempdev_11',size=15000mb)

-- File: BACKUPDATABASE.SQL -- Drop the LOAD_FG
-- Microsoft TPC-H Benchmark Kit Version
2.00 ALTER DATABASE %DBNAME% REMOVE FILE
-- Copyright Microsoft, 1999 %DBNAME%_load1
-- go
backup database %DBNAME% to BackupDev1, ALTER DATABASE %DBNAME% REMOVE FILE
BackupDev2, BackupDev3 with init, stats=10 %DBNAME%_load2
go
ALTER DATABASE %DBNAME% REMOVE FILE
-- File: RESTOREDATABASE.SQL %DBNAME%_load3
-- Microsoft TPC-H Benchmark Kit Version go
2.00 ALTER DATABASE %DBNAME% REMOVE FILE
-- go
ALTER DATABASE %DBNAME% REMOVE FILE
%DBNAME%_load4
go
```


Appendix B

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

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

        commit transaction T

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

    end
go

-- File: ACID_HIST.SQL

```

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

```

Appendix C

```

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

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

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

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

```

```

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

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

        select
        @rand_supp_key= PS_SUPPKEY
        from
        PARTSUPP
        where
        PS_PARTKEY = @rand_part_key
        set
        rowcount 0
        end
        else
        begin
            select
            @rand_part_key = 0,
            @rand_supp_key = 0
            end

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

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

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

            set rowcount @cnt

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

            set rowcount 0

            select @rand_delta = (RAND()*100)

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

```

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,
    = 0,
    = 0
    end
else
begin
    select @counter
    = @counter + 1,
    = 0,
    = 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,
@skkey = L_SUPPKEY,
@tax = L_TAX,
@disc = L_DISCOUNT
from LINEITEM
where L_ORDERKEY = @o_key and
L_LINENUMBER =
@l_key

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

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

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

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

commit transaction T

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

-- ACID CODE END

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

end

go

-- 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

```

Appendix C

```

        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

        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)

```

Appendix C

```

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

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

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

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

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

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

begin
    begin tran T

--      ACID CODE BEGIN
print " "
print "TPC-H ACID Transaction Start:"
select  convert(char(30), getdate(),9)
print " "
print "O_TOTALPRICE from Orders Table before updates:"
select  O_TOTALPRICE
from    ORDERS
where   O_ORDERKEY = @o_key
print " "
--      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_EXTENDEDPRI 'L_EXTENDEDPRI',
        L_PARTKEY    'L_PARTKEY',
        L_SUPPKEY    'L_SUPPKEY',
        L_TAX        'L_TAX',
        L_DISCOUNT  'L_DISCOUNT'
from    LINEITEM
where   L_ORDERKEY = @o_key and
        L_LINENUMBER = @l_key
print " "
--      ACID CODE END

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

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

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

```

Appendix C

```

@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

```

Appendix C

```

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

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

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

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

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

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

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

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

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

rollback transaction T

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

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

```

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
```

Appendix C

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

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

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

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

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

GO

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

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

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

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

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

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

```
exec iso34_tran_w_com @rand_o_key,
```

```
@rand_l_key,
@rand_delta
```

GO

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

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

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

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

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

GO

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

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

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

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

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

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


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_EXTENDEDPRI)
                AS SUM_BASE_PRICE,
                SUM(L_EXTENDEDPRI*(1-L_DISCOUNT))
                AS SUM_DISC_PRICE,
                SUM(L_EXTENDEDPRI*(1-
L_DISCOUNT)*(1+L_TAX)) AS SUM_CHARGE,
                AVG(L_QUANTITY )
                AS AVG_QTY,
                AVG(L_EXTENDEDPRI)
                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 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 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 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 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>	<pre> not exists (select * from HISTORY_DUR where H_O_KEY = acid_o_key and and H_L_KEY = acid_l_key and H_DELTA = acid_delta) -- -- These selects should result in Zero or One row(s) found -- -- Durability Stream 1 select * from acid_values where seq_num between 11 and 210 and not exists (select * from HISTORY_DUR where H_O_KEY = acid_o_key and 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 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 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 and H_L_KEY = acid_l_key and H_DELTA = acid_delta) </pre>
--	--

Appendix C

```

and          where  H_O_KEY = acid_o_key          (      o_orderkey
and          H_L_KEY = acid_l_key                int,
and          H_DELTA = acid_delta                money,
)                                                    l_orderkey
                                                    int,
-- Durability Stream 5                               lineitem_sum
select *                                           money
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
```

-- using default substitutions

/* TPC_H Query 1 - Pricing Summary Report */

```
SELECT L_RETURNFLAG,
  L_LINESTATUS,
  SUM(L_QUANTITY)
  AS SUM_QTY,
  SUM(L_EXTENDEDPRI)
  AS SUM_BASE_PRICE,
  SUM(L_EXTENDEDPRI*(1-L_DISCOUNT))
  AS SUM_DISC_PRICE,
  SUM(L_EXTENDEDPRI*(1-
L_DISCOUNT)*(1+L_TAX)) AS SUM_CHARGE,
  AVG(L_QUANTITY)
  AS AVG_QTY,
  AVG(L_EXTENDEDPRI)
  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
56586554400.730141 53758257134.870117
55909065222.827682 25.522006 38273.129735
0.049985 1478493
N F 991417.000000 1487504710.379999
1413082168.054098 1469649223.194377 25.516472
38284.467761 0.050093 38854
N O 74476057.000000
111701750865.969470 106118250629.105680
110367064600.428500 25.502224 38249.112140
0.049997 2920375
R F 37719753.000000
56568041380.900078 53741292684.604080
55889619119.831833 25.505794 38250.854626
0.050009 1478870
```

Appendix D

6131 blithely silent pinto beans are furiously. slyly final deposits across
 9937.840000 Supplier#000005969 ROMANIA
 108438 Manufacturer#1
 ANDENSOSmk,miq23Xfb5RWt6dvUcvt6Qa 29-520-692-3537 carefully slow deposits use furiously. slyly ironic platelets above the ironic
 9936.220000 Supplier#000005250 UNITED KINGDOM 249 Manufacturer#4
 B3rqp0xbSEim4Mpy2RH J 33-320-228-2957
 blithely special packages are. stealthily express deposits across the closely final instructi
 9923.770000 Supplier#000002324 GERMANY 29821 Manufacturer#4 y3OD9UyWSTOk
 17-779-299-1839 quickly express packages breach quiet pinto beans. requ
 9871.220000 Supplier#000006373 GERMANY 43868 Manufacturer#5 J8fcXWSTqM
 17-813-485-8637 never silent deposits integrate furiously blit
 9870.780000 Supplier#000001286 GERMANY 81285 Manufacturer#2
 YKA,E2fjiVd7eUrzp2Ef8j1QxGo2DFnosaTEH 17-516-924-4574 final theodolites cajole slyly special,
 9870.780000 Supplier#000001286 GERMANY 181285 Manufacturer#4
 YKA,E2fjiVd7eUrzp2Ef8j1QxGo2DFnosaTEH 17-516-924-4574 final theodolites cajole slyly special,
 9852.520000 Supplier#000008973 RUSSIA 18972 Manufacturer#2
 t5L67YdBYH6o,Vz24jpDyQ9 32-188-594-7038
 quickly regular instructions wake-- carefully unusual braids into the expres
 9847.830000 Supplier#000008097 RUSSIA 130557 Manufacturer#2 xMe97bpE69NzdwLoX
 32-375-640-3593 slyly regular dependencies sleep slyly furiously express dep
 9847.570000 Supplier#000006345 FRANCE 86344 Manufacturer#1
 VSt3rzk3qG698u6ld8HhOByvrTcSTSvQIDQDag 16-886-766-7945 silent pinto beans should have to snooze carefully along the final reques
 9847.570000 Supplier#000006345 FRANCE 173827 Manufacturer#2
 VSt3rzk3qG698u6ld8HhOByvrTcSTSvQIDQDag 16-886-766-7945 silent pinto beans should have to snooze carefully along the final reques
 9836.930000 Supplier#000007342 RUSSIA 4841 Manufacturer#4 JOIK7C1,7xrEZSSOw
 32-399-414-5385 final accounts haggle. bold accounts are furiously dugouts. furiously silent asymptotes are slyly
 9817.100000 Supplier#000002352 RUSSIA 124815 Manufacturer#2 4LfoHUZjgEbAKw
 TgdKcgOc4D4uCYw 32-551-831-1437 blithely pending packages across the ironic accounts grow slyly after the furiously
 9817.100000 Supplier#000002352 RUSSIA 152351 Manufacturer#3 4LfoHUZjgEbAKw
 TgdKcgOc4D4uCYw 32-551-831-1437 blithely pending

packages across the ironic accounts grow slyly after the furiously
 9739.860000 Supplier#000003384 FRANCE 138357 Manufacturer#2 o,Z3v4POifevE k9U1b
 6J1ucX,I 16-494-913-5925 slyly ironic theodolites hag
 9721.950000 Supplier#000008757 UNITED KINGDOM 156241 Manufacturer#3
 Atg6GnM4dT2 33-821-407-2995 ironic, even dolphins above the furiously ironic foxes sleep slyly around the caref
 9681.330000 Supplier#000008406 RUSSIA 78405 Manufacturer#1 ,qUuXcftU1
 32-139-873-8571 furiously even deposits affix thinly special theodolites. furiou
 9643.550000 Supplier#000005148 ROMANIA 107617 Manufacturer#1 kT4ciVFslx9z4s79p Js825
 29-252-617-4850 doggedly even ideas boost furiously against the furiously express
 9624.820000 Supplier#000001816 FRANCE 34306 Manufacturer#3
 e7vab91vLJPWxxZnewmnDBpDmxYHrb 16-392-237-6726 blithely regular accounts cajole furiously. regular
 9624.780000 Supplier#000009658 ROMANIA 189657 Manufacturer#1
 oE9uBgEfSS4opIcepXyAYM,x 29-748-876-2014
 regular deposits haggle. furiously express asympto

..... Additional Rows Deleted

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
 wgfosrVPexl9pEXWywaqlBMDYYf 16-668-570-1402 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 hagg
 8042.090000 Supplier#000003245 RUSSIA 150729 Manufacturer#1
 Dh8lkg39onrbOL4DyTfGw8a9oKUX3d9Y 32-836-132-8872 carefully regular instructions integrate blithely silent foxes. furiously express instructions hagg

Appendix D

7992.400000 Supplier#000006108 FRANCE
 118574 Manufacturer#1 8tBydnTDwUqfBfV413
 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,IPYsFXQFFOG 17-266-
 947-7315 final requests integrate slyly above the silent, even
 7912.910000 Supplier#000004211 GERMANY
 184210 Manufacturer#4
 2wQRVovHrm3,v03IKzfTd,IPYsFXQFFOG 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
 2Z0JGkiv01Y00oCFwUGfviIbhzcDy 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
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

