



Hewlett-Packard Company

TPC Benchmark™ H
Full Disclosure Report
for
HP ProLiant ML370 G5
using
Microsoft SQL Server 2005 Enterprise x64 Edition SP2
and
Windows Server 2003 Enterprise x64 Edition SP2

First Edition
April 2007

First Edition – April, 2007

Hewlett-Packard Company (HP), the Sponsor of this benchmark test, believes that the information in this document is accurate as of the publication date. The information in this document is subject to change without notice. The Sponsor assumes no responsibility for any errors that may appear in this document.

The pricing information in this document is believed to accurately reflect the current prices as of the publication date. However, the Sponsor provides no warranty of the pricing information in this document.

Benchmark results are highly dependent upon workload, specific application requirements, and system design and implementation. Relative system performance will vary as a result of these and other factors. Therefore, the TPC Benchmark H should not be used as a substitute for a specific customer application benchmark when critical capacity planning and/or product evaluation decisions are contemplated.

All performance data contained in this report was obtained in a rigorously controlled environment. Results obtained in other operating environments may vary significantly. No warranty of system performance or price/performance is expressed or implied in this report.

Copyright 2007 Hewlett-Packard Company.

All rights reserved. Permission is hereby granted to reproduce this document in whole or in part provided the copyright notice printed above is set forth in full text or on the title page of each item reproduced.

NonStop, ProLiant ML370 G5, and ProLiant are registered trademarks of Hewlett-Packard Company.

Microsoft, Windows 2003 and SQL Server 2005 are registered trademarks of Microsoft Corporation.

TPC Benchmark, TPC-H, QppH, QthH and QphH are trademarks of the Transaction Processing Performance Council.

All other brand or product names mentioned herein must be considered trademarks or registered trademarks of their respective owners.



HP ProLiant ML370 G5

TPC-H Rev. 2.6.0

Report Date:
Apr 23, 2007

Total System Cost

\$140,978 USD

Composite Query per Hour Metric

17,686.7
QphH@100GB

Price / Performance

\$7.98 USD
\$ / QphH@100GB

Database Size

100GB

Database Manager

Microsoft SQL Server 2005 Enterprise Edition SP2

Operating System

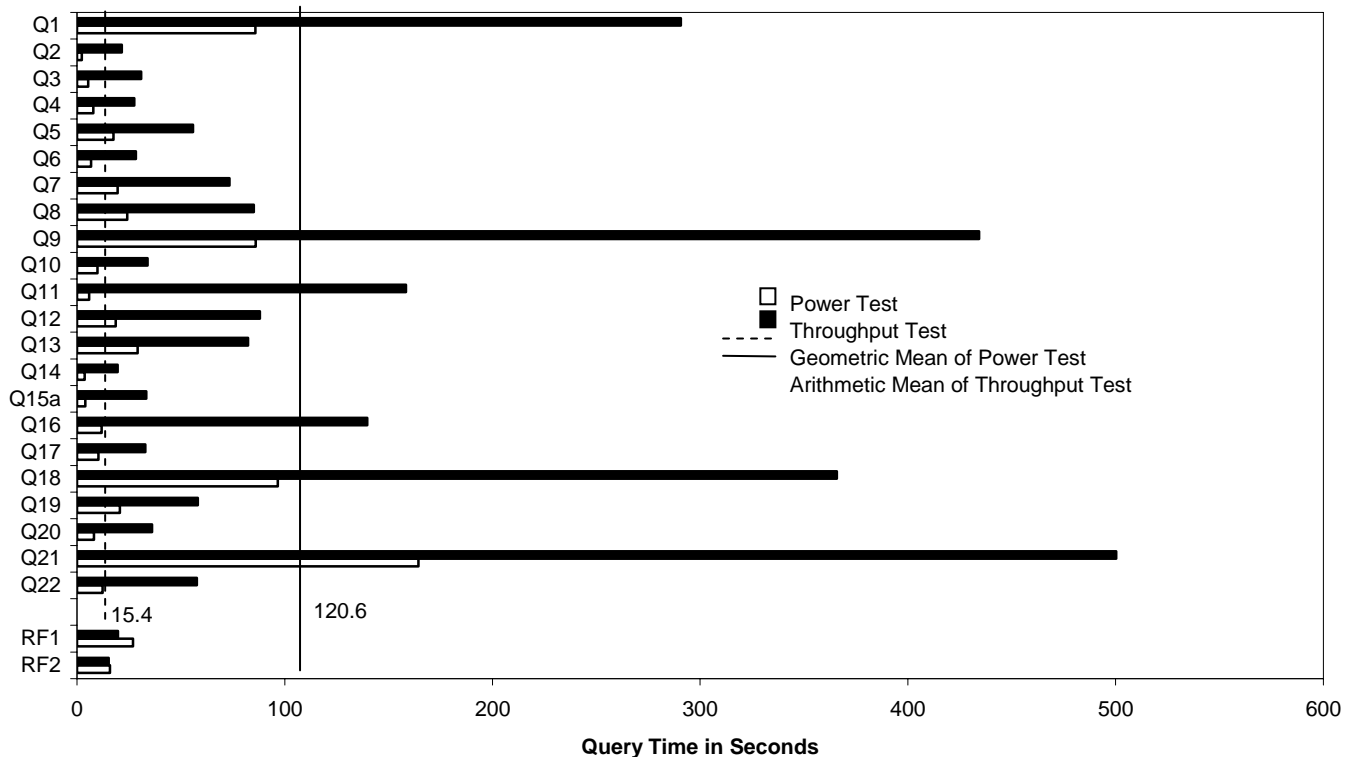
Windows Server 2003, Enterprise Edition SP2

Other Software

**Visual C++
Visual Basic**

Availability Date

Apr 23, 2007



Database Load Time = 1:03:47

Load Included Backup: Y

Total Data Storage / Database Size = 55.08

RAID (Base tables only): N

RAID (Base tables and auxiliary data structures): Y

RAID (All): N

System Configuration:

Processors : 2x 2.66 GHz Quad Core Intel X5355
Cores : 8
Threads : 8
Memory : 64 GB
OS Disk Drives : 1x 36 GB 15K rpm SFF SAS (internal)
Network : 2x on-board GigE
Disk Controllers : 6x Smart Array P800, 1x Smart Array P400
Disks : 150x 36 GB 15K rpm SFF SAS drives (external)
 3x36GB 15K rpm SFF SAS drives (internal)
Total Disk Storage: 5508 GB

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

**HP ProLiant ML370 G5**

TPC-H Rev. 2.6.0

Report Date: 23-Apr-07

Description	Part Number	Third Party	Unit Price	Qty	Extended Price	3 yr. Maint. Price
Server Hardware						
Brand Pricing						
HP ML370T05 SAS ModX CTO Svr	400607-B21	1	1,293	1	1,293	
HP X5355 ML370G5 FIO Kit	433104-L21	1	1,849	2	3,698	
HP ML370 G5 Mem Board Kit	403766-B21	1	179	1	179	
HP 8GB FBD PC2-5300 2x4GB Kit	397415-B21	1	5,999	8	47,992	
HP s7540 17in CRT Monitor	PF997AA#ABA	1	139	1	139	
HP 3y 4h 24x7 ProLiant ML370 HW Support	U4529E	1	853	1		853
Subtotal					53,301	853
Storage						
HP Smart Array P400/256 Controller	405132-B21	1	449	1	449	
HP SmartArray Cache Battery Kit	383280-B21	1	109	1	109	
HP Smart Array P800/512 Controller	381513-B21	1	1,099	6	6,594	
HP StgWks 70 Modular Smart Arry ALL	418800-B21	1	3,199	6	19,194	
HP 36GB 15K SAS Single Port SFF Hard Drive (internal)	431933-B21	1	369	3	1,107	
HP 36GB 15K SAS Single Port SFF Hard Drive	431933-B21	1	369	150	55,350	
HP 5642 Unassembled Rack	358254-B21	1	865	1	865	
HP StgWks 70 Modular Smart Arry ALL (10%)	418800-B21	1	3,199	2		6,398
HP 36GB 15K SAS Single Port SFF Hard Drive (10%)	431933-B21	1	369	15		5,535
Subtotal					83,668	11,933
Hardware and Maintenance Discount						
Large Purchase and Net 30 discount	16.0%	1			(\$21,915)	(\$2,046)
Hardware Subtotal					115,054	10,740
Software						
SQL Server 2005 Enterprise x64 Edition with 25 CALs	810-04779	Microsoft	2	8,487	1	8,487
SQL Server 2005 Client License	359-01911	Microsoft	2	156	25	3,900
Windows Server 2003 Enterprise x64 Edition	P72-00274	Microsoft	2	2,334	1	2,334
Microsoft Problem Resolution Services		Microsoft	2	245	1	245
Microsoft Visual C++ .NET Standard 2003	254-00170	Microsoft	2	109	1	109
Microsoft Visual Basic .Net Standard 2003	046-00856	Microsoft	2	109	1	109
Subtotal					14,939	245
Total					\$129,993	\$10,985

Three-Year Cost of Ownership: \$140,978 USD**QpH @ 100GB: 17686.7****\$ / QpH @ 100GB: \$7.98 USD**

Pricing: 1=HP Direct: 800-203-6748; 2=Microsoft

Note 1 = Discount based on HP Direct guidance with large purchase and Net 30 discount. Applies to all lines with 1 in pricing column.

* = These components are not immediately orderable. See the FDR for more information.

Note: The benchmark results and test methodology were audited by Lorna Livingtree of Performance Metrics, Inc. (www.perfmetrics.com).

Audited by: Lorna Livingtree of Performance Metrics Inc.

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 terms, please inform at pricing@tpc.org. Thank you.



HP ProLiant ML370 G5

TPC-H Rev. 2.6.0

Report Date:
Apr 23, 2007

Numerical Quantities

Measurement Results:

Database Scale Factor	= 100
Total Data Storage / Database Size	= 55.08
Start of Database Load	= 2007-04-03 20:16:55
End of Database Load	= 2007-04-03 21:20:42
Database Load Time	= 1:03:47
Query Streams for Throughput Test	= 5
TPC-H Power	= 23,378.0
TPC-H Throughput	= 13,381.0
TPC-H Composite Query-per-Hour Metric (QphH@100GB)	= 17,686.7
Total System Price Over 3 Years	= \$140,978
TPC-H Price/ Performance Metric (\$/QphH@100GB)	= \$7.98 USD

Measurement Intervals:

Measurement Interval in Throughput Test (Ts)	= 2,959.4 seconds
--	-------------------

Duration of Stream Execution:

Stream ID	Seed	Start Date	Start time	Stop Date	Stop Time	Duration
Stream00	403212042	4/4/2007	10:39:40	4/4/2007	10:51:13	0:11:33
Stream01	403212043	4/4/2007	10:51:14	4/4/2007	11:37:31	0:46:18
Stream02	403212044	4/4/2007	10:51:14	4/4/2007	11:31:39	0:40:25
Stream03	403212045	4/4/2007	10:51:14	4/4/2007	11:37:04	0:45:50
Stream04	403212046	4/4/2007	10:51:14	4/4/2007	11:37:38	0:46:24
Stream05	403212047	4/4/2007	10:51:14	4/4/2007	11:33:26	0:42:12
Refresh00		4/4/2007	10:39:40	4/4/2007	10:51:13	0:11:33
Refresh01		4/4/2007	11:37:38	4/4/2007	11:38:16	0:00:38
Refresh02		4/4/2007	11:38:16	4/4/2007	11:38:54	0:00:38
Refresh03		4/4/2007	11:38:54	4/4/2007	11:39:29	0:00:35
Refresh04		4/4/2007	11:39:30	4/4/2007	11:40:01	0:00:32
Refresh05		4/4/2007	11:40:02	4/4/2007	11:40:32	0:00:31