```

Appendix D

```

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 O_ORDERKEY =
L_ORDERKEY AND
C_CUSTKEY = O_CUSTKEY
AND S_NATIONKEY =
N1.N_NATIONKEY AND
C_NATIONKEY =
N2.N_NATIONKEY AND
( (N1.N_NAME =
'FRANCE' AND N2.N_NAME = 'GERMANY')
OR
(N1.N_NAME =
'GERMANY' AND N2.N_NAME = 'FRANCE')
) AND
L_SHIPDATE BETWEEN
'1995-01-01' AND '1996-12-31'
)
AS SHIPPING
GROUP BY SUPP_NATION,
CUST_NATION,
L_YEAR
ORDER BY SUPP_NATION,
CUST_NATION,

```

Appendix D

```

L_YEAR
SUPP_NATION CUST_NATION L_YEAR
REVENUE
-----
FRANCE GERMANY 1995
54639732.733600
FRANCE GERMANY 1996
54633083.307600
GERMANY FRANCE 1995
52531746.669700
GERMANY FRANCE 1996
52520549.022400

```

(4 row(s) affected)

-- using default substitutions

/* TPC_H Query 8 - National Market Share */

```

SELECT O_YEAR,
SUM(CASE WHEN NATION =
'BRAZIL'
THEN VOLUME
ELSE 0
END) / SUM(VOLUME) AS
MKT_SHARE
FROM ( SELECT
datepart(yy,O_ORDERDATE) AS
O_YEAR,
L_EXTENDEDPRI * (1-
L_DISCOUNT) AS VOLUME,
N2.N_NAME
AS NATION
FROM PART,
SUPPLIER,
LINEITEM,
ORDERS,
CUSTOMER,
NATION N1,
NATION N2,
REGION
WHERE P_PARTKEY = L_PARTKEY
AND
S_SUPPKEY = L_SUPPKEY
AND
L_ORDERKEY =
O_ORDERKEY AND
O_CUSTKEY = C_CUSTKEY
AND
C_NATIONKEY =
N1.N_NATIONKEY AND
N1.N_REGIONKEY =
R_REGIONKEY AND
R_NAME =
'AMERICA' AND
S_NATIONKEY =
N2.N_NATIONKEY AND

```

```

O_ORDERDATE
BETWEEN '1995-01-01' AND '1996-12-31' AND
P_TYPE = 'ECONOMY
ANODIZED STEEL'
) AS ALL_NATIONS
GROUP BY O_YEAR
ORDER BY O_YEAR
O_YEAR MKT_SHARE
-----
1995 0.034436
1996 0.041486
(2 row(s) affected)

```

-- using default substitutions

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

```

SELECT NATION,
O_YEAR,
SUM(AMOUNT) AS SUM_PROFIT
FROM ( SELECT N_NAME
AS NATION,
datepart(yy, O_ORDERDATE)
AS O_YEAR,
L_EXTENDEDPRI * (1-
L_DISCOUNT) - PS_SUPPLYCOST * L_QUANTITY
AS AMOUNT
FROM PART,
SUPPLIER,
LINEITEM,
PARTSUPP,
ORDERS,
NATION
WHERE S_SUPPKEY = L_SUPPKEY
AND
PS_SUPPKEY = L_SUPPKEY
AND
PS_PARTKEY = L_PARTKEY
AND
P_PARTKEY = L_PARTKEY
AND
O_ORDERKEY =
L_ORDERKEY AND
S_NATIONKEY =
N_NATIONKEY AND
P_NAME LIKE
'%%green%%'
) AS PROFIT
GROUP BY NATION,
O_YEAR
ORDER BY NATION,
O_YEAR DESC
NATION O_YEAR SUM_PROFIT
-----
ALGERIA 1998 31342867.234500
ALGERIA 1997 57138193.023300
ALGERIA 1996 56140140.133000
ALGERIA 1995 53051469.653400

```

Appendix D

ALGERIA	1994	53867582.128600
ALGERIA	1993	54942718.132400
ALGERIA	1992	54628034.712700
ARGENTINA	1998	30211185.708100
ARGENTINA	1997	50805741.752300
ARGENTINA	1996	51923746.575500
ARGENTINA	1995	49298625.766600
ARGENTINA	1994	50835610.109500
ARGENTINA	1993	51646079.177500
ARGENTINA	1992	50410314.994800
BRAZIL	1998	27217924.383200
BRAZIL	1997	48378669.198900
BRAZIL	1996	50482870.357200
BRAZIL	1995	47623383.634900
BRAZIL	1994	47840165.725600
BRAZIL	1993	49054694.035100
BRAZIL	1992	48667639.084200
CANADA	1998	30379833.768500

..... Additional Rows Deleted

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
-----
-----
-----
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

```

Appendix D

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 2qBnze5WBauxbA 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
vXCxoCsU0Bad5JQI ,oobkZ 20-834-292-4707
express requests sublate blithely regular requests. regular,
even ideas solve.
39922 Customer#000039922 584878.113400
7321.110000 GERMANY
Zgy4s50l2GKN4pLDPBU8m342glw6R 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 furiously
115640 Customer#000115640 569341.193300
6436.100000 ARGENTINA Vtgfia9ql
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
HgiV0phqhal9aydNoIlb 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
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

```

..... Additional Rows Deleted

45924 7925047.680000

Appendix D

```

11493 7916722.230000
104478 7916253.600000
166794 7913842.000000
161995 7910874.270000
23538 7909752.060000
41093 7909579.920000
112073 7908617.570000
92814 7908262.500000
88919 7907992.500000
79753 7907933.880000
108765 7905338.980000
146530 7905336.600000
71475 7903367.580000
36289 7901946.500000
61739 7900794.000000
52338 7898638.080000
194299 7898421.240000
105235 7897829.940000
77207 7897752.720000
96712 7897575.270000
10157 7897046.250000
171154 7896814.500000
79373 7896186.000000
113808 7893353.880000
27901 7892952.000000
128820 7892882.720000
25891 7890511.200000
122819 7888881.020000
154731 7888301.330000
101674 7879324.600000
51968 7879102.210000
72073 7877736.110000
5182 7874521.730000

(1048 row(s) affected)

-- using default substitutions

/* TPC_H Query 12 - Shipping Modes and Order Priority */

SELECT L_SHIPMODE,
SUM( CASE WHEN O_ORDERPRIORITY =
'1-URGENT' OR
O_ORDERPRIORITY = '2-
HIGH'
THEN 1
ELSE 0
END) AS HIGH_LINE_COUNT,
SUM( CASE WHEN O_ORDERPRIORITY <
'1-URGENT' AND
O_ORDERPRIORITY < '2-
HIGH'
THEN 1
ELSE 0
END) AS LOW_LINE_COUNT
FROM ORDERS,
LINEITEM
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%%'
)
GROUP BY C_CUSTKEY
AS C_ORDERS (C_CUSTKEY,
C_COUNT)
GROUP BY C_COUNT
ORDER BY CUSTDIST DESC,
C_COUNT DESC
C_COUNT CUSTDIST
-----
0 50005
9 6641
10 6566
11 6058
8 5949
12 5553
13 4989
19 4748
7 4707
18 4625
15 4552
17 4530
14 4484
20 4461
16 4323
21 4217
22 3729
6 3334