HP ProLiant ML370 G5

TPC-H Rev. 2.6.0

Report Date:
Apr 23, 2007

TPC-H Timing Intervals (in seconds)

Query	Q01	Q02	Q03	Q04	Q05	Q06	Q07	Q08
Stream 00	85.8	2.3	5.4	7.8	17.5	6.8	19.5	24.2
Stream 01	175.7	15.3	55.0	11.0	64.0	32.0	68.4	122.3
Stream 02	231.1	35.0	9.7	26.6	58.0	29.5	79.7	80.0
Stream 03	444.4	12.0	36.5	42.2	61.8	33.1	72.1	95.9
Stream 04	380.9	13.4	6.5	25.5	62.7	25.8	74.8	72.3
Stream 05	221.5	32.2	46.7	32.3	32.9	21.0	72.0	54.9
Min Qi	175.7	12.0	6.5	11.0	32.9	21.0	68.4	54.9
Max Qi	444.4	35.0	55.0	42.2	64.0	33.1	79.7	122.3
Avg Qi	290.7	21.6	30.9	27.5	55.9	28.3	73.4	85.1
Query	Q09	Q10	Q11	Q12	Q13	Q14	Q15	Q16
Stream 00	86.0	9.9	5.8	18.6	29.2	3.7	4.0	11.8
Stream 01	503.0	23.6	251.6	76.7	62.5	15.7	24.4	212.5
Stream 02	454.8	49.1	72.4	96.3	99.8	18.9	25.7	67.1
Stream 03	381.1	32.1	123.6	39.6	100.8	23.5	43.3	103.8
Stream 04	384.0	30.6	292.7	133.3	53.0	15.9	40.0	168.6
Stream 05	448.8	34.3	51.4	94.1	95.9	23.8	33.5	146.9
Min Qi	381.1	23.6	51.4	39.6	53.0	15.7	24.4	67.1
Max Qi	503.0	49.1	292.7	133.3	100.8	23.8	43.3	212.5
Avg Qi	434.3	33.9	158.3	88.0	82.4	19.6	33.4	139.8
Query	Q17	Q18	Q19	Q20	Q21	Q22	RF1	RF2
Stream 00	10.3	96.7	20.6	8.2	164.4	12.3	26.9	15.8
Stream 01	22.3	361.0	48.3	48.6	537.8	46.0	22.0	16.1
Stream 02	47.5	345.3	54.9	41.6	421.5	81.4	22.9	15.0
Stream 03	33.8	406.0	64.0	45.1	491.3	64.5	19.5	15.8
Stream 04	39.4	332.6	63.2	13.2	524.0	31.6	17.5	14.4
Stream 05	21.8	383.9	60.8	32.4	526.9	65.1	16.9	14.8
Min Qi	21.8	332.6	48.3	13.2	421.5	31.6	16.9	14.4
Max Qi	47.5	406.0	64.0	48.6	537.8	81.4	22.9	16.1
Avg Qi	33.0	365.8	58.2	36.2	500.3	57.7	19.8	15.2

Abstract

Overview

This report documents the methodology and results of the TPC Benchmark™ H test conducted on the HP ProLiant ML370 G5 using Microsoft SQL Server 2005 Enterprise x64 Edition SP2, in conformance with the requirements of the TPC Benchmark™ H Standard Specification, Revision 2.6.0. The operating system used for the benchmark was Microsoft Windows 2003 Enterprise x64 Edition SP2.

The benchmark results are summarized in the following table.

Hardware	Software	Total System Cost	QppH @ 100GB	QthH @ 100GB	QphH @ 100GB	\$/ QphH @ 100GB
HP ProLiant ML370 G5	Microsoft SQL Server 2005 Enterprise x64 Edition SP2, Windows Server 2003, Enterprise x64 Edition SP2	\$140,978	23378.0	13381.0	17686.7	\$7.98

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

Standard and Executive Summary Statements

Pages ii-iv contains the Executive Summary and Numerical Quantities Summary of the benchmark results for the HP ProLiant ML370 G5.

Auditor

The benchmark configuration, environment and methodology used to produce and validate the test results, and the pricing model used to calculate the cost per QppH and QthH were audited by Lorna Livingtree of Performance Metrics, Inc. to verify compliance with the relevant TPC specifications. The auditor's letter of attestation is attached in Section 9.1 "Auditors' Report."

Table of Contents

- ABSTRACT I
 - OVERVIEW I
 - STANDARD AND EXECUTIVE SUMMARY STATEMENTS I
 - AUDITOR I
- TABLE OF CONTENTS II
- 1.0 GENERAL ITEMS..... 5
 - 1.1 TEST SPONSOR..... 5
 - 1.2 PARAMETER SETTINGS 5
 - 1.3 CONFIGURATION ITEMS..... 5
- 2.0 CLAUSE 1: LOGICAL DATABASE DESIGN 7
 - 2.1 TABLE DEFINITIONS 7
 - 2.2 PHYSICAL ORGANIZATION OF DATABASE..... 7
 - 2.3 HORIZONTAL PARTITIONING 7
 - 2.4 REPLICATION..... 7
- 3.0 CLAUSE 2: QUERIES AND REFRESH FUNCTIONS RELATED ITEMS 8
 - 3.1 QUERY LANGUAGE..... 8
 - 3.2 RANDOM NUMBER GENERATION 8
 - 3.3 SUBSTITUTION PARAMETERS GENERATION..... 8
 - 3.4 QUERY TEXT AND OUTPUT DATA FROM DATABASE 8
 - 3.5 QUERY SUBSTITUTION PARAMETERS AND SEEDS USED 8
 - 3.6 ISOLATION LEVEL 9
 - 3.7 REFRESH FUNCTIONS 9
- 4.0 CLAUSE 3: DATABASE SYSTEM PROPERTIES 10
 - 4.1 ATOMICITY REQUIREMENTS 10
 - 4.2 CONSISTENCY REQUIREMENTS 10
 - 4.3 ISOLATION REQUIREMENTS..... 11
 - 4.4 DURABILITY REQUIREMENTS..... 12
- 5.0 CLAUSE 4: SCALING AND DATABASE POPULATION 14
 - 5.1 INITIAL CARDINALITY OF TABLES 14
 - 5.2 DISTRIBUTION OF TABLES AND LOGS ACROSS MEDIA 14
 - 5.3 MAPPING OF DATABASE PARTITIONS/REPLICATIONS..... 15
 - 5.4 IMPLEMENTATION OF RAID..... 15
 - 5.5 DBGEN MODIFICATIONS..... 16
 - 5.6 DATABASE LOAD TIME..... 16
 - 5.7 DATA STORAGE RATIO..... 16
 - 5.8 DATABASE LOAD MECHANISM DETAILS AND ILLUSTRATION..... 16
- 6.0 CLAUSE 5: PERFORMANCE METRICS AND EXECUTION RULES RELATED ITEMS..... 18
 - 6.1 STEPS IN THE POWER TEST..... 18
 - 6.2 TIMING INTERVALS FOR EACH QUERY AND REFRESH FUNCTION 18
 - 6.3 NUMBER OF STREAMS FOR THE THROUGHPUT TEST 18
 - 6.4 START AND END DATE/TIMES FOR EACH QUERY STREAM 18
 - 6.5 TOTAL ELAPSED TIME FOR THE MEASUREMENT INTERVAL..... 18
 - 6.6 REFRESH FUNCTION START DATE/TIME AND FINISH DATE/TIME 18
 - 6.7 TIMING INTERVALS FOR EACH QUERY AND EACH REFRESH FUNCTION FOR EACH STREAM 19

6.8 PERFORMANCE METRICS.....	19
6.9 THE PERFORMANCE METRIC AND NUMERICAL QUANTITIES FROM BOTH RUNS	19
6.11 SYSTEM ACTIVITY BETWEEN TESTS.....	19
7.0 CLAUSE 6: SUT AND DRIVER IMPLEMENTATION RELATED ITEMS.....	20
7.1 DRIVER.....	20
7.2 IMPLEMENTATION SPECIFIC LAYER (ISL).....	20
7.3 PROFILE-DIRECTED OPTIMIZATION	20
8.0 CLAUSE 7: PRICING RELATED ITEMS	21
8.1 HARDWARE AND SOFTWARE USED.....	21
8.2 TOTAL 3 YEAR PRICE	21
8.3 AVAILABILITY DATE.....	21
8.4 ORDERABILITY DATE.....	21
8.5 COUNTRY-SPECIFIC PRICING.....	21
9.0 CLAUSE 9: RELATED ITEMS	22
9.1 AUDITORS' REPORT.....	22
APPENDIX A: TUNABLE PARAMETERS	25
A.1 MICROSOFT SQL SERVER 2005 VERSION	25
A.2 SQL SERVER 2005 INSTALLATION.....	25
A.3 SQL SERVER 2005 STARTUP PARAMETERS	25
A.4 MICROSOFT SQL SERVER 2005 CONFIGURATION PARAMETERS.....	25
A.5 MICROSOFT SQL SERVER 2005 NODE CONFIGURATION	25
A.6 WINDOWS 2003 CONFIGURATION	26
A.7 SMART ARRAY DRIVER SETTINGS	26
A.8 SYSTEM HARDWARE INFORMATION	26
APPENDIX B: DATABASE BUILD SCRIPTS	54
B.1 CREATEDATABASE.SQL.....	54
B.2 CREATETABLES.SQL	54
B.3 CREATEINDEXES_1.SQL.....	55
B.4 CREATEINDEXES_2.SQL.....	55
B.5 CREATEFK.SQL.....	55
B.6 BACKUPDATABASE.SQL	56
B.7 RESTOREDATABASE.SQL	56
B.8 MOVETEMPDB.SQL.....	56
B.9 RESIZETEMPDB.SQL.....	56
B.10 DELLOADFG.SQL.....	56
APPENDIX C: QUERY TEXT AND OUTPUT	57
C.1 QUALIFICATION QUERIES AND OUTPUT	57
APPENDIX D: SEEDS AND QUERY SUBSTITUTION PARAMETERS.....	68
APPENDIX E: REFRESH FUNCTION SOURCE CODE.....	70
E.1 CREATERF1PROC.SQL	70
E.2 CREATERF2PROC.SQL	71
APPENDIX F: IMPLEMENTATION SPECIFIC LAYER AND SOURCE CODE.....	73
F.1 SETUP.CMD.....	73
F.2 RUN.CMD.....	75
F.3 SEMAPHORE.CPP.....	78
F.4 PRINT.C FOR DBGEN	79

APPENDIX G: PRICE QUOTATIONS & VERIFICATION 85

1.0 General Items

1.1 Test Sponsor

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

This benchmark was sponsored by Hewlett-Packard Company. The benchmark was developed and engineered by Hewlett-Packard Company. Testing took place at HP benchmarking laboratories in Houston, Texas.

1.2 Parameter Settings

Settings must be provided for all customer-tunable parameters and options which have been changed from the defaults found in actual products, including by 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 parameters*
- *Configuration parameters and options for any other software component incorporated into the pricing structure*
- *Compiler optimization options*

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

Appendix A, "Tunable Parameters," contains a list of all database parameters and operating system parameters.

1.3 Configuration Items

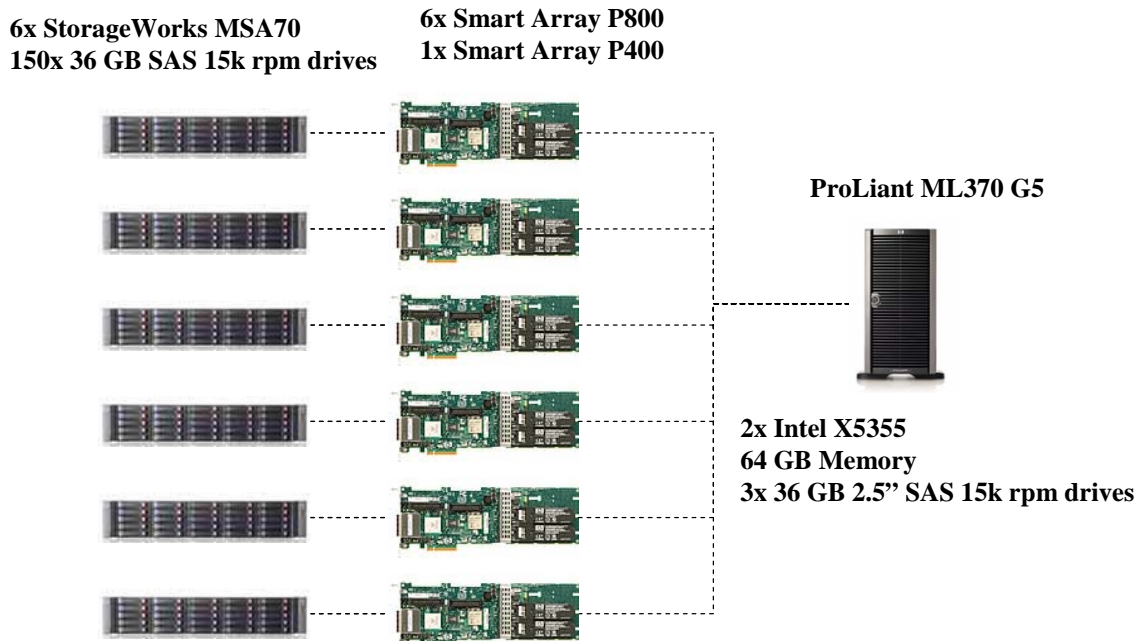
Diagrams of both measured and priced configurations must be provided, accompanied by a description of the differences. This includes, but is not limited to:

- *Number and type of processors*
- *Size of allocated memory, and any specific mapping/partitioning of memory unique to 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 server System Under Test (SUT), a HP ProLiant ML370 G5 , depicted in Figure 1.1, consisted of :

- 2x Intel X5355 2.66GHz quad core
- 64 GB of memory
- 6 x HP Smart Array P800 Controllers
- 1 x HP Smart Array P400 Controller
- 6 x HP StorageWorks MSA70 Enclosures
- 150 x 36GB Pluggable SAS 2.5" 15k rpm drives external
- 3 x 36GB Pluggable SAS 2.5" 15K rpm drives internal

Figure 1.1 Benchmarked & Priced configuration



2.0 Clause 1: Logical Database Design

2.1 Table Definitions

Listings must be provided for all table definition statements and all other statements used to set up the test and qualification databases. (8.1.2.1)

Appendix B, "Database Build Scripts," contains the table definitions and the program used to load the database.

2.2 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.

Appendix B, "Database Build Scripts," contains the DDL for the index definitions.

2.3 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

2.4 Replication

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

No replication was used.

3.0 Clause 2: Queries and Refresh Functions Related Items

3.1 Query Language

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

SQL was the query language used.

3.2 Random Number Generation

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

The TPC-supplied DBGEN version 2.6.0 and QGEN version 2.6.0 were used to generate all database populations.

3.3 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.

The supplied QGEN version 2.6.0 was used to generate the substitution parameters.

3.4 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 C contains the query text and query output. The following modifications were used:

- In Q1, Q4, Q5, Q6, Q10, Q12, Q14, Q15 and Q20, the “dateadd” function is used to perform date arithmetic.
- In Q7, Q8 and Q9, the “datepart” function is used to extract part of a date (e.g., “YY”).
- In Q2, Q3, Q10, Q18 and Q21, the “top” function is used to restrict the number of output rows.
- The word GO is used as a command delimiter.

3.5 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 D contains the seed and query substitution parameters used.

3.6 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 1.

3.7 Refresh Functions

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

Appendix E contains the source code for the refresh functions.

4.0 Clause 3: Database System Properties

4.1 Atomicity Requirements

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.

All ACID tests were conducted according to specification. The Atomicity, Isolation, Consistency and Durability tests were performed on the HP ProLiant ML370 G5.

4.1.1 Atomicity of the Completed Transactions

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.

The following steps were performed to verify the Atomicity of completed transactions.

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.
3. The ACID Transaction 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.

4.1.2 Atomicity of Aborted Transactions

Perform the ACID transaction for a randomly selected set of input data, submitting 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.

The following steps were performed to verify the Atomicity of the aborted ACID transaction:

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 used in steps 1 and 2. It was verified that the appropriate rows had not been changed.

4.2 Consistency Requirements

Consistency is the property of the application that requires any execution of transactions to take the database from one consistent state to another.

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

$$O_TOTALPRICE = SUM(L_EXTENDEDPRICE - L_DISCOUNT) * (1 + L_TAX)$$

For each ORDER and LINEITEM defined by (O_ORDERKEY = L_ORDERKEY)

4.2.1 Consistency Tests

Verify that ORDER and LINEITEM tables are initially consistent as defined in Clause 3.3.2.1, based upon a random sample of at least 10 distinct values of O_ORDERKEY.

The following steps were performed to verify consistency:

1. The consistency of the ORDER and LINEITEM tables was verified based on a sample of O_ORDERKEYs.

2. One hundred ACID Transactions were submitted from each of six execution streams.
3. The consistency of the ORDER and LINEITEM tables was reverified.

4.3 Isolation Requirements

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.

4.3.1 Isolation Test 1 - 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.

The following steps were performed to satisfy the test of isolation for a read-only and a read-write committed transaction:

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 blocked and did not see any uncommitted changes made by the ACID Transaction.
3. The ACID Transaction was resumed and committed.
4. The ACID query completed. It returned the data as committed by the ACID Transaction.

4.3.2 Isolation Test 2 - 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.

The following steps were performed to satisfy the test of isolation for read-only and a rolled back read-write transaction:

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 did not see any uncommitted changes made by the ACID Transaction.
3. The ACID Transaction was ROLLED BACK.
4. The ACID query completed.

4.3.3 Isolation Test 3 - Write-Write Conflict with Commit

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

The following steps were performed to verify isolation of two update transactions:

1. An ACID Transaction T1 was started 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 the same O_KEY and L_KEY and a randomly selected DELTA.
3. T2 waited.
4. The ACID transaction T1 was allowed to Commit and T2 completed.
5. It was verified that:

$$T2.L_EXTENDEDPRICE = T1.L_EXTENDEDPRICE + (DELTA1*(T1.L_EXTENDEDPRICE/T1.L_QUANTITY))$$

4.3.4 Isolation Test 4 - Write-Write Conflict with Rollback

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

The following steps were performed to verify the isolation of two update transactions after the first one is rolled back:

1. An ACID Transaction T1 was started for a randomly selected O_KEY, L_KEY and DELTA. The ACID Transaction T1 was suspended prior to Rollback.
2. Another ACID Transaction T2 was started using the same O_KEY and L_KEY used in step 1 and a randomly selected DELTA.
3. T2 waited.
4. T1 was allowed to ROLLBACK and T2 completed.
5. It was verified that T2.L_EXTENDEDPRICE = T1.L_EXTENDEDPRICE.

4.3.5 Isolation Test 5 – 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.

4.3.6 Isolation Test 6 – 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.

4.4 Durability Requirements

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.

4.4.1 Permanent Unrecoverable Failure of Any Durable Medium and Loss of System Power

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 log was stored on a RAID-1 protected array of two physical drives. The tables for the database were stored on 6 RAID-0 arrays each containing 25 physical drives. A backup of the database was taken. The backup was spread across 6 RAID5 arrays.

The tests were conducted on the qualification database. The steps performed are shown below:

1. The complete database was backed up.
2. Six streams of ACID transactions were started. Each stream executed a minimum of 100 transactions.
3. While the test was running, one of the disks from the database RAID-1 log was removed.
4. After it was determined that the test would still run with the loss of a log disk, one physical drive of a RAID-0 data volume was removed.
5. A checkpoint was issued to force a failure.
6. The six streams of ACID transactions failed and recorded their number of committed transaction in success files.

7. The database log was dumped to disk.
8. The database and log disks were replaced with new disks and RAID rebuild process started
9. When log RAID rebuild process finished a database restore was done.
10. A command was issued causing the database to run through its roll-forward recovery.
11. The counts in the success files and the HISTORY table count were compared and were found to match.

4.4.2 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. Each stream executed a minimum of 100 transactions.
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 were found to match.

4.4.3 Memory Failure

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

See section 4.4.2

5.0 Clause 4: Scaling and Database Population

5.1 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.

Table 5.1 lists the TPC Benchmark H defined tables and the row count for each table as they existed upon completion of the build.

Table 5.1: Initial Number of Rows

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

5.2 Distribution of Tables and Logs Across Media

The distribution of tables and logs across all media must be explicitly described for the tested and priced systems.

Microsoft SQL Server was configured on a HP ProLiant ML370 G5 with the following configuration:

- 6 x Smart Array P800 disk controllers
- 1 x Smart Array P400 disk controller
- 6 x StorageWorks MSA70 Enclosures
- 150 x 36GB SAS 2.5" 15k rpm external disk drives
- 3 x 36GB SAS 2.5" 15k rpm internal disk drives

All 153 disks were used to hold table data, indexes, database log and the temporary database (TempDB).

A detailed description of distribution of database filegroups and log can be found in Table 5.2.1

Table 5.2.1: SMART Array Controller Disk Array to Logical Drive Mapping

SMART Array Controller	SMART Logical Drive Array Letter	Number of Physical Drives in SMART LDA	SMART Logical Drive Number	SMART Fault Tolerance	Disk Format	Size (MB)	Contents
Slot 4	A	1	1	RAID0	NTFS	36000	OS
Slot 4	B	2	1	RAID1	RAW	20000	TpchLog
			2	RAID1	RAW	10000	TempDBLog
			3	RAID1	RAW	500	Tpch1gbLog
Slot 5	A	25	1	RAID0	RAW	32000	Tpch100g
			2	RAID0	RAW	16000	TempDB
			3	RAID5	NTFS	100000	LoadFg & Backup & Flatfiles
			4	RAID0	RAW	2000	Tpch1G
Slot 6	A	25	1	RAID0	RAW	32000	Tpch100g
			2	RAID0	RAW	16000	TempDB
			3	RAID5	NTFS	100000	LoadFg & Backup & Flatfiles
Slot 7	A	25	1	RAID0	RAW	32000	Tpch100g
			2	RAID0	RAW	16000	TempDB
			3	RAID5	NTFS	100000	LoadFg & Backup & Flatfiles
Slot 1	A	25	1	RAID0	RAW	32000	Tpch100g
			2	RAID0	RAW	16000	TempDB
			3	RAID5	NTFS	100000	LoadFg & Backup & Flatfiles
Slot 8	A	25	1	RAID0	RAW	32000	Tpch100g
			2	RAID0	RAW	16000	TempDB
			3	RAID5	NTFS	100000	LoadFg & Backup & Flatfiles
Slot 9	A	25	1	RAID0	RAW	32000	Tpch100g
			2	RAID0	RAW	16000	TempDB
			3	RAID5	NTFS	100000	LoadFg & Backup & Flatfiles

5.3 Mapping of Database Partitions/Replications

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

Database partitioning/replication was not used..