```


Appendix D

```

23 3130
24 2622
25 2079
5 1972
26 1593
27 1185
4 1033
28 869
29 559
3 398
30 373
31 235
2 144
32 128
33 71
34 48
35 33
1 24
36 17
37 7
40 4
38 4
39 2
41 1

```

(42 row(s) affected)

-- using default substitutions

/* TPC_H Query 14 - Promotion Effect */

```

SELECT      100.00 * SUM (      CASE WHEN
P_TYPE LIKE 'PROMO%%%'
                        THEN
L_EXTENDEDPRICE*(1-L_DISCOUNT)
                        ELSE 0
                        END) /
SUM(L_EXTENDEDPRICE*(1-L_DISCOUNT)) AS
PROMO_REVENUE
FROM LINEITEM,
PART
WHERE L_PARTKEY = P_PARTKEY AND
      L_SHIPDATE >= '1995-09-01' AND
      L_SHIPDATE < dateadd(mm, 1, '1995-09-01')
PROMO_REVENUE

```

```
-----
16.380779
```

(1 row(s) affected)

-- using default substitutions

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

```

CREATE      VIEW REVENUE0 (SUPPLIER_NO,
TOTAL_REVENUE)
AS
SELECT      L_SUPPKEY,
SUM(L_EXTENDEDPRICE*(1-L_DISCOUNT))

```

```

FROM LINEITEM
WHERE L_SHIPDATE >= '1996-01-01' AND
      L_SHIPDATE < dateadd(mm, 3, '1996-01-01')
GROUP BY   L_SUPPKEY
GO

```

/* TPC_H Query 15 - Top Supplier */

```

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

```

Appendix D

GROUP BY	P_BRAND, P_TYPE, P_SIZE				
ORDER BY	SUPPLIER_CNTDESC, 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		
..... Additional Rows Deleted					
Brand#55	SMALL POLISHED NICKEL	49	4		
Brand#55	SMALL POLISHED STEEL	19	4		
Brand#55	SMALL POLISHED STEEL	45	4		
Brand#55	SMALL POLISHED TIN	14	4		
Brand#55	SMALL POLISHED TIN	23	4		
Brand#55	SMALL POLISHED TIN	45	4		
Brand#55	STANDARD ANODIZED BRASS	9	4		
Brand#55	STANDARD ANODIZED BRASS	23	4		
Brand#55	STANDARD ANODIZED BRASS	49	4		
Brand#55	STANDARD ANODIZED COPPER	9	4		
Brand#55	STANDARD ANODIZED COPPER	14	4		
Brand#55	STANDARD ANODIZED COPPER	45	4		
Brand#55	STANDARD ANODIZED NICKEL	3	4		
Brand#55	STANDARD ANODIZED NICKEL	14	4		
Brand#55	STANDARD ANODIZED NICKEL	45	4		
Brand#55	STANDARD ANODIZED NICKEL	49	4		
Brand#55	STANDARD ANODIZED STEEL	3	4		
Brand#55	STANDARD ANODIZED STEEL	14	4		
Brand#55	STANDARD ANODIZED TIN	14	4		
Brand#55	STANDARD ANODIZED TIN	36	4		
Brand#55	STANDARD ANODIZED TIN	45	4		
Brand#55	STANDARD BRUSHED BRASS	9	4		
Brand#55	STANDARD BRUSHED BRASS	19	4		
Brand#55	STANDARD BRUSHED COPPER	14	4		
Brand#55	STANDARD BRUSHED COPPER	19	4		
Brand#55	STANDARD BRUSHED COPPER	3	4		
Brand#55	STANDARD BRUSHED COPPER	36	4		
Brand#55	STANDARD BRUSHED COPPER	36	4		
Brand#55	STANDARD BRUSHED COPPER	3	4		
Brand#55	STANDARD BRUSHED COPPER	9	4		
Brand#55	STANDARD BRUSHED COPPER	45	4		
Brand#55	STANDARD BRUSHED COPPER	49	4		
Brand#55	STANDARD BRUSHED STEEL	9	4		
Brand#55	STANDARD BRUSHED STEEL	19	4		
Brand#55	STANDARD BRUSHED STEEL	23	4		
Brand#55	STANDARD BRUSHED STEEL	36	4		
Brand#55	STANDARD BRUSHED STEEL	45	4		
Brand#55	STANDARD BRUSHED STEEL	49	4		
Brand#55	STANDARD BRUSHED TIN	19	4		
Brand#55	STANDARD BRUSHED TIN	49	4		
Brand#55	STANDARD BURNISHED BRASS	9	4		
Brand#55	STANDARD BURNISHED BRASS	19	4		
Brand#55	STANDARD BURNISHED BRASS	23	4		
Brand#55	STANDARD BURNISHED BRASS	36	4		
Brand#55	STANDARD BURNISHED COPPER	3	4		
Brand#55	STANDARD BURNISHED COPPER	9	4		
Brand#55	STANDARD BURNISHED COPPER	49	4		
Brand#55	STANDARD BURNISHED NICKEL	9	4		
Brand#55	STANDARD BURNISHED NICKEL	49	4		
Brand#55	STANDARD BURNISHED NICKEL	19	4		
Brand#55	STANDARD BURNISHED NICKEL	23	4		
Brand#55	STANDARD BURNISHED NICKEL	36	4		
Brand#55	STANDARD BURNISHED NICKEL	45	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 STEEL	49	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 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 COPPER	49	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		

Appendix D

```

Brand#22 STANDARD PLATED STEEL 23 3
Brand#25 LARGE PLATED STEEL 19 3
Brand#32 STANDARD ANODIZED COPPER 23 3 300
Brand#33 SMALL ANODIZED BRASS 9 3
Brand#35 MEDIUM ANODIZED TIN 19 3
Brand#51 SMALL PLATED BRASS 23 3
Brand#52 MEDIUM BRUSHED BRASS 45 3
Brand#53 MEDIUM BRUSHED TIN 45 3
Brand#54 ECONOMY POLISHED BRASS 9 3
Brand#55 PROMO PLATED BRASS 19 3
Brand#55 STANDARD PLATED TIN 49 3
  
```

(18314 row(s) affected)

-- using default substitutions

/* TPC_H Query 17 - Small-Quantity-Order Revenue */

```

SELECT      SUM(L_EXTENDEDPRICE)/7.0 AS
AVG_YEARLY
FROM LINEITEM,
      PART
WHERE P_PARTKEY = L_PARTKEY AND
      P_BRAND = 'Brand#23'
      AND
      P_CONTAINER = 'MED BOX' AND
      L_QUANTITY < ( SELECT
0.2 * AVG(L_QUANTITY)
FROM
      LINEITEM
WHERE
      L_PARTKEY = P_PARTKEY
)
  
```

```

AVG_YEARLY
-----
348406.054286
  
```

(1 row(s) affected)

-- using default substitutions

/* TPC_H Query 18 - Large Volume Customer */

```

SELECT      TOP 100
      C_NAME,
      C_CUSTKEY,
      O_ORDERKEY,
      O_ORDERDATE,
      O_TOTALPRICE,
      SUM(L_QUANTITY)
FROM CUSTOMER,
      ORDERS,
      LINEITEM
WHERE O_ORDERKEY IN ( SELECT
L_ORDERKEY
FROM
      LINEITEM
  
```

```

GROUP BY
L_ORDERKEY HAVING SUM(L_QUANTITY) >
) 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
  