5.4 Implementation of RAID

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 0 was used for database filegroups and tempdb, and RAID 1 for database recovery logs.

5.5 DBGEN 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.

A modified DBGEN version 2.6.0 was used for database population. The modified version differs only in column order for output flatfile. The only modified file, Print.C, is included in Appendix F.1

5.6 Database Load time

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

The database load time was 1 hour 3 minutes 47 seconds.

5.7 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 1/100th, rounded up.

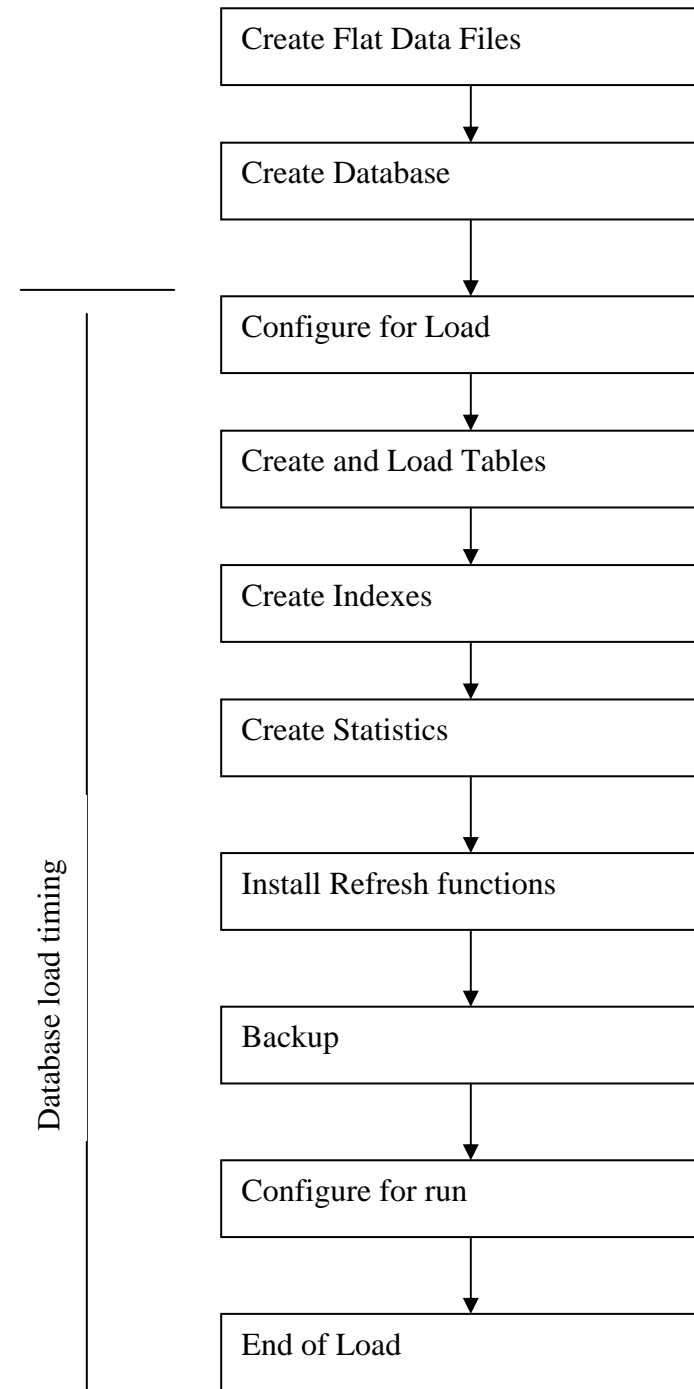
Disk Type	Number of Disks	Total Disk Space	Data Storage Ratio
36 GB	153	5508 GB	55.08

5.8 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.

Flat files for each of the tables were created using DBGEN.
The tables were loaded as depicted in Figure 5-8.

Figure 5.8: Block Diagram of Database Load Process



6.0 Clause 5: Performance Metrics and Execution Rules Related Items

6.1 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. The system was rebooted
2. RF1 Refresh Transaction
3. Stream 00 Execution
4. RF2 Refresh Transaction.

6.2 Timing Intervals for Each Query and Refresh Function

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

The timing intervals for each query and both refresh functions are given in the Numerical Quantities Summary earlier in the executive summary.

6.3 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.

6.4 Start and End Date/Times for Each Query Stream

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

The Numerical Quantities Summary contains the start and stop times for the query execution streams run on the system reported.

6.5 Total Elapsed Time for the Measurement Interval

The total elapsed time of the measurement interval(see Clause 5.3.5) must be reported for the throughput test.

The Numerical Quantities Summary contains the timing intervals for the throughput test run on the system reported.

6.6 Refresh Function Start Date/Time and Finish Date/Time

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

Stream ID	RF	Start Date	Start time	Stop Date	Stop Time
Stream00	RF1	4/4/2007	10:39:40	4/4/2007	10:40:07
Stream00	RF2	4/4/2007	10:50:58	4/4/2007	10:51:14
Stream01	RF1	4/4/2007	11:37:38	4/4/2007	11:38:00
Stream01	RF2	4/4/2007	11:38:00	4/4/2007	11:38:16
Stream02	RF1	4/4/2007	11:38:16	4/4/2007	11:38:39
Stream02	RF2	4/4/2007	11:38:39	4/4/2007	11:38:54
Stream03	RF1	4/4/2007	11:38:54	4/4/2007	11:39:14
Stream03	RF2	4/4/2007	11:39:14	4/4/2007	11:39:29
Stream04	RF1	4/4/2007	11:39:29	4/4/2007	11:39:47
Stream04	RF2	4/4/2007	11:39:47	4/4/2007	11:40:01
Stream05	RF1	4/4/2007	11:40:01	4/4/2007	11:40:18
Stream05	RF2	4/4/2007	11:40:18	4/4/2007	11:40:33

6.7 Timing Intervals for Each Query and Each Refresh Function for Each Stream

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 given in the Numerical Quantities Summary earlier in the executive summary.

6.8 Performance Metrics

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

The Numerical Quantities Summary contains the performance metrics, related numerical quantities, and the price/performance metric for the system reported.

6.9 The Performance Metric and Numerical Quantities from Both Runs

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 difference for the metric points:

Run	QppH @ 100GB	QthH @ 100GB	QphH @ 100GB
Run 1	23340.7	13436.0	17708.9
Run 2	23378.0	13381.0	17686.7

6.11 System Activity Between Tests

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

SQL Server was restarted between runs.

7.0 Clause 6: SUT and Driver Implementation

Related Items

7.1 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.

Two scripts were used. The first one was used to create and load the database, while the second was used to run the Power and Throughput tests. These scripts are in Appendix F. A C program, semaphore.c, was used for coordination of parallel processes.

7.2 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. The following steps are performed, to accomplish the Power and Throughput Runs:

1. Power Run

- Execute sixteen concurrent RF1 processes, each of which will apply a segment of an update set generated by dbgen.
- Each process submits multiple transactions, where a transaction spans a set of orders and their associated line items.
- Execute the Stream0 queries, in the prescribed order.
- Execute sixteen concurrent RF2 processes, each of which will apply a segment of an update set generated by dbgen. Each thread submits multiple transactions, where a transaction spans a set of orders and their associated line items.

2. Throughput Run

- Execute five concurrent query streams. Each stream executes queries in the prescribed order for the appropriate Stream Id (1-5). Upon completion of each stream, a semaphore is set to indicate completion.
- Execute five consecutive RF1/RF2 transactions, against ascending Update sets produced by dbgen. The first RF1 waits on a semaphore prior to beginning its insert operations.

Each step is timed by the script. The timing information is stored in the database for later analysis. The inputs and outputs of steps are stored in text files for later analysis.

7.3 Profile-Directed Optimization

If profile-directed optimization as described in Clause 5.2.9 is used, such used must be disclosed.

Profile-directed optimization was not used.

8.0 Clause 7: Pricing Related Items

8.1 Hardware and Software Used

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 all hardware and software, including the 3-year price, is provided in the Executive Summary at the front of this report. The price quotations are included in Appendix G, at the end of this document.

8.2 Total 3 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 list of all hardware and software, including the 3-year price, is provided in the Executive Summary at the front of this report. The price quotations are included in Appendix G, at the end of this document. As a large purchase, this purchase qualifies for a 16% discount from Hewlett-Packard Company.

8.3 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.

The HP ProLiant ML370 G5 and all other hardware is generally available at the time of publication. The system software, Microsoft Windows Server 2003, Enterprise x64 Edition SP2 and the database software, Microsoft SQL Server 2005 Enterprise x64 Edition SP2 are generally available at the time of publication.

8.4 Orderability Date

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

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

All components are orderable on the publication date.

8.5 Country-Specific Pricing

Additional Clause 7 related items may be included in the Full Disclosure Report for each country-specific priced configuration. Country-specific pricing is subject to Clause 7.1.7.

The configuration is priced for the United States of America.

9.0 Clause 9: Related Items

9.1 Auditors' 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.

This implementation of the TPC Benchmark H was audited by Lorna Livingtree of Performance Metrics. Further information regarding the audit process may be obtained from:

Performance Metrics, Inc.
PO Box 984
Klamath, CA 95548
Telephone: (707) 482-0523
Fax: (707) 482-0575

For a copy of this disclosure, go to www.tpc.org.



PERFORMANCE METRICS INC.
TPC Certified Auditors

April 19, 2007

Mr. Daniel Pol
Hewlett-Packard Company
20555 SH 249
Houston, TX 77077

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

Platform: ProLiant ML370 G5
Database Manager: Microsoft SQL Server 2005 Enterprise x64 Edition
Operating System: Windows Server 2003 Enterprise x64 Edition

CPU's	Memory	Total Disks	Qpph@ 100GB	QthH @ 100GB	QphH@100GB
2 EM64T @ 2.66 Ghz	64 GB	153 @ 36 GB	23,378.0	13,381.0	17,686.7

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

- The database tables were defined with the proper columns, layout and sizes.
- The tested database was correctly scaled and populated for 100GB using DBGEN. The version of DBGEN was 2.6.0.
- The data generated by DBGEN was verified compliant with TAB ID #415.
- The qualification database layout was identical to the tested database except for the size of the files.
- The query text was verified to use only compliant variants and minor modifications.
- The executable query text was generated by QGEN and submitted through a standard interactive interface. The version of QGEN was 2.6.0.
- The validation of the query text against the qualification database produced compliant results.

PO Box 984 Klamath, CA 95548
(707) 482-0523 fax: (707) 482-0575

Page 1
email: LornaL@PerfMetrics.com

PERFORMANCE METRICS INC.
TPC Certified Auditors

- 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,



Lorna Livingtree
Auditor

Appendix A: Tunable Parameters

- Note: These are the settings used during the power test. The settings altered for the load are documented in Appendix B.

A.1 Microsoft SQL Server 2005 Version

The following text was output was generated by executing the select @@version command:

```
Microsoft SQL Server 2005 - 9.00.3042.00 (X64)
Feb 10 2007 00:59:02
Copyright (c) 1988-2005 Microsoft Corporation
Enterprise Edition (64-bit) on Windows NT 5.2 (Build 3790:
Service Pack 2)
```

A.2 SQL Server 2005 Installation

The installation followed the default options. For the sort order Latin1_General_binary was chosen. Client tools and development tools were not installed on the server. Mixed mode authentication was used.

A.3 SQL Server 2005 Startup Parameters

```
SQLSERVER -c -x -E -T834 -T836
-x Disable the Keeping of CPU time and cache-hit ratio statistics.
-c Start SQL Server independently of Windows NT Service
Control Manager
-E Increase the number of consecutive extents allocated per file to
4
-T834 Enable large page support
-T836 Make use of all physical memory
```

A.4 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,	0,	0
affinity mask	,-2147483648,	2147483647,	255,	255
affinity64 I/O mask	,-2147483648,	2147483647,	0,	0
affinity64 mask	,-2147483648,	2147483647,	0,	0
Agent XPs	, 0,	1,	0,	0
allow updates	, 0,	1,	1,	1
awe enabled	, 0,	1,	0,	0
blocked process threshold	, 0,	86400,	0,	0
c2 audit mode	, 0,	1,	0,	0
clr enabled	, 0,	1,	0,	0
common criteria compliance enabled	, 0,	1,	0,	0
cost threshold for parallelism	, 0,	32767,	0,	0
cross db ownership chaining	, 0,	1,	0,	0
cursor threshold	, -1,	2147483647,	-1,	-1
Database Mail XPs	, 0,	1,	0,	0
default full-text language	, 0,	2147483647,	1033,	1033
default language	, 0,	9999,	0,	0

default trace enabled	, 0,	1,	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,	0,	0
lightweight pooling	, 0,	1,	1,	1
locks	, 5000,	2147483647,	0,	0
max degree of parallelism	, 0,	64,	0,	0
max full-text crawl range	, 0,	256,	4,	4
max server memory (MB)	, 16,	2147483647,	63000,	63000
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,	0,	0
nested triggers	, 0,	1,	1,	1
network packet size (B)	, 512,	32767,	32767,	32767
Ole Automation Procedures	, 0,	1,	0,	0
open objects	, 0,	2147483647,	0,	0
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
remote access	, 0,	1,	1,	1
remote admin connections	, 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

A.5 Microsoft SQL Server 2005 Node Configuration

Windows Registry Editor Version 5.00

```
[HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Microsoft SQL
Server\90\NodeConfiguration]
```

```
[HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Microsoft SQL
Server\90\NodeConfiguration\Node0]
"CPUMask"=dword:000000F0
```

```
[HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Microsoft SQL
Server\90\NodeConfiguration\Node1]
"CPUMask"=dword:000000F0
```

A.6 Windows 2003 Configuration

The default installation of Windows 2003 Enterprise Edition was used. All default options were selected during the install except:

- A TCP/IP address was configured on the system.

Updated installation to optimize performance for applications. (System Properties > Advanced > Performance Options > Programs)

A.7 Smart Array driver settings

Windows Registry Editor Version 5.00

```
[HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\HpCIS
Ss2]
"Type"=dword:00000001
"Start"=dword:00000000
"ErrorControl"=dword:00000001
"Tag"=dword:00000103
"ImagePath"=hex(2):73,00,79,00,73,00,74,00,65,00,6d,00,33,00,32,00,5c,00,
44,00,\
```

```
52,00,49,00,56,00,45,00,52,00,53,00,5c,00,48,00,70,00,43,00,49,00,53,00,53
.\
00,73,00,32,00,2e,00,73,00,79,00,73,00,00,00
"Group"="SCSI Miniport"
```

```
[HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\HpCIS
Ss2\Parameters]
"BusType"=dword:00000008
```

```
[HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\HpCIS
Ss2\Parameters\Device]
"DriverParameter"="CSMI=None;"
"OSVersion"="5.2"
"MaxScatterGather"=dword:00000040
```

```
[HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\HpCIS
Ss2\Parameters\PnpInterface]
"5"=dword:00000001
```

```
[HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\HpCIS
Ss2\Security]
"Security"=hex:01,00,14,80,b8,00,00,00,c4,00,00,00,14,00,00,00,30,00,00,0
0,02,\
```

```
00,1c,00,01,00,00,00,02,80,14,00,ff,01,0f,00,01,01,00,00,00,00,01,00,00,\
00,00,02,00,88,00,06,00,00,00,00,14,00,fd,01,02,00,01,01,00,00,00,00,00
.\
```

```
05,12,00,00,00,00,18,00,ff,01,0f,00,01,02,00,00,00,00,00,05,20,00,00,00,\
```

```
20,02,00,00,00,00,14,00,8d,01,02,00,01,01,00,00,00,00,00,05,04,00,00,00,00
.\
00,14,00,8d,01,02,00,01,01,00,00,00,00,00,05,06,00,00,00,00,14,00,00,01
.\
00,00,01,01,00,00,00,00,05,0b,00,00,00,00,18,00,fd,01,02,00,01,02,00
.\
00,00,00,00,05,20,00,00,00,23,02,00,00,01,01,00,00,00,00,05,12,00,00,00
.\
01,01,00,00,00,00,05,12,00,00,00
```

```
[HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\HpCIS
Ss2\Enum]
"0"="PCI\VEN_103C&DEV_3230&SUBSYS_3223103C&REV_02\6&35
6d7036&0&00000010"
"Count"=dword:00000007
"NextInstance"=dword:00000007
"1"="PCI\VEN_103C&DEV_3230&SUBSYS_3234103C&REV_01\6&14
cdf429&0&00080010"
"2"="PCI\VEN_103C&DEV_3230&SUBSYS_3223103C&REV_03\4&8c
20058&0&0038"
"3"="PCI\VEN_103C&DEV_3230&SUBSYS_3223103C&REV_03\4&79
c23&0&0030"
"4"="PCI\VEN_103C&DEV_3230&SUBSYS_3223103C&REV_03\4&1a
b8b18d&0&0028"
"5"="PCI\VEN_103C&DEV_3230&SUBSYS_3223103C&REV_03\4&23
7315c2&0&0020"
"6"="PCI\VEN_103C&DEV_3230&SUBSYS_3223103C&REV_01\4&efc
3e79&0&0018"
```

A.8 System Hardware Information

System Information report written at: 04/13/07 10:30:19

System Name: DELLSEYE

[System Summary]

Item	Value
OS Name	Microsoft(R) Windows(R) Server 2003 Enterprise x64 Edition
Version	5.2.3790 Service Pack 2 Build 3790
Other OS Description	Not Available
OS Manufacturer	Microsoft Corporation
System Name	DELLSEYE
System Manufacturer	HP
System Model	ProLiant ML370 G5
System Type	x64-based PC
Processor	EM64T Family 6 Model 15 Stepping 7 GenuineIntel ~2667 Mhz
Processor	EM64T Family 6 Model 15 Stepping 7 GenuineIntel ~2667 Mhz
Processor	EM64T Family 6 Model 15 Stepping 7 GenuineIntel ~2667 Mhz
Processor	EM64T Family 6 Model 15 Stepping 7 GenuineIntel ~2667 Mhz
Processor	EM64T Family 6 Model 15 Stepping 7 GenuineIntel ~2667 Mhz
Processor	EM64T Family 6 Model 15 Stepping 7 GenuineIntel ~2667 Mhz
Processor	EM64T Family 6 Model 15 Stepping 7 GenuineIntel ~2667 Mhz
BIOS Version/Date	HP P57, 3/1/2007
SMBIOS Version	2.3

Windows Directory C:\WINDOWS
 System Directory C:\WINDOWS\system32
 Boot Device \Device\HarddiskVolume4
 Locale United States
 Hardware Abstraction Layer Version = "5.2.3790.3959
 (srv03_sp2_rtm.070216-1710)"
 User Name Not Available
 Time Zone Central Daylight Time
 Total Physical Memory 64,509.67 MB
 Available Physical Memory 397.31 MB
 Total Virtual Memory 63.64 GB
 Available Virtual Memory 2.05 GB
 Page File Space 2.19 GB
 Page File C:\pagefile.sys

[Hardware Resources]

[Conflicts/Sharing]

Resource	Device
I/O Port 0x0000A000-0x0000AFFF	PCI standard PCI-to-PCI bridge
I/O Port 0x0000A000-0x0000AFFF	Smart Array P800 Controller
I/O Port 0x00000000-0x00000CF7	PCI bus
I/O Port 0x00000000-0x00000CF7	Direct memory access controller
IRQ 5	Base System Device
IRQ 5	PCI Device
I/O Port 0x00009000-0x00009FFF	PCI standard PCI-to-PCI bridge
I/O Port 0x00009000-0x00009FFF	Smart Array P800 Controller
I/O Port 0x00006000-0x00006FFF	PCI standard PCI-to-PCI bridge
I/O Port 0x00006000-0x00006FFF	Smart Array P400 Controller

IRQ 16	PCI standard PCI-to-PCI bridge
IRQ 16	Smart Array P800 Controller
IRQ 16	PCI standard PCI-to-PCI bridge
IRQ 16	HP NC373i Virtual Bus Device
IRQ 16	Standard Universal PCI to USB Host Controller
IRQ 16	Standard Enhanced PCI to USB Host Controller

Memory Address 0xFD400000-0xFD7FFFFF	PCI standard PCI-to-PCI bridge
Memory Address 0xFD400000-0xFD7FFFFF	PCI standard PCI-to-PCI bridge

IRQ 17	PCI standard PCI-to-PCI bridge
IRQ 17	Smart Array P400 Controller
IRQ 17	PCI standard PCI-to-PCI bridge
IRQ 17	HP NC373i Virtual Bus Device
IRQ 17	Standard Universal PCI to USB Host Controller
I/O Port 0x00005000-0x00006FFF	PCI standard PCI-to-PCI bridge
I/O Port 0x00005000-0x00006FFF	PCI standard PCI-to-PCI bridge
I/O Port 0x00005000-0x00006FFF	PCI standard PCI-to-PCI bridge
I/O Port 0x00005000-0x00006FFF	Smart Array P800 Controller

IRQ 18	PCI standard PCI-to-PCI bridge
IRQ 18	Smart Array P800 Controller
IRQ 18	Smart Array P800 Controller
IRQ 18	Smart Array P800 Controller
IRQ 18	Standard Universal PCI to USB Host Controller

IRQ 19	Smart Array P800 Controller
IRQ 19	Smart Array P800 Controller
IRQ 19	Standard Universal PCI to USB Host Controller

Memory Address 0xA0000-0xBFFFF	PCI bus
Memory Address 0xA0000-0xBFFFF	ATI ES1000

Memory Address 0xFA000000-0xFBFFFFFF	PCI standard PCI-to-PCI bridge
Memory Address 0xFA000000-0xFBFFFFFF	PCI standard PCI-to-PCI bridge
Memory Address 0xFA000000-0xFBFFFFFF	HP NC373i Virtual Bus Device

Memory Address 0xF8000000-0xF9FFFFFF	PCI standard PCI-to-PCI bridge
Memory Address 0xF8000000-0xF9FFFFFF	PCI standard PCI-to-PCI bridge
Memory Address 0xF8000000-0xF9FFFFFF	HP NC373i Virtual Bus Device

I/O Port 0x00007000-0x00007FFF	PCI standard PCI-to-PCI bridge
--------------------------------	--------------------------------

I/O Port 0x00007000-0x00007FFF	Smart Array P800 Controller
--------------------------------	-----------------------------

I/O Port 0x00004000-0x00004FFF	PCI standard PCI-to-PCI bridge
--------------------------------	--------------------------------

I/O Port 0x00004000-0x00004FFF	Smart Array P800 Controller
--------------------------------	-----------------------------

I/O Port 0x00008000-0x00008FFF	PCI standard PCI-to-PCI bridge
--------------------------------	--------------------------------

I/O Port 0x00008000-0x00008FFF	Smart Array P800 Controller
--------------------------------	-----------------------------

[DMA]

Resource	Device	Status
Channel 7	Direct memory access controller	OK

[Forced Hardware]

Device	PNP Device ID
--------	---------------

[I/O]