```

Appendix D

Customer#000064483	64483	2745894	1996-07-04 00:00:00.000	466991.350000	304.000000	Customer#000149842	149842	5156581	1994-05-30 00:00:00.000	411329.350000	302.000000
Customer#000136573	136573	2761378	1996-05-31 00:00:00.000	461282.730000	301.000000	Customer#000010129	10129	5849444	1994-03-21 00:00:00.000	409129.850000	309.000000
Customer#000016384	16384	502886	1994-04-12 00:00:00.000	458378.920000	312.000000	Customer#000069904	69904	1742403	1996-10-19 00:00:00.000	408513.000000	305.000000
Customer#000117919	117919	2869152	1996-06-20 00:00:00.000	456815.920000	317.000000	Customer#000017746	17746	6882	1997-04-09 00:00:00.000	408446.930000	303.000000
Customer#000012251	12251	735366	1993-11-24 00:00:00.000	455107.260000	309.000000	Customer#000013072	13072	1481925	1998-03-15 00:00:00.000	399195.470000	301.000000
Customer#000120098	120098	1971680	1995-06-14 00:00:00.000	453451.230000	308.000000	Customer#000082441	82441	857959	1994-02-07 00:00:00.000	382579.740000	305.000000
Customer#000066098	66098	5007490	1992-08-07 00:00:00.000	453436.160000	304.000000	Customer#000088703	88703	2995076	1994-01-30 00:00:00.000	363812.120000	302.000000
Customer#000117076	117076	4290656	1997-02-05 00:00:00.000	449545.850000	301.000000	(57 row(s) affected)					
Customer#000129379	129379	4720454	1997-06-07 00:00:00.000	448665.790000	303.000000	-- using default substitutions					
Customer#000126865	126865	4702759	1994-11-07 00:00:00.000	447606.650000	320.000000	/* TPC_H Query 19 - Discounted Revenue */					
Customer#000088876	88876	983201	1993-12-30 00:00:00.000	446717.460000	304.000000	SELECT	SUM(L_EXTENDEDPRICE* (1 - L_DISCOUNT)) AS REVENUE				
Customer#000036619	36619	4806726	1995-01-17 00:00:00.000	446704.090000	328.000000	FROM	LINEITEM,				
Customer#000141823	141823	2806245	1996-12-29 00:00:00.000	446269.120000	310.000000		PART				
Customer#000053029	53029	2662214	1993-08-13 00:00:00.000	446144.490000	302.000000	WHERE(P_PARTKEY	=	L_PARTKEY		
Customer#000018188	18188	3037414	1995-01-25 00:00:00.000	443807.220000	308.000000		P_BRAND		'Brand#12'		
Customer#000066533	66533	29158	1995-10-21 00:00:00.000	443576.500000	305.000000		P_CONTAINER	IN	('SM CASE', 'SM BOX', 'SM PACK', 'SM PKG')	AND	
Customer#000037729	37729	4134341	1995-06-29 00:00:00.000	441082.970000	309.000000		L_QUANTITY	>=	1		
Customer#000003566	3566	2329187	1998-01-04 00:00:00.000	439803.360000	304.000000		L_QUANTITY	<=	1 + 10		
Customer#000045538	45538	4527553	1994-05-22 00:00:00.000	436275.310000	305.000000		P_SIZE	BETWEEN	1 AND 5		
Customer#000081581	81581	4739650	1995-11-04 00:00:00.000	435405.900000	305.000000		L_SHIPMODE	IN	('AIR', 'AIR REG')	AND	
Customer#000119989	119989	1544643	1997-09-20 00:00:00.000	434568.250000	320.000000		L_SHIPINSTRUCT	=	'DELIVER IN PERSON'		
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	OR					
Customer#000141098	141098	565574	1995-09-24 00:00:00.000	430986.690000	301.000000	(P_PARTKEY	=	L_PARTKEY		
Customer#000093392	93392	5200102	1997-01-22 00:00:00.000	425487.510000	304.000000		P_BRAND		'Brand#23'		
Customer#000015631	15631	1845057	1994-05-12 00:00:00.000	419879.590000	302.000000		P_CONTAINER	IN	('MED BAG', 'MED BOX', 'MED PKG', 'MED PACK')	AND	
Customer#000112987	112987	4439686	1996-09-17 00:00:00.000	418161.490000	305.000000		L_QUANTITY	>=	10		
Customer#000012599	12599	4259524	1998-02-12 00:00:00.000	415200.610000	304.000000		L_QUANTITY	<=	10 + 10		
Customer#000105410	105410	4478371	1996-03-05 00:00:00.000	412754.510000	302.000000		P_SIZE	BETWEEN	1 AND 10		
							L_SHIPMODE	IN	('AIR', 'AIR REG')	AND	
							L_SHIPINSTRUCT	=	'DELIVER IN PERSON'		

Appendix D

```

)
OR
( P_PARTKEY = L_PARTKEY AND L_SHIPDATE >= '1994-01-01'
  P_BRAND = 'Brand#34' AND L_SHIPDATE <
    AND dateadd(yy,1,'1994-01-01')
  P_CONTAINER IN ('LG CASE', 'LG
BOX', 'LG PACK', 'LG PKG') AND
  L_QUANTITY >= 20 ) AND
  AND S_NATIONKEY = N_NATIONKEY AND
  L_QUANTITY <= 20 + 10 N_NAME = 'CANADA'
  AND ORDER BY S_NAME
  P_SIZE BETWEEN 1 AND 15 S_NAME S_ADDRESS
  AND
  L_SHIPMODE IN ('AIR', 'AIR REG') Supplier#000000020 iybAE,RmTymrZVYafZva2SH,j
  AND Supplier#000000091
  L_SHIPINSTRUCT = 'DELIVER IN YV45D7TtkfdQanOOZ7q9QxkyGUapU1oOWU6q3
PERSON' Supplier#000000197
) YC2Acon6kjY3zj3Fbxs2k4Vdf7X0cd2F
REVENUE Supplier#000000226 83qOdU2EYRdPQAQhEtn GRZED
----- Supplier#000000285 Br7e1nnt1yxrw6ImgpJ7YdhFDjuBf
3083843.057800 Supplier#000000378 FfbhyCxWvcPrO8ltp9
(1 row(s) affected) Supplier#000000402
-- using default substitutions i9Sw4DoyMhzhKXCH9By,AYSgmD
Supplier#000000530 0qwCMwobKY
OcmLyfRXlagA8ukENJv,
Supplier#000000688 D
fw5ocppmZpYBBIP1718hCihLDZ5KhKX
Supplier#000000710 f19YPvOyb
QoYwjKC,oPycpGfieBAcwKJo
Supplier#000000736
l6i2nMwVuovfKnuVgaSGK2rDy65DIAFLegil7
Supplier#000000761
zlSLeIQUj2XrvTTFnv7WAcYZGvvtMtX882d4
Supplier#000000884 bnhEShejaS
Supplier#000000887 urEaTejH5POADP2ARrf
Supplier#000000935 ij98czM
2KzWe7dDT0xB8sq0UfCdvrx
Supplier#000000975 ,AC e,tBpNwKb5xMUzeohxlRn,
hdZJo73gFQF8y
Supplier#000001263 rQWr6nf8ZhB2TAiIDivo5Io
Supplier#000001399 LmrocnIMSyYOWuANx7
Supplier#000001446 lch9HMNU1R7a0LIybsUodVknk6
Supplier#000001454 TOpingu2TVXIjhiL93h,
Supplier#000001500 wDmF5xLxtQch9ctVu,
Supplier#000001602 uKNWleafaM644
Supplier#000001626 UhxNRzUu1dtFmp0
Supplier#000001682 pXTkGxrTQVyH1Rr
Supplier#000001699 Q9C4rfJ26oijVPqqcqVXeRI
Supplier#000001700 7hMICoflY5zLFg
Supplier#000001726 TeRY7TtTH24sEword7yAaSkjx8
Supplier#000001730 Rc8e,1Pybn r6zo0VJIEiD0UD vhk
Supplier#000001746
qWsendlOekQG1aW4uq06uQaCm51se8lirv7 hBRd
Supplier#000001752 Fra7outx41THYJaRThdOGiBk
Supplier#000001856
jXcRgzYF0ah05iR8p6w5SbJLLcUGyYiURPvFwUWM
Supplier#000001931 FpJbMU2h6ZR2eBv8I9NlxF
Supplier#000001939 Nrk,JA4bfReUs

```

Appendix D

Supplier#000001990
DSDJkCgBJzuPg1yuM,CUdLnsRliOxkkHezTCA

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

..... Additional Rows Deleted

Supplier#000008231 IK7eGw Yj90sTdpsP,vcqWxLB
Supplier#000008243 2AyePMkDqzmzVzjGTizXthFLo8h
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 85Lu1sekb2xrSIzm0
Supplier#000008895
2cH4okfaLZTTg8sKRbbJQxkmeFu2Esj
Supplier#000008967 2kwEHyMG
7FwozNImAUE6mH0hYtqYculJM
Supplier#000008972 w2vF6 D5YZO3visPXsqVfLADTK
Supplier#000009032 qK,trB6Sdy4Dz1BRUFNy
Supplier#000009147 rOAuryHxpZ9eOvx
Supplier#000009252 F7cZaPUHwh1
ZKyj3xmAVWC1XdP ue1p5m,i
Supplier#000009278 RqYTzgxj93CLX 0mcYfCENOfD
Supplier#000009327 uoqMdf7e7Gj9dbQ53
Supplier#000009430 igRqmneFt
Supplier#000009567 r4Wfx4c3xsEAjcGj71HHZByornl
D9vrztXlv4
Supplier#000009601 51m637bO,Rw5DnHWFUVuLacRx9
Supplier#000009709
rRnCbHYgDgl9PZYnyWKVYSUW0vKg
Supplier#000009753 wLhVEcRmd7PkJF4FBnGK7Z
Supplier#000009796 z,y4Idmr15DOvPUqYG
Supplier#000009799 4wNjXGa4OKW1
Supplier#000009811 E3iuyq7UnZxU7oPZIE2Gu6
Supplier#000009812
APFRMy3lCbGfGa53n5t9DxzFPQPgnjrGt32
Supplier#000009862 rJzweWeN58
Supplier#000009868 ROjGgx5gvtkmnUUoeyy7v
Supplier#000009869
ucLqxzrpBTRMewGSM29t0rNTM30g1Tu3Xgg3mKag
Supplier#000009899 7XdPAHrzr1t,UQFZE
Supplier#000009974
7wJ,J5DKcxSU4KplcQLpbcAvB5AsvKT

(204 row(s) affected)

-- using default substitutions

```

SELECT          TOP 100
                S_NAME,
                COUNT(*) AS NUMWAIT
FROM            SUPPLIER,
                LINEITEM L1,
                ORDERS,
                NATION
WHERE           S_SUPPKEY = L1.L_SUPPKEY
                AND
                O_ORDERKEY = L1.L_ORDERKEY
                AND
                O_ORDERSTATUS = 'F'
                AND
                L1.L_RECEIPTDATE > L1.L_COMMITDATE
                AND
                EXISTS (
                    SELECT          *
                    FROM            LINEITEM L2
                    WHERE           L2.L_ORDERKEY
                                = L1.L_ORDERKEY AND
                                L2.L_SUPPKEY <>
                                L1.L_SUPPKEY
                ) AND
                NOT EXISTS (
                    SELECT          *
                    FROM            LINEITEM L3
                    WHERE           L3.L_ORDERKEY =
                                L1.L_ORDERKEY AND
                                L3.L_SUPPKEY
                                <> L1.L_SUPPKEY
                                AND
                                L3.L_RECEIPTDATE > L3.L_COMMITDATE
                ) AND
                S_NATIONKEY = N_NATIONKEY AND
                N_NAME = 'SAUDI ARABIA'
GROUP BY       S_NAME
ORDER BY       NUMWAIT DESC,
                S_NAME
S_NAME        NUMWAIT
-----
Supplier#000002829 20
Supplier#000005808 18
Supplier#000000262 17
Supplier#000000496 17
Supplier#000002160 17
Supplier#000002301 17
Supplier#000002540 17
Supplier#000003063 17
Supplier#000005178 17
Supplier#000008331 17
Supplier#000002005 16
Supplier#000002095 16
Supplier#000005799 16
Supplier#000005842 16
Supplier#000006450 16
Supplier#000006939 16
Supplier#000009200 16
Supplier#000009727 16

```

Appendix D

```

Supplier#00000486 15
Supplier#00000565 15
Supplier#000001046 15
Supplier#000001047 15
Supplier#000001161 15
Supplier#000001336 15
Supplier#000001435 15
Supplier#000003075 15
Supplier#000003335 15
Supplier#000005649 15
Supplier#000006027 15
Supplier#000006795 15
Supplier#000006800 15
Supplier#000006824 15
Supplier#000007131 15
Supplier#000007382 15
Supplier#000008913 15
Supplier#000009787 15
Supplier#00000633 14
Supplier#000001960 14
Supplier#000002323 14
Supplier#000002490 14
Supplier#000002993 14

```

..... Additional Rows Deleted

```

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#00000379 12
Supplier#00000673 12
Supplier#00000762 12
Supplier#00000811 12
Supplier#00000821 12
Supplier#000001337 12
Supplier#000001916 12
Supplier#000001925 12
Supplier#000002039 12
Supplier#000002357 12
Supplier#000002483 12

```

(100 row(s) affected)

-- using default substitutions

/* TPC_H Query 22 - Global Sales Opportunity */

```

SELECT      CENTRYCODE,

```

```

COUNT(*)   AS NUMCUST,
SUM(C_ACCTBAL) AS TOTACCTBAL
FROM (      SELECT
            SUBSTRING(C_PHONE,1,2) AS
CENTRYCODE,
            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   CENTRYCODE
ORDER BY   CENTRYCODE
CENTRYCODE NUMCUST  TOTACCTBAL
-----
13      888      6737713.990000
17      861      6460573.720000
18      964      7236687.400000
23      892      6701457.950000
29      948      7158866.630000
30      909      6808436.130000
31      922      6806670.180000

```

(7 row(s) affected)

Appendix E: Seed and Input Parameters

Appendix E

Seed

210050242

Stream0

1 74
 2 40 TIN AFRICA
 3 BUILDING 1995-03-05
 4 1993-10-01
 5 AFRICA 1993-01-01
 6 1993-01-01 0.02 24
 7 ARGENTINA IRAN
 8 IRAN MIDDLE EAST PROMO BRUSHED
 STEEL
 9 white
 10 1993-06-01
 11 MOZAMBIQUE 0.0001000000
 12 REG AIR AIR 1994-01-01
 13 special requests
 14 1994-12-01
 15 1996-12-01
 16 Brand#35 SMALL BURNISHED 9
 37 11 16 45 7 3
 48
 17 Brand#52 SM CAN
 18 312
 19 Brand#15 Brand#32 Brand#51
 3 16 23
 20 violet 1995-01-01 INDONESIA
 21 IRAN
 22 19 20 13 16 10 12
 24

Stream1

21 BRAZIL
 3 HOUSEHOLD 1995-03-22
 18 314
 5 AMERICA 1993-01-01
 11 EGYPT 0.0001000000
 7 CHINA BRAZIL
 6 1993-01-01 0.07 24
 20 honeydew 1993-01-01 UNITED
 KINGDOM
 17 Brand#54 LG BOX
 12 SHIP AIR 1995-01-01
 16 Brand#25 LARGE POLISHED 10
 28 6 48 14 49 7
 33
 15 1994-08-01
 13 special requests
 10 1994-03-01
 2 27 COPPER EUROPE

8 BRAZIL AMERICA PROMO
 PLATED STEEL
 14 1995-03-01
 19 Brand#22 Brand#15 Brand#55
 8 17 30
 9 tan
 22 16 30 20 29 26 31
 12
 1 82
 4 1996-05-01

Stream2

6 1993-01-01 0.05 25
 17 Brand#55 LG PACK
 14 1995-07-01
 16 Brand#55 PROMO BRUSHED 39
 41 2 37 38 32 15
 43
 19 Brand#25 Brand#53 Brand#45
 4 18 26
 10 1994-12-01
 9 sky
 2 15 STEEL AMERICA
 15 1997-03-01
 8 ROMANIA EUROPE PROMO
 ANODIZED STEEL
 5 ASIA 1993-01-01
 22 23 28 30 25 14 19
 20
 12 MAIL AIR 1995-01-01
 7 IRAN ROMANIA
 13 pending requests
 18 315
 1 90
 4 1994-02-01
 20 saddle 1997-01-01 JORDAN
 3 AUTOMOBILE 1995-03-07
 11 PERU 0.0001000000
 21 SAUDI ARABIA

Stream3

8 IRAQ MIDDLE EAST ECONOMY POLISHED
 STEEL
 5 EUROPE 1993-01-01
 4 1996-09-01
 6 1993-01-01 0.02 24
 17 Brand#52 LG CAN
 7 BRAZIL IRAQ
 1 98
 18 313
 22 13 26 11 17 24 15
 23
 14 1995-10-01
 9 royal

Appendix E

10 1993-10-01
 15 1994-12-01
 11 ETHIOPIA 0.0001000000
 20 cyan 1995-01-01 CANADA
 2 3 NICKEL EUROPE
 21 JAPAN
 19 Brand#22 Brand#31 Brand#44
 9 19 22
 13 pending accounts
 16 Brand#35 MEDIUM BURNISHED 19
 11 17 7 34 29 42
 35
 12 TRUCK RAIL 1995-01-01
 3 FURNITURE 1995-03-24

Stream4

5 MIDDLE EAST 1994-01-01
 21 EGYPT
 14 1996-01-01
 19 Brand#34 Brand#14 Brand#43
 4 20 29
 15 1997-07-01
 17 Brand#54 MED BOX
 12 RAIL MAIL 1997-01-01
 6 1994-01-01 0.08 24
 4 1994-06-01
 9 powder
 8 CANADA AMERICA ECONOMY
 BURNISHED COPPER
 16 Brand#25 ECONOMY PLATED 22
 32 9 37 31 27 18
 11
 11 CHINA 0.0001000000
 2 41 TIN AMERICA
 10 1994-07-01
 18 315
 1 106
 13 pending accounts
 7 ROMANIA CANADA
 22 28 25 22 18 33 32
 16
 3 AUTOMOBILE 1995-03-09
 20 orange 1993-01-01 CHINA

Stream5

21 VIETNAM
 15 1995-03-01
 4 1997-01-01
 6 1994-01-01 0.05 25
 7 IRAQ SAUDI ARABIA
 16 Brand#55 STANDARD BRUSHED 8
 19 44 16 7 18 45
 14
 19 Brand#31 Brand#52 Brand#32
 9 10 26

18 312
 14 1996-04-01
 22 27 23 18 20 17 31
 10
 11 FRANCE 0.0001000000
 13 pending accounts
 3 FURNITURE 1995-03-26
 1 114
 2 29 COPPER MIDDLE EAST
 5 AFRICA 1994-01-01
 8 SAUDI ARABIA MIDDLE EAST LARGE
 BRUSHED COPPER
 20 beige 1997-01-01 GERMANY
 12 AIR RAIL 1996-01-01
 17 Brand#51 MED PACK
 10 1993-04-01
 9 pale

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_START(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].clen);
    PR_END(fp_l);
  }

  return(0);
}

```

```

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

```

```

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

  return(0);
}

```

```

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

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

  PR_START(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_START(ps_fp);
  PR_HUGE(ps_fp, &part->s[i].partkey);
  PR_HUGE(ps_fp, &part->s[i].supkey);
  PR_MONEY(ps_fp, &part->s[i].scost);
}

```