Resource	Device	Status
0x00000000-0x00000CF7	PCI bus	OK
0x00000000-0x00000CF7	Direct memory access controller	OK
0x0000D000-0x0000FFFF	PCI bus	OK
0x00005000-0x00006FFF	PCI standard PCI-to-PCI bridge	OK
0x00005000-0x00006FFF	PCI standard PCI-to-PCI bridge	OK
0x00005000-0x00006FFF	PCI standard PCI-to-PCI bridge	OK
0x00005000-0x00006FFF	Smart Array P800 Controller	OK
0x00006000-0x00006FFF	PCI standard PCI-to-PCI bridge	OK

0x00006000-0x00006FFF	Smart Array P400 Controller	OK	0x00000CA4-0x00000CA5	Motherboard resources	OK
0x00004000-0x00004FFF	PCI standard PCI-to-PCI bridge	OK	0x000002F8-0x000002FF	Motherboard resources	OK
0x00004000-0x00004FFF	Smart Array P800 Controller	OK	0x00000CA2-0x00000CA3	OK	
0x00007000-0x00007FFF	PCI standard PCI-to-PCI bridge	OK	0x00000040-0x00000043	System timer	OK
0x00007000-0x00007FFF	Smart Array P800 Controller	OK	0x00000080-0x0000008F	Direct memory access controller	OK
0x00007000-0x00007FFF	PCI standard PCI-to-PCI bridge	OK	0x000000C0-0x000000DF	Direct memory access controller	OK
0x00008000-0x00008FFF	PCI standard PCI-to-PCI bridge	OK	0x00000061-0x00000061	System speaker	OK
0x00008000-0x00008FFF	Smart Array P800 Controller	OK	0x00000060-0x00000060	Standard 101/102-Key or Microsoft	OK
0x00009000-0x00009FFF	PCI standard PCI-to-PCI bridge	OK	0x00000064-0x00000064	Standard 101/102-Key or Microsoft	OK
0x00009000-0x00009FFF	Smart Array P800 Controller	OK	0x0000002E-0x0000002F	Extended IO Bus	OK
0x0000A000-0x0000AFFF	PCI standard PCI-to-PCI bridge	OK	0x0000004E-0x0000004F	Extended IO Bus	OK
0x0000A000-0x0000AFFF	Smart Array P800 Controller	OK	0x00000620-0x0000065F	Extended IO Bus	OK
0x00001000-0x0000101F	Standard Universal PCI to USB Host Controller	OK	0x00000680-0x0000069F	Extended IO Bus	OK
0x00001020-0x0000103F	Standard Universal PCI to USB Host Controller	OK	0x00000600-0x0000061F	Extended IO Bus	OK
0x00001040-0x0000105F	Standard Universal PCI to USB Host Controller	OK	0x00000660-0x0000067F	Extended IO Bus	OK
0x00001060-0x0000107F	Standard Universal PCI to USB Host Controller	OK	0x00000300-0x0000030F	Extended IO Bus	OK
0x00003000-0x000030FF	ATI ES1000	OK	0x000003F8-0x000003FF	Communications Port (COM1)	OK
0x000003B0-0x000003BB	ATI ES1000	OK	0x00000500-0x0000050F	Standard Dual Channel PCI IDE Controller	OK
0x000003C0-0x000003DF	ATI ES1000	OK	0x000001F0-0x000001F7	Primary IDE Channel	OK
0x00002800-0x000028FF	Base System Device	OK	0x000003F6-0x000003F6	Primary IDE Channel	OK
0x00003400-0x000034FF	Base System Device	OK	0x00000170-0x00000177	Secondary IDE Channel	OK
0x00003800-0x0000381F	Standard Universal PCI to USB Host Controller	OK	0x00000376-0x00000376	Secondary IDE Channel	OK
0x00000070-0x00000077	Motherboard resources	OK			
0x00000408-0x0000040F	Motherboard resources	OK			
0x000004D0-0x000004D1	Motherboard resources	OK			
0x00000020-0x0000003F	Motherboard resources	OK			
0x000000A0-0x000000BF	Motherboard resources	OK			
0x00000090-0x0000009F	Motherboard resources	OK			
0x00000050-0x00000053	Motherboard resources	OK			
0x00000700-0x0000071F	Motherboard resources	OK			
0x00000800-0x0000083F	Motherboard resources	OK			
0x00000900-0x0000097F	Motherboard resources	OK			
0x00000010-0x0000001F	Motherboard resources	OK			
0x00000C80-0x00000C83	Motherboard resources	OK			
0x00000CD4-0x00000CD7	Motherboard resources	OK			
0x00000F50-0x00000F58	Motherboard resources	OK			
0x000000F0-0x000000F0	Motherboard resources	OK			
0x00000CA0-0x00000CA1	Motherboard resources	OK			
			[IRQs]		
			Resource	Device	Status
			IRQ 9	Microsoft ACPI-Compliant System	OK
			IRQ 16	PCI standard PCI-to-PCI bridge	OK
			IRQ 16	Smart Array P800 Controller	OK
			IRQ 16	PCI standard PCI-to-PCI bridge	OK
			IRQ 16	HP NC373i Virtual Bus Device	OK
			IRQ 16	Standard Universal PCI to USB Host Controller	OK
			IRQ 16	Standard Enhanced PCI to USB Host Controller	OK
			IRQ 17	PCI standard PCI-to-PCI bridge	OK
			IRQ 17	Smart Array P400 Controller	OK
			IRQ 17	PCI standard PCI-to-PCI bridge	OK
			IRQ 17	HP NC373i Virtual Bus Device	OK
			IRQ 17	Standard Universal PCI to USB Host Controller	OK
			IRQ 18	PCI standard PCI-to-PCI bridge	OK
			IRQ 18	Smart Array P800 Controller	OK
			IRQ 18	Smart Array P800 Controller	OK
			IRQ 18	Smart Array P800 Controller	OK
			IRQ 18	Standard Universal PCI to USB Host Controller	OK
			IRQ 19	Smart Array P800 Controller	OK
			IRQ 19	Smart Array P800 Controller	OK
			IRQ 19	Standard Universal PCI to USB Host Controller	OK
			IRQ 23	ATI ES1000	OK
			IRQ 5	Base System Device	OK
			IRQ 5	PCI Device	OK
			IRQ 10	Base System Device	OK
			IRQ 22	Standard Universal PCI to USB Host Controller	OK
			IRQ 0	System timer	OK
			IRQ 1	Standard 101/102-Key or Microsoft Natural PS/2 Keyboard	OK

IRQ 12 PS/2 Compatible Mouse OK
 IRQ 4 Communications Port (COM1) OK
 IRQ 14 Primary IDE Channel OK

[Memory]

Resource	Device	Status
0xA0000-0xBFFFF	PCI bus	OK
0xA0000-0xBFFFF	ATI ES1000	OK
0xD0000000-0xDFFFFFFF	PCI bus	OK
0xF0000000-0xFEBFFFFFF	PCI bus	OK
0xFD300000-0xFD7FFFFFF	PCI standard PCI-to-PCI bridge	OK
0xFD400000-0xFD7FFFFFF	PCI standard PCI-to-PCI bridge	OK
0xFD400000-0xFD7FFFFFF	PCI standard PCI-to-PCI bridge	OK
0xFD500000-0xFD5FFFFFF	Smart Array P800 Controller	OK
0xFD4F0000-0xFD4F0FFF	Smart Array P800 Controller	OK
0xFD600000-0xFD7FFFFFF	PCI standard PCI-to-PCI bridge	OK
0xFD700000-0xFD7FFFFFF	Smart Array P400 Controller	OK
0xFD6F0000-0xFD6F0FFF	Smart Array P400 Controller	OK
0xFD100000-0xFD2FFFFFF	PCI standard PCI-to-PCI bridge	OK
0xFD200000-0xFD2FFFFFF	Smart Array P800 Controller	OK
0xFD1F0000-0xFD1F0FFF	Smart Array P800 Controller	OK
0xFD800000-0xFD9FFFFFF	PCI standard PCI-to-PCI bridge	OK
0xFD900000-0xFD9FFFFFF	Smart Array P800 Controller	OK
0xFD8F0000-0xFD8F0FFF	Smart Array P800 Controller	OK
0xFDA00000-0xFDBFFFFFF	PCI standard PCI-to-PCI bridge	OK
0xFDB00000-0xFDBFFFFFF	Smart Array P800 Controller	OK
0xFDAF0000-0xFDAF0FFF	Smart Array P800 Controller	OK
0xFDC00000-0xFDDFFFFFF	PCI standard PCI-to-PCI bridge	OK
0xFDD00000-0xFDDFFFFFF	Smart Array P800 Controller	OK
0xFDCF0000-0xFDCF0FFF	Smart Array P800 Controller	OK
0xFDE00000-0xFDEFFFFFF	PCI standard PCI-to-PCI bridge	OK
0xFDF00000-0xFDFFFFFFF	Smart Array P800 Controller	OK
0xFDEF0000-0xFDEF0FFF	Smart Array P800 Controller	OK
0xF8000000-0xF9FFFFFF	PCI standard PCI-to-PCI bridge	OK
0xF8000000-0xF9FFFFFF	PCI standard PCI-to-PCI bridge	OK
0xF8000000-0xF9FFFFFF	HP NC373i Virtual Bus Device	OK
0xFA000000-0xFBFFFFFF	PCI standard PCI-to-PCI bridge	OK
0xFA000000-0xFBFFFFFF	PCI standard PCI-to-PCI bridge	OK
0xFA000000-0xFBFFFFFF	HP NC373i Virtual Bus Device	OK

0xF7DF0000-0xF7DF03FF	Standard Enhanced PCI to USB Host Controller	OK
0xD8000000-0xDFFFFFFF	ATI ES1000	OK
0xF7FF0000-0xF7FFFFFF	ATI ES1000	OK
0xF7FE0000-0xF7FE01FF	Base System Device	OK
0xF7FD0000-0xF7FD07FF	Base System Device	OK
0xF7FC0000-0xF7FC1FFF	Base System Device	OK
0xF7F00000-0xF7F7FFFF	Base System Device	OK
0xF7EF0000-0xF7EF00FF	PCI Device	OK
0xE0000000-0xEFFFFFFF	Motherboard resources	OK
0xFE000000-0xFEBFFFFFF	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\msadp32.acm	OK	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	Microsoft Corporation	C:\WINDOWS\system32\MSADP32.ACM 23.50 KB (24,064 bytes) 3/25/2005 6:00 AM
c:\windows\system32\tsoft32.acm	OK	13.50 KB (13,824 bytes)	DSP GROUP, INC.	C:\WINDOWS\system32\TSSOFT32.ACM 1.01 3/25/2005 6:00 AM
c:\windows\system32\msgsm32.acm	OK	34.50 KB (35,328 bytes)	Microsoft Corporation	C:\WINDOWS\system32\MSGSM32.ACM 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 3/25/2005 6:00 AM
c:\windows\system32\msg711.acm	OK	13.50 KB (13,824 bytes)	Microsoft Corporation	C:\WINDOWS\system32\MSG711.ACM 3/25/2005 6:00 AM
c:\windows\system32\imaadp32.acm	OK	24.00 KB (24,576 bytes)	Microsoft Corporation	C:\WINDOWS\system32\IMAADP32.ACM 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 3/25/2005 6:00 AM

[Video Codecs]

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

[CD-ROM]