```

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

return(0);
}

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

    return(0);
}

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

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

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

    return(0);
}

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

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

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

```

```

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

    return(0);
}

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

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

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

    return(0);
}

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

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

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

```

```

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

rows_per_segment = (cnt / delete_segments) + 1;

if(++rows_this_segment) > rows_per_segment)
{

fclose(dfp);
dfp =
print_prep(tbl, -num);
if (dfp
== NULL) return(-1);

last_num = num;

rows_this_segment=1;
}
}

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

}

return(0);
}

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

return(0);
}

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

return(0);
}

```



```

}

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

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

    return(0);
}

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

    return(0);
}

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

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

sLabel = msLblThroughputRF12Mgr
sIt = CStr(iStreamId)
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

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

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! " &
-
"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

lInstId = 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(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

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

If iQueryId = miQueryIdRF1 Then
sLabel = msLabelThroughputRF1

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

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

ParentInstIdEnd = lInstId

#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."
        End Sub
    End Sub

```

```

End If

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

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

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

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

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

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

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

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

```

```

Exit Sub
End If

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

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

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

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

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

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

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

```

```

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

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

Exit Sub

GenerateSelectedErr:
DisplayErrors

End Sub
Private Function LabelStartPower(iQueryId As Integer) As
String
' Returns the step label for the passed in power query
identifier
' Uses the label that marks the start of execution for the
query
' E.g. TPC-H Kit, Stream1, RF1: the start time for the
refresh function
' is the start time for the step, 'Throughput - Semaphore
Loop for RF Delay'
' but the end time for the refresh function is the end time for
the step,
' 'Throughput - Execute Stream1 RF1'
' Similarly, in the HP version of the TPC-H Kit, Throughput
Run, RF1:
' the start time for RF1 is the start time for the step,
' 'Wait for Throughput Run' but the end time for RF1 is the
end time
' for the step, 'Throughput RF1'
' E.g. in the HP version of the TPC-H Kit, query 15 is
executed in
' 2 parts. Therefore, the start time for query 15 is the start
time
' for the step, 'Create REVENUE View' but the end time for
query 15
' is the end time for the step, 'Execute using REVENUE'

Select Case iQueryId
Case miQueryIdRF1
LabelStartPower = msStartStepLabelPowerRF1

Case miQueryIdRF2
LabelStartPower = msStartStepLabelPowerRF2

#If Not TPCH_KIT Then
Case miQuery15
LabelStartPower = msStartStepLabelPower15
#End If

Case Else
LabelStartPower = msStartStepLabelPowerOther &
Format$(iQueryId, msFmtNumberPadWZeros)

```

```

End Select

End Function
Private Function LabelEndPower(iQueryId As Integer) As
String
' Returns the step label for the passed in power query
identifier
' Uses the label that marks the end of execution for the
query
' E.g. TPC-H Kit, Stream1, RF1: the start time for the
refresh function
' is the start time for the step, 'Throughput - Semaphore
Loop for RF Delay'
' but the end time for the refresh function is the end time for
the step,
' 'Throughput - Execute Stream1 RF1'
' Similarly, in the HP version of the TPC-H Kit, Throughput
Run, RF1:
' the start time for RF1 is the start time for the step,
' 'Wait for Throughput Run' but the end time for RF1 is the
end time
' for the step, 'Throughput RF1'
' E.g. in the HP version of the TPC-H Kit, query 15 is
executed in
' 2 parts. Therefore, the start time for query 15 is the start
time
' for the step, 'Create REVENUE View' but the end time for
query 15
' is the end time for the step, 'Execute using REVENUE'

#If TPCH_KIT Then
Debug.Assert iQueryId = miQueryIdRF1 Or iQueryId =
miQueryIdRF2
Select Case iQueryId
Case miQueryIdRF1
LabelEndPower = msEndStepLabelPowerRF1
Case miQueryIdRF2
LabelEndPower = msEndStepLabelPowerRF2
End Select
#Else
Debug.Assert iQueryId = miQueryIdRF1 Or iQueryId =
miQueryIdRF2 Or iQueryId = miQuery15
Select Case iQueryId
Case miQueryIdRF1
LabelEndPower = msEndStepLabelPowerRF1
Case miQueryIdRF2
LabelEndPower = msEndStepLabelPowerRF2
Case miQuery15
LabelEndPower = msEndStepLabelPower15
End Select
#End If

End Function
#If Not TPCH_KIT Then
Private Function GetEndStepIfThroughput(iQueryId As
Integer) As String
' Returns the iterator value for the passed in query identifier
' for the throughput run

```

```

' Returns the iterator value that marks the end of execution
for the query
' E.g. in the HP version of the TPC-H Kit, query 15 is
executed in
' 2 parts. Therefore, the iterator value for the start of query
15
' is 15V but the the iterator value for the end of query 15 is
15

```

```

Debug.Assert iQueryId = miQuery15
GetEndStepItThroughput = miQuery15

```

```

End Function
#End If

```

```

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

```

```

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

        Case miQueryIdRF2
            LabelStartThroughput = msLblThroughputRF2

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

        Case miQueryIdRF2

```

```

        LabelStartThroughput =
msStartStepLabelThroughputRF2

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

```

```

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

```

```

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

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

        Case Else
            Debug.Assert True
    End Select

```

```

#Else
    LabelEndThroughput = msEndStepLabelThroughputRF1
#End If

```

```

End Function

```

```

Private Function IteratorThroughput(iStream As Integer,
iQuery As Integer) As String
' Returns the iterator value for the passed in stream and
query
' for the throughput run
' Returns the iterator value that marks the start of execution
for the query

```

```

' E.g. in the HP version of the TPC-H Kit, query 15 is
executed in
' 2 parts. Therefore, the iterator value for the start of query
15
' is 15V but the the iterator value for the end of query 15 is
15

#If TPC_H_KIT Then
    Dim iQIndex As Integer
#End If

Select Case iQuery
    Case miQueryIdRF1
        IteratorThroughput = msFirstRFIterator

    Case miQueryIdRF2
        IteratorThroughput = msFirstRFIterator

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

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

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

    Debug.Assert iQuery = miQueryIdRF1 Or iQuery =
miQueryIdRF2

```

```

Select Case iQuery
    Case miQueryIdRF1
        IteratorPowerRF = msFirstRFIterator

    Case miQueryIdRF2
        IteratorPowerRF = msFirstRFIterator

End Select

End Function

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

    Dim iStreamId As Integer
    Dim lParentInstId As Long
    Dim iQueryId As Integer
    Dim iNextQuery As Integer
    Dim iNextStream As Integer
    Dim sLabel As String
    Dim sIt As String
    Dim sSql As String
    Dim iUBound As Integer

    If mbRunType(eRunType.Power) Then
        ' Populate start and end times for the PowerRun
        iStreamId = miStreamPowerRun

        For iQueryId = miQueryIdMin To miQueryIdMax Step 1
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 TPC_H_KIT Then
        End If
    #End If

    #If Not TPC_H_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 TPC_H_KIT Then
            sIt = IteratorThroughput(iNextStream,
iNextQuery)
            sSql = sSql & " and iterator_value = " &
MakeStringFieldValid(sIt)
        #Else
            sIt = IteratorThroughput(iNextStream,
iNextQuery)
            sSql = sSql & " and iterator_value = " &
MakeStringFieldValid(sIt)
        #End If

        If iQueryId = miQueryIdRF1 Or iQueryId =
miQueryIdRF2 Then
            IParentInstId = ParentInstId(iNextStream,
iNextQuery)
            If IParentInstId = 0 Then Exit Sub
            sSql = sSql & " and parent_instance_id = " &
CStr(IParentInstId)
        End If

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

        arExecutionDtls(iStreamId,
iQueryId).StartTimeNextStep =
mrecDtls.Fields("start_time").Value
    Else
        ' Else, initialize start time for the next step to the
end time for the step
        arExecutionDtls(iStreamId,
iQueryId).StartTimeNextStep = arExecutionDtls(iStreamId,
iQueryId).EndTime
    End If

    ' Convert all the 64-bit timestamps to string values
    arExecutionDtls(iStreamId, iQueryId).sStartTm =
JulianToString(arExecutionDtls(iStreamId,
iQueryId).StartTime)
    arExecutionDtls(iStreamId, iQueryId).sEndTm =
JulianToString(arExecutionDtls(iStreamId,
iQueryId).EndTime)
    arExecutionDtls(iStreamId, iQueryId).sStartNextTm
= JulianToString(arExecutionDtls(iStreamId,
iQueryId).StartTimeNextStep)

    Next iQueryId
    Next iStreamId

```



```

End If

' Call a procedure to calculate the elapsed time for each step
and
' the Power and Throughput Metrics
Call CalcElapsedTmAndPrint