Item	Value
Drive	D:
Description	CD-ROM Drive
Media Loaded	No
Media Type	CD-ROM
Name	TSScorp CD-ROM TS-H192C
Manufacturer	(Standard CD-ROM drives)
Status	OK
Transfer Rate	Not Available
SCSI Target ID	0
PNP Device ID	IDE\CDROMTSSCORP_CD-ROM__TS-H192C_____B504____\5&5FD9AC6&0&0.0.0
Driver	c:\windows\system32\drivers\cdrom.sys (5.2.3790.1830 (srv03_sp1_rtm.050324-1447), 75.50 KB (77,312 bytes), 3/25/2005 6:00 AM)

[Sound Device]

Item	Value
------	-------

[Display]

Item	Value
Name	ATI ES1000
PNP Device ID	PCI\VEN_1002&DEV_515E&SUBSYS_31FB103C&REV_02\4&2014205D&0&18F0
Adapter Type	ATI ES1000 (0x515E), ATI Technologies Inc. compatible
Adapter Description	ATI ES1000
Adapter RAM	32.00 MB (33,554,432 bytes)
Installed Drivers	ati2dvag.dll
Driver Version	6.14.10.6583
INF File	oem8.inf (ati2mtag_RN50 section)
Color Planes	1
Color Table Entries	4294967296
Resolution	1024 x 768 x 60 hertz
Bits/Pixel	32
Memory Address	0xD8000000-0xDFFFFFFF
I/O Port	0x00003000-0x000030FF
Memory Address	0xF7FF0000-0xF7FFFFFF
IRQ Channel	IRQ 23
I/O Port	0x000003B0-0x000003BB
I/O Port	0x000003C0-0x000003DF
Memory Address	0xA0000-0xBFFFF
Driver	c:\windows\system32\drivers\ati2mtag.sys (6.14.10.6583, 1.97 MB (2,066,432 bytes), 3/12/2007 11:06 AM)

[Infrared]

Item	Value
------	-------

[Input]

[Keyboard]

Item	Value
Description	USB Human Interface Device
Name	Enhanced (101- or 102-key)

Layout	00000409
PNP Device ID	USB\VID_03F0&PID_1027&MI_00\7&2CD6FDA9&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)

Description	Standard 101/102-Key or Microsoft Natural PS/2 Keyboard
-------------	---

Name	Enhanced (101- or 102-key)
Layout	00000409
PNP Device ID	ACPI\PNP0303\4&2AA4AD3D&0
Number of Function Keys	12
I/O Port	0x00000060-0x00000060
I/O Port	0x00000064-0x00000064
IRQ Channel	IRQ 1
Driver	c:\windows\system32\drivers\i8042prt.sys (5.2.3790.3959 (srv03_sp2_rtm.070216-1710), 91.00 KB (93,184 bytes), 3/25/2005 6:00 AM)

[Pointing Device]

Item	Value
Hardware Type	USB Human Interface Device
Number of Buttons	5
Status	OK
PNP Device ID	USB\VID_03F0&PID_1027&MI_01\7&2CD6FDA9&0&0001

Power Management Supported	No
Double Click Threshold	6
Handedness	Right Handed Operation
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)

Hardware Type	PS/2 Compatible Mouse
Number of Buttons	5
Status	OK
PNP Device ID	ACPI\PNP0F13\4&2AA4AD3D&0
Power Management Supported	No
Double Click Threshold	6
Handedness	Right Handed Operation
IRQ Channel	IRQ 12
Driver	c:\windows\system32\drivers\i8042prt.sys (5.2.3790.3959 (srv03_sp2_rtm.070216-1710), 91.00 KB (93,184 bytes), 3/25/2005 6:00 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	Not Available
Last Reset	4/4/2007 9:32 AM
Index	1
Service Name	b57nd
IP Address	Not Available

IP Subnet Not Available
Default IP Gateway Not Available
DHCP Enabled Yes
DHCP Server Not Available
DHCP Lease Expires Not Available
DHCP Lease Obtained Not Available
MAC Address Not Available

Name [00000002] RAS Async Adapter
Adapter Type Not Available
Product Type RAS Async Adapter
Installed Yes
PNP Device ID Not Available
Last Reset 4/4/2007 9:32 AM

Index 2
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 [00000003] WAN Miniport (L2TP)
Adapter Type Not Available
Product Type WAN Miniport (L2TP)
Installed Yes
PNP Device ID ROOT\MS_L2TPMINIPORT\0000
Last Reset 4/4/2007 9:32 AM

Index 3
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 (5.2.3790.3959 (srv03_sp2_rtm.070216-1710), 132.00 KB (135,168 bytes), 3/25/2005 6:00 AM)

Name [00000004] WAN Miniport (PPTP)
Adapter Type Wide Area Network (WAN)
Product Type WAN Miniport (PPTP)
Installed Yes
PNP Device ID ROOT\MS_PPTPMINIPORT\0000
Last Reset 4/4/2007 9:32 AM

Index 4
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 (5.2.3790.3959 (srv03_sp2_rtm.070216-1710), 117.50 KB (120,320 bytes), 3/25/2005 6:00 AM)

Name [00000005] WAN Miniport (PPPOE)
Adapter Type Wide Area Network (WAN)
Product Type WAN Miniport (PPPOE)
Installed Yes
PNP Device ID ROOT\MS_PPPOEMINIPORT\0000

Last Reset 4/4/2007 9:32 AM
Index 5
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 (5.2.3790.3959 (srv03_sp2_rtm.070216-1710), 67.50 KB (69,120 bytes), 3/25/2005 6:00 AM)

Name [00000006] Direct Parallel
Adapter Type Not Available
Product Type Direct Parallel
Installed Yes
PNP Device ID ROOT\MS_PTMINIPORT\0000
Last Reset 4/4/2007 9:32 AM

Index 6
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 [00000007] WAN Miniport (IP)
Adapter Type Not Available
Product Type WAN Miniport (IP)
Installed Yes
PNP Device ID ROOT\MS_NDISWANIP\0000
Last Reset 4/4/2007 9:32 AM

Index 7
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 (5.2.3790.3959 (srv03_sp2_rtm.070216-1710), 157.50 KB (161,280 bytes), 3/25/2005 6:00 AM)

Name [00000008] HP NC371i Multifunction Gigabit Server Adapter
Adapter Type Not Available
Product Type HP NC371i Multifunction Gigabit Server Adapter

Installed Yes
PNP Device ID Not Available
Last Reset 4/4/2007 9:32 AM
Index 8
Service Name l2nd
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 [00000009] HP NC371i Multifunction Gigabit Server Adapter

Adapter Type Not Available
Product Type HP NC371i Multifunction Gigabit Server Adapter

Installed Yes
PNP Device ID Not Available
Last Reset 4/4/2007 9:32 AM
Index 9
Service Name l2nd
IP Address Not Available
IP Subnet Not Available
Default IP Gateway Not Available
DHCP Enabled Yes
DHCP Server Not Available
DHCP Lease Expires Not Available
DHCP Lease Obtained Not Available
MAC Address Not Available

Name [00000010] Intel (R) 82544GC Based Network Connection

Adapter Type Not Available
Product Type Intel (R) 82544GC Based Network Connection

Installed Yes
PNP Device ID Not Available
Last Reset 4/4/2007 9:32 AM
Index 10
Service Name E1000
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 [00000011] HP NC373i Multifunction Gigabit Server Adapter

Adapter Type Ethernet 802.3
Product Type HP NC373i Multifunction Gigabit Server Adapter

Installed Yes
PNP Device ID B06BDRV\L2ND&PCI_164C14E4&SUBSYS_7038103C&REV_12\6&154EFE07&0&20050500
Last Reset 4/4/2007 9:32 AM
Index 11
Service Name l2nd
IP Address 0.0.0.0
IP Subnet 0.0.0.0
Default IP Gateway Not Available
DHCP Enabled Yes
DHCP Server
DHCP Lease Expires Not Available
DHCP Lease Obtained Not Available
MAC Address 00:17:A4:F7:F7:46
Driver c:\windows\system32\drivers\bxnd52a.sys (2.8.13.0 built by: WinDDK, 81.00 KB (82,944 bytes), 2/28/2007 10:05 AM)

Name [00000012] HP NC373i Multifunction Gigabit Server Adapter

Adapter Type Ethernet 802.3
Product Type HP NC373i Multifunction Gigabit Server Adapter

Installed Yes
PNP Device ID B06BDRV\L2ND&PCI_164C14E4&SUBSYS_7038103C&REV_12\6&183F41DD&0&20050300
Last Reset 4/4/2007 9:32 AM
Index 12
Service Name l2nd
IP Address 130.168.250.39
IP Subnet 255.255.0.0
Default IP Gateway Not Available
DHCP Enabled Yes
DHCP Server 130.168.253.2
DHCP Lease Expires 4/13/2007 10:32 PM
DHCP Lease Obtained 4/12/2007 10:32 PM
MAC Address 00:17:A4:F7:F7:44
Driver c:\windows\system32\drivers\bxnd52a.sys (2.8.13.0 built by: WinDDK, 81.00 KB (82,944 bytes), 2/28/2007 10:05 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\wsock32.dll
Size	24.50 KB (25,088 bytes)
Version	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)

[Ports]

[Serial]

Item	Value
Name	Communications Port (COM1)
Status	OK
PNP Device ID	ACPI\PNP0501\0
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
IRQ Channel	IRQ 4
I/O Port	0x000003F8-0x000003FF
Driver	c:\windows\system32\drivers\serial.sys (5.2.3790.1830 (srv03_sp1_rtm.050324-1447), 118.50 KB (121,344 bytes), 3/25/2005 6:00 AM)

[Parallel]

Item	Value
------	-------

[Storage]

[Drives]

Item	Value
Drive	C:
Description	Local Fixed Disk
Compressed	No
File System	NTFS
Size	33.88 GB (36,381,306,880 bytes)
Free Space	20.55 GB (22,066,081,792 bytes)
Volume Name	
Volume Serial Number	18DB8253

Drive	D:
Description	CD-ROM Disc

Drive	Z:
Description	Local Fixed Disk
Compressed	No
File System	NTFS
Size	585.93 GB (629,133,012,992 bytes)
Free Space	117.72 GB (126,401,331,200 bytes)
Volume Name	New Volume
Volume Serial Number	00007174

[Disks]

Item	Value
Description	Disk drive
Manufacturer	(Standard disk drives)
Model	HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector	512
Media Loaded	Yes
Media Type	Fixed hard disk
Partitions	1
SCSI Bus	0
SCSI Logical Unit	0
SCSI Port	3
SCSI Target ID	4
Sectors/Track	63
Size	31.25 GB (33,550,917,120 bytes)
Total Cylinders	4,079
Total Sectors	65,529,135
Total Tracks	1,040,145
Tracks/Cylinder	255
Partition	Disk #4, Partition #0
Partition Size	31.25 GB (33,552,334,848 bytes)
Partition Starting Offset	131,072 bytes
Description	Disk drive

Manufacturer (Standard disk drives)
 Model HP LOGICAL VOLUME SCSI Disk Device
 Bytes/Sector 512
 Media Loaded Yes
 Media Type Fixed hard disk
 Partitions 1
 SCSI Bus 0
 SCSI Logical Unit 0
 SCSI Port 3
 SCSI Target ID 5
 Sectors/Track 63
 Size 15.62 GB (16,771,345,920 bytes)
 Total Cylinders 2,039
 Total Sectors 32,756,535
 Total Tracks 519,945
 Tracks/Cylinder 255
 Partition Disk #5, Partition #0
 Partition Size 15.62 GB (16,774,070,272 bytes)
 Partition Starting Offset 131,072 bytes