End Sub
Private Function JulianToString(cJTime As Currency)
' Converts the passed in 64-bit date to a formatted string
that can
' be printed in the report
' The format of date/time in reports is yyyy-mm-dd
hh:mm:ss.sss
' This format has these benefits:
' - is sortable, since all fields are arranged most to least
significant
' and all numeric
' - is directly interpreted by Excel as a time/date value
' - is fixed width
' - is Y2K compliant

Dim lYr As Long
Dim lMon As Long
Dim lDt As Long
Dim lHr As Long
Dim lMin As Long
Dim lSec As Long
Dim lMs As Long
Dim cJTemp As Currency

Call smtimelib.JulianToTime(cJTime, lYr, lMon, lDt, lHr,
lMin, lSec, lMs)
JulianToString = Format$(lYr, msFmtYrPadWZeroes) &
msDtSeparator & _
Format$(lMon, msFmtNumberPadWZeroes) &
msDtSeparator & _
Format$(lDt, msFmtNumberPadWZeroes) & msBlank
& _
Format$(lHr, msFmtNumberPadWZeroes) &
msTmSeparator & _
Format$(lMin, msFmtNumberPadWZeroes) &
msTmSeparator & _
Format$(lSec, msFmtNumberPadWZeroes) &
msMsSeparator & _
Format$(lMs, msFmtMsPadWZeroes)

End Function
Public Sub LoadRunIds(cboLoad As ComboBox, sDbFile As
String)
' Opens the passed in workspace definition file and loads all
the
' run identifiers in the passed in combo box

Dim strSql As String
Dim lRunId As Long

On Error GoTo LoadRunIdsErr

```

```

Screen.MousePointer = vbHourglass

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

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

strSql = "select run_id from run_header order by run_id
desc"
Set mrecDtls = mDB.OpenRecordset(strSql,
dbOpenSnapshot)

cboLoad.Clear

If mrecDtls.RecordCount = 0 Then
Screen.MousePointer = vbDefault
MsgBox "There are no run records. Unable to load list of
run ids."
Else
mrecDtls.MoveFirst
While Not mrecDtls.EOF
' Add run identifier to the combo box
lRunId = mrecDtls.Fields("run_id").Value
cboLoad.AddItem CStr(lRunId)

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

mrecDtls.Close
CloseDbAndWsp

Screen.MousePointer = vbDefault

Exit Sub

LoadRunIdsErr:

Screen.MousePointer = vbDefault
DisplayErrors

CloseDbAndWsp

End Sub
Public Sub LoadSFAndStreams(cboSF As ComboBox,
cboStreams As ComboBox)
' Loads all the valid scale factors in cboSF
' Loads the number of throughput streams for each scale
factor in
' cboStreams
' This procedure assumes that the arrays, marrSF and
marrStreams have
' already been initialized.

```

```

Dim iIndex As Integer

On Error GoTo LoadSFAndStreamsErr

cboSF.Clear
cboStreams.Clear

For iIndex = LBound(marrSF) To UBound(marrSF)
    cboSF.AddItem CStr(marrSF(iIndex))
    cboSF.ItemData(iIndex) = iIndex

    cboStreams.AddItem CStr(marrStreams(iIndex))
    cboStreams.ItemData(iIndex) = iIndex
Next iIndex

cboSF.ListIndex = miDefaultSF
cboStreams.ListIndex = miDefaultSF

Exit Sub

LoadSFAndStreamsErr:

    DisplayErrors

End Sub

Private Function NextStepExists(iStream As Integer, iQuery
As Integer, _
    iNextQuery As Integer) As Boolean
    ' Returns False if this is the last step in the query stream
    ' If not, populates iNextQuery with the index of the next
    query

    Dim iQIndex As Integer

    If iQuery = miQueryIdRF1 Or iQuery = miQueryIdRF2
Then
        NextStepExists = False
    Else
        For iQIndex = LBound(arQuerySequence,
miDimensionQuery) _
            To UBound(arQuerySequence, miDimensionQuery)
Step 1
            If arQuerySequence(iStream, iQIndex) = iQuery Then
                Exit For
            End If
        Next iQIndex

        NextStepExists = (iQIndex < UBound(arQuerySequence,
miDimensionQuery))

        If NextStepExists Then
            iNextQuery = arQuerySequence(iStream, iQIndex + 1)
        End If
    End If

End Function

Private Sub PrintStatistics(fQppPower As Double,
fElapsedThroughput As Double, _

```

```

    fQppThroughput As Double, fQppH As Double,
sStartTm As String, _
    sEndTm As String)
    ' This function prints the execution statistics for each step
    ' and the Power and Throughput Metrics to the output file

    Dim iQIndex As Integer
    Dim iSIndex As Integer
    Dim sPrint As String
    Dim hOutputFile As Integer

    hOutputFile = 0

    hOutputFile = FreeFile
    Open msOutput For Output Shared As hOutputFile
    ' Header information
    Print #hOutputFile, "Workspace file:" & vbTab &
msDbFile
    Print #hOutputFile, "Run identifier:" & vbTab &
CStr(mlRunId)
    Print #hOutputFile, "Database Scale Factor:" & vbTab &
CStr(mfSF)
    Print #hOutputFile, "Query Streams for Throughput Test:"
& vbTab & CStr(miStreamIdHi)
    Print #hOutputFile, "Measurement Interval in Throughput
Test (Ts):" & vbTab & CStr(fElapsedThroughput) & vbTab &
vbTab & _
        "Start Time: " & vbTab & sStartTm & vbTab
& vbTab & _
        "End Time: " & vbTab & sEndTm
    Print #hOutputFile, "TPC-H Power:" & vbTab &
CStr(fQppPower)
    Print #hOutputFile, "TPC-H Throughput:" & vbTab &
CStr(fQppThroughput)
    Print #hOutputFile, "TPC-H Composite Query-Per-Hour
Rating (QphH):" & vbTab & CStr(fQppH)
    Print #hOutputFile,

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

    For iQIndex = miQueryIdMin To miQueryIdRF1 - 1
        sPrint = "Q" & Format$(iQIndex,
msFmtNumberWOZeros) & vbTab
        Print #hOutputFile, sPrint;
    Next iQIndex

    For iQIndex = miQueryIdRF1 To miQueryIdRF2
        sPrint = "RF" & Format$(iQIndex - miQueryIdRF1 + 1,
msFmtNumberWOZeros) & vbTab
        Print #hOutputFile, sPrint;
    Next iQIndex

    Print #hOutputFile,

    ' Print TPC-H timing intervals for each query in timing grid
    For iSIndex = miStreamIdLo To miStreamIdHi

```

```

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

For iQIndex = miQueryIdMin To miQueryIdMax Step 1

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

Print #hOutputFile,

Next iSIndex

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

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

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

    For iQIndex = miQueryIdMin To miQueryIdMax Step 1

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

    Print #hOutputFile,

Next iSIndex

Print #hOutputFile,
Print #hOutputFile, vbTab & "Query Id" & vbTab & "Start
Time" & vbTab & _
    "End Time" & vbTab & "Start Next Step" & vbTab &
"Step Delta" & vbTab & _
    "Official Query Elapsed" & vbTab & "Difference"

' Print step execution details, viz. start time, end time,
TPCH timing
' interval and elapsed times for each query
For iSIndex = miStreamIdLo To miStreamIdHi

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

    For iQIndex = miQueryIdMin To miQueryIdMax Step 1

        sPrint = vbTab & CStr(iQIndex) & vbTab & _
            arExecutionDtls(iSIndex, iQIndex).sStartTm &
vbTab & _

```

```

arExecutionDtls(iSIndex, iQIndex).sEndTm &
vbTab & _
            arExecutionDtls(iSIndex, iQIndex).sStartNextTm
& vbTab & _
            CStr(arExecutionDtls(iSIndex,
iQIndex).ElapsedTime) & vbTab & _
            CStr(arExecutionDtls(iSIndex,
iQIndex).ElapsedTpch) & vbTab & _
            Round(CStr(arExecutionDtls(iSIndex,
iQIndex).ElapsedTpch - arExecutionDtls(iSIndex,
iQIndex).ElapsedTime), miNumDecimalPlaces)
        Print #hOutputFile, sPrint
        Next iQIndex

    Print #hOutputFile,

Next iSIndex

Close hOutputFile
hOutputFile = 0

MsgBox "The report has been generated at " & gsSQ &
msOutput & gsSQ & "!"

Exit Sub

GenerateSelectedErr:
DisplayErrors

If hOutputFile <> 0 Then
    Close hOutputFile
End If

End Sub
Public Sub SFChanged()

    ' Called when the scale factor is changed - modifies the
number
' of streams depending on the scale factor
frmTPCHMetrics.cboStreams.ListIndex =
frmTPCHMetrics.cboSF.ListIndex

End Sub

```

Utility.bas

```

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

```

```

Option Explicit

Private Type OPENFILENAME
    lStructSize As Long
    hwndOwner As Long
    hInstance As Long
    lpstrFilter As String
    lpstrCustomFilter As String
    nMaxCustFilter As Long
    nFilterIndex As Long
    lpstrFile As String
    nMaxFile As Long
    lpstrFileName As String
    nMaxFileName As Long
    lpstrInitialDir As String
    lpstrTitle As String
    Flags As Long
    nFileOffset As Integer
    nFileExtension As Integer
    lpstrDefExt As String
    lCustData As Long
    lpfnHook As Long
    lpTemplateName As Long
End Type

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

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

Private Const ms_DLG_TITLE_OPEN = "Open"

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

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

Private Const ms_FILE_ALL_FILTER = "|All Files (*.*)*.*)"

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

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

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

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

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

    ' Replaces all occurrences of ReplaceString in MainString
with ReplaceWith

    Dim intPos As Integer
    Dim strTemp As String

    strTemp = MainString

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

Public Function ShowFileDialog(ByVal strFilter As
String, _

```

```

    ByVal strDialogTitle As String, ByVal lngFlags As
Long, _
    Optional ByVal strOldFile As String = gsEmptyString)
As String

```

```

' Returns the file name selected by the user
Dim strInitDir As String
Dim intPos As Integer
Dim opfile As OPENFILENAME
Dim sFile As String

```

```

On Error GoTo ShowFileDialogErr

```

```

If Not strOldFile <> gsEmptyString Then
    intPos = InstrR(strOldFile, gsPeriod)
    If intPos > 0 Then
        strInitDir = Left$(strOldFile, intPos - 1)
    End If
End If

```

```

With opfile
    .lStructSize = Len(opfile)
    .Flags = lngFlags
    .lpstrInitialDir = strInitDir
    .lpstrTitle = strDialogTitle
    .lpstrFilter = MakeWindowsFilter(strFilter)
    sFile = strOldFile & String$(MAX_PATH -

```

```

Len(strOldFile), 0)
    .lpstrFile = sFile
    .nMaxFile = MAX_PATH
End With

```

```

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

```

```

Exit Function

```

```

ShowFileDialogErr:

```

```

    Call DisplayErrors
    ' Reset the selection to the passed in file, if any
    ShowFileDialog = strOldFile

```

```

End Function

```

```

Public Function InstrR(strMain As String, _
    strSearch As String) As Integer

```

```

' Finds the last occurrence of the passed in string

```

```

    Dim intPos As Integer
    Dim intPrev As Integer

```

```

    intPrev = intPos
    intPos = InStr(1, strMain, strSearch)

```

```

    Do While intPos > 0
        intPrev = intPos
        intPos = InStr(intPos + 1, strMain, strSearch)
    End Do

```

```

    Loop
    InstrR = intPrev

```

```

End Function

```

```

Private Function MakeWindowsFilter(sFilter As String) As
String

```

```

    Dim s As String, ch As String, iTemp As Integer

```

```

' To make Windows-style filter, replace | and : with nulls
For iTemp = 1 To Len(sFilter)
    ch = Mid$(sFilter, iTemp, 1)
    If ch = "|" Then
        s = s & vbNullChar
    Else
        s = s & ch
    End If
Next iTemp

```

```

' Put double null at end
s = s & vbNullChar & vbNullChar
MakeWindowsFilter = s

```

```

End Function

```

```

Public Function BrowseStpFile(ByVal strDefaultFile As
String) As String

```

```

' This function initializes the values of the filter property,
' the dialog title and flags for the File Open dialog
depending
' on the FileType passed in
' It then calls ShowFileDialog to set these properties
and
' display the File Open dialog to the user

```

```

On Error GoTo BrowseStpFileErr

```

```

BrowseStpFile = ShowFileDialog( _
    ms_FILE_DB_FILTER & ms_FILE_ALL_FILTER, _
    ms_DLG_TITLE_OPEN, _
    ml_FILE_DB_FLAGS, _
    strDefaultFile)

```

```

Exit Function

```

```

BrowseStpFileErr:

```

```

    DisplayErrors
    BrowseStpFile = gsEmptyString

```

```

End Function

```

```

Public Function BrowseOutputFile(ByVal strDefaultFile As
String) As String

```

```

' This function initializes the values of the filter property,
' the dialog title and flags for the File Open dialog
depending
' on the FileType passed in
' It then calls ShowFileDialog to set these properties
and
' display the File Open dialog to the user

```

```

On Error GoTo BrowseOutputFileErr

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

Exit Function

BrowseOutputFileErr:
    DisplayErrors
    BrowseOutputFile = gsEmptyString

End Function
Public Function MakePathValid(strFileName As String) As
String
    ' Makes the passed in file path valid

    Dim strFileDir As String
    Dim strTempDir As String
    Dim strTempFile As String
    Dim sTemp As String
    Dim intPos As Integer
    Dim intStart As Integer

    strTempFile = strFileName
    intPos = InstrR(strFileName, gsFileSeparator)

    If intPos > 0 Then
        strFileDir = Left$(strTempFile, intPos - 1)
        If Dir$(strFileDir, vbDirectory) = "" Then
            ' Loop through the entire path starting at the root
            ' since Mkdir can create only one level of sub-directory
            ' at a time
            intStart = InStr(strFileDir, gsFileSeparator)
            If Mid(strFileDir, 2, 1) = ":" Then
                ' Remove drive from directory specification
                intStart = InStr(intStart + 1, strFileDir,
gsFileSeparator)
            End If

            Do While strTempDir <> strFileDir

                If intStart > 0 Then
                    strTempDir = Left$(strFileDir, intStart - 1)
                Else
                    strTempDir = strFileDir
                End If

                If Dir$(strTempDir, vbDirectory) <> "" Then
                    ' If the specified directory doesn't exist, try to
                    ' create it.
                    Mkdir strTempDir
                Else
                    ' The directory exists - go to it's sub-directory
                End If
            End If
        End If
    End If

```

```

        intStart = InStr(intStart + 1, strFileDir,
gsFileSeparator)
    Loop

    ' Sanity check
    If Dir$(strFileDir, vbDirectory) <> "" Then
        ' We were unable to create the file directory
        MsgBox "Unable to create directory " & strFileDir
        MakePathValid = gsEmptyString
    Else
        MakePathValid = strTempFile
    End If
Else
    ' The specified directory exists - we should be able
    ' to create the output file in it
    MakePathValid = strTempFile
End If
Else
    ' The user has only specified a filename - VB will try
    ' to create it in the current directory
    MakePathValid = strTempFile
End If
End Function

```

MoveTempDB.sql

```

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

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

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

```

AddTempDB.sql

```

alter database tempdb modify file
    (name=tempdev, filename='T:\TempdB.mdf,size=30000mb)
alter database tempdb modify file
    (name=templog, filename='T:\Templog.ldf,size=30000mb)
alter database tempdb add file
    (name=tempdev2, filename='U:\tempdev_2',size=15000mb),
    (name=tempdev3, filename='U:\tempdev_3',size=15000mb),
    (name=tempdev4, filename='U:\tempdev_4',size=15000mb),
    (name=tempdev5, filename='U:\tempdev_5',size=15000mb),
    (name=tempdev6, filename='X:\tempdev_6',size=15000mb),
    (name=tempdev7, filename='X:\tempdev_7',size=15000mb),
    (name=tempdev8, filename='F:\tempdev_8',size=15000mb),
    (name=tempdev9, filename='F:\tempdev_9',size=15000mb),

```

(name=tempdev10,
filename='Z:\tempdev_10',size=15000mb),
(name=tempdev11, filename='Z:\tempdev_11',size=15000mb)

Appendix G: Price Quotations

April 26, 2006

Dell
Gene Purdy
1 Dell Way
Round Rock, TX 78664

Mr. Purdy:

Here is the information you requested regarding pricing for several Microsoft products to be used in conjunction with your TPC-H benchmark testing.

All pricing shown is in US Dollars (\$).

Part Number	Description	Unit Price	Quantity	Price
810-04793	SQL Server 2005 Enterprise x64 Edition <i>Server License with 25 CALs</i> <i>Discount Schedule: Open Program - No Level</i> <i>Unit Price reflects a 39% discount from the retail unit price of \$13,969.</i>	\$8,487	1	\$8,487
359-01911	SQL Server 2005 Client License <i>Discount Schedule: Open Program - No Level</i> <i>Unit Price reflects a 4% discount from the retail unit price of \$163.</i>	\$156	25	\$3,900
P72-00274	Windows Server 2003 Enterprise x64 Edition <i>Server License Only - No CALs</i> <i>Discount Schedule: Open Program - No Level</i> <i>Unit Price reflects a 42% discount from the retail unit price of \$3,999.</i>	\$2,334	1	\$2,334
254-00170	Visual C++ Standard Edition <i>No Discounts Applied</i>	\$109	1	\$109
046-00856	Visual Basic 2003 .Net Professional <i>No Discounts Applied</i>	\$109	1	\$109
N/A	Microsoft Problem Resolution Services <i>Professional Support</i> <i>(1 Incident)</i>	\$245	1	\$245

All products are currently orderable through Microsoft's normal distribution channels.

Some products may not be currently orderable but will be available through Microsoft's normal distribution channels by November 7, 2005.

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: PHgepu0626049068.

Please include this Reference ID in any correspondence regarding this price quote.