Description Disk drive
 Manufacturer (Standard disk drives)
 Model HP LOGICAL VOLUME SCSI Disk Device
 Bytes/Sector 512
 Media Loaded Yes
 Media Type Fixed hard disk
 Partitions 1
 SCSI Bus 0
 SCSI Logical Unit 0
 SCSI Port 3
 SCSI Target ID 6
 Sectors/Track 63
 Size 97.65 GB (104,855,869,440 bytes)
 Total Cylinders 12,748
 Total Sectors 204,796,620
 Total Tracks 3,250,740
 Tracks/Cylinder 255
 Partition Disk #6, Partition #0
 Partition Size 97.65 GB (104,855,837,184 bytes)
 Partition Starting Offset 32,256 bytes

Description Disk drive
 Manufacturer (Standard disk drives)
 Model HP LOGICAL VOLUME SCSI Disk Device
 Bytes/Sector 512
 Media Loaded Yes
 Media Type Fixed hard disk
 Partitions 1
 SCSI Bus 0
 SCSI Logical Unit 0
 SCSI Port 7
 SCSI Target ID 4
 Sectors/Track 63
 Size 31.25 GB (33,550,917,120 bytes)
 Total Cylinders 4,079
 Total Sectors 65,529,135
 Total Tracks 1,040,145
 Tracks/Cylinder 255
 Partition Disk #17, Partition #0
 Partition Size 31.25 GB (33,552,334,848 bytes)
 Partition Starting Offset 131,072 bytes

Description Disk drive
 Manufacturer (Standard disk drives)
 Model HP LOGICAL VOLUME SCSI Disk Device
 Bytes/Sector 512
 Media Loaded Yes
 Media Type Fixed hard disk
 Partitions 1
 SCSI Bus 0

SCSI Logical Unit 0
 SCSI Port 7
 SCSI Target ID 5
 Sectors/Track 63
 Size 15.62 GB (16,771,345,920 bytes)
 Total Cylinders 2,039
 Total Sectors 32,756,535
 Total Tracks 519,945
 Tracks/Cylinder 255
 Partition Disk #18, Partition #0
 Partition Size 15.62 GB (16,774,070,272 bytes)
 Partition Starting Offset 131,072 bytes

Description Disk drive
 Manufacturer (Standard disk drives)
 Model HP LOGICAL VOLUME SCSI Disk Device
 Bytes/Sector 512
 Media Loaded Yes
 Media Type Fixed hard disk
 Partitions 1
 SCSI Bus 0
 SCSI Logical Unit 0
 SCSI Port 7
 SCSI Target ID 6
 Sectors/Track 63
 Size 97.65 GB (104,855,869,440 bytes)
 Total Cylinders 12,748
 Total Sectors 204,796,620
 Total Tracks 3,250,740
 Tracks/Cylinder 255
 Partition Disk #19, Partition #0
 Partition Size 97.65 GB (104,855,837,184 bytes)
 Partition Starting Offset 32,256 bytes

Description Disk drive
 Manufacturer (Standard disk drives)
 Model HP LOGICAL VOLUME SCSI Disk Device
 Bytes/Sector 512
 Media Loaded Yes
 Media Type Fixed hard disk
 Partitions 1
 SCSI Bus 0
 SCSI Logical Unit 0
 SCSI Port 6
 SCSI Target ID 4
 Sectors/Track 32
 Size 31.25 GB (33,552,875,520 bytes)
 Total Cylinders 8,031
 Total Sectors 65,532,960
 Total Tracks 2,047,905
 Tracks/Cylinder 255
 Partition Disk #14, Partition #0
 Partition Size 31.25 GB (33,552,334,848 bytes)
 Partition Starting Offset 131,072 bytes

Description Disk drive
 Manufacturer (Standard disk drives)
 Model HP LOGICAL VOLUME SCSI Disk Device
 Bytes/Sector 512
 Media Loaded Yes
 Media Type Fixed hard disk
 Partitions 1
 SCSI Bus 0
 SCSI Logical Unit 0
 SCSI Port 6
 SCSI Target ID 5
 Sectors/Track 32
 Size 15.62 GB (16,774,348,800 bytes)
 Total Cylinders 4,015
 Total Sectors 32,762,400

Total Tracks 1,023,825
 Tracks/Cylinder 255
 Partition Disk #15, Partition #0
 Partition Size 15.62 GB (16,774,070,272 bytes)
 Partition Starting Offset 131,072 bytes

Description Disk drive
 Manufacturer (Standard disk drives)
 Model HP LOGICAL VOLUME SCSI Disk Device
 Bytes/Sector 512
 Media Loaded Yes
 Media Type Fixed hard disk
 Partitions 1
 SCSI Bus 0
 SCSI Logical Unit 0
 SCSI Port 6
 SCSI Target ID 6
 Sectors/Track 32
 Size 97.66 GB (104,857,436,160 bytes)
 Total Cylinders 25,098
 Total Sectors 204,799,680
 Total Tracks 6,399,990
 Tracks/Cylinder 255
 Partition Disk #16, Partition #0
 Partition Size 97.65 GB (104,855,837,184 bytes)
 Partition Starting Offset 32,256 bytes

Description Disk drive
 Manufacturer (Standard disk drives)
 Model HP LOGICAL VOLUME SCSI Disk Device
 Bytes/Sector 512
 Media Loaded Yes
 Media Type Fixed hard disk
 Partitions 1
 SCSI Bus 0
 SCSI Logical Unit 0
 SCSI Port 8
 SCSI Target ID 4
 Sectors/Track 63
 Size 31.25 GB (33,550,917,120 bytes)
 Total Cylinders 4,079
 Total Sectors 65,529,135
 Total Tracks 1,040,145
 Tracks/Cylinder 255
 Partition Disk #20, Partition #0
 Partition Size 31.25 GB (33,552,334,848 bytes)
 Partition Starting Offset 131,072 bytes

Description Disk drive
 Manufacturer (Standard disk drives)
 Model HP LOGICAL VOLUME SCSI Disk Device
 Bytes/Sector 512
 Media Loaded Yes
 Media Type Fixed hard disk
 Partitions 1
 SCSI Bus 0
 SCSI Logical Unit 0
 SCSI Port 8
 SCSI Target ID 5
 Sectors/Track 63
 Size 15.62 GB (16,771,345,920 bytes)
 Total Cylinders 2,039
 Total Sectors 32,756,535
 Total Tracks 519,945
 Tracks/Cylinder 255
 Partition Disk #21, Partition #0
 Partition Size 15.62 GB (16,774,070,272 bytes)
 Partition Starting Offset 131,072 bytes

Description Disk drive

Manufacturer (Standard disk drives)
 Model HP LOGICAL VOLUME SCSI Disk Device
 Bytes/Sector 512
 Media Loaded Yes
 Media Type Fixed hard disk
 Partitions 1
 SCSI Bus 0
 SCSI Logical Unit 0
 SCSI Port 8
 SCSI Target ID 6
 Sectors/Track 63
 Size 97.65 GB (104,855,869,440 bytes)
 Total Cylinders 12,748
 Total Sectors 204,796,620
 Total Tracks 3,250,740
 Tracks/Cylinder 255
 Partition Disk #22, Partition #0
 Partition Size 97.65 GB (104,855,837,184 bytes)
 Partition Starting Offset 32,256 bytes

Description Disk drive
 Manufacturer (Standard disk drives)
 Model HP LOGICAL VOLUME SCSI Disk Device
 Bytes/Sector 512
 Media Loaded Yes
 Media Type Fixed hard disk
 Partitions 1
 SCSI Bus 0
 SCSI Logical Unit 0
 SCSI Port 5
 SCSI Target ID 4
 Sectors/Track 63
 Size 31.25 GB (33,550,917,120 bytes)
 Total Cylinders 4,079
 Total Sectors 65,529,135
 Total Tracks 1,040,145
 Tracks/Cylinder 255
 Partition Disk #11, Partition #0
 Partition Size 31.25 GB (33,552,334,848 bytes)
 Partition Starting Offset 131,072 bytes

Description Disk drive
 Manufacturer (Standard disk drives)
 Model HP LOGICAL VOLUME SCSI Disk Device
 Bytes/Sector 512
 Media Loaded Yes
 Media Type Fixed hard disk
 Partitions 1
 SCSI Bus 0
 SCSI Logical Unit 0
 SCSI Port 5
 SCSI Target ID 5
 Sectors/Track 63
 Size 15.62 GB (16,771,345,920 bytes)
 Total Cylinders 2,039
 Total Sectors 32,756,535
 Total Tracks 519,945
 Tracks/Cylinder 255
 Partition Disk #12, Partition #0
 Partition Size 15.62 GB (16,774,070,272 bytes)
 Partition Starting Offset 131,072 bytes

Description Disk drive
 Manufacturer (Standard disk drives)
 Model HP LOGICAL VOLUME SCSI Disk Device
 Bytes/Sector 512
 Media Loaded Yes
 Media Type Fixed hard disk
 Partitions 1
 SCSI Bus 0

SCSI Logical Unit 0
 SCSI Port 5
 SCSI Target ID 6
 Sectors/Track 63
 Size 97.65 GB (104,855,869,440 bytes)
 Total Cylinders 12,748
 Total Sectors 204,796,620
 Total Tracks 3,250,740
 Tracks/Cylinder 255
 Partition Disk #13, Partition #0
 Partition Size 97.65 GB (104,855,837,184 bytes)
 Partition Starting Offset 32,256 bytes

Description Disk drive
 Manufacturer (Standard disk drives)
 Model HP LOGICAL VOLUME SCSI Disk Device
 Bytes/Sector 512
 Media Loaded Yes
 Media Type Fixed hard disk
 Partitions 1
 SCSI Bus 0
 SCSI Logical Unit 0
 SCSI Port 4
 SCSI Target ID 4
 Sectors/Track 32
 Size 33.89 GB (36,385,505,280 bytes)
 Total Cylinders 8,709
 Total Sectors 71,065,440
 Total Tracks 2,220,795
 Tracks/Cylinder 255
 Partition Disk #7, Partition #0
 Partition Size 33.88 GB (36,381,310,976 bytes)
 Partition Starting Offset 16,384 bytes

Description Disk drive
 Manufacturer (Standard disk drives)
 Model HP LOGICAL VOLUME SCSI Disk Device
 Bytes/Sector 512
 Media Loaded Yes
 Media Type Fixed hard disk
 Partitions 1
 SCSI Bus 0
 SCSI Logical Unit 0
 SCSI Port 4
 SCSI Target ID 5
 Sectors/Track 32
 Size 9.77 GB (10,486,579,200 bytes)
 Total Cylinders 2,510
 Total Sectors 20,481,600
 Total Tracks 640,050
 Tracks/Cylinder 255
 Partition Disk #8, Partition #0
 Partition Size 9.77 GB (10,485,760,000 bytes)
 Partition Starting Offset 131,072 bytes

Description Disk drive
 Manufacturer (Standard disk drives)
 Model HP LOGICAL VOLUME SCSI Disk Device
 Bytes/Sector 512
 Media Loaded Yes
 Media Type Fixed hard disk
 Partitions 1
 SCSI Bus 0
 SCSI Logical Unit 0
 SCSI Port 4
 SCSI Target ID 6
 Sectors/Track 32
 Size 19.53 GB (20,968,980,480 bytes)
 Total Cylinders 5,019
 Total Sectors 40,955,040

Description Disk drive
 Manufacturer (Standard disk drives)
 Model HP LOGICAL VOLUME SCSI Disk Device
 Bytes/Sector 512
 Media Loaded Yes
 Media Type Fixed hard disk
 Partitions 1
 SCSI Bus 0
 SCSI Logical Unit 0
 SCSI Port 2
 SCSI Target ID 5
 Sectors/Track 63
 Size 15.62 GB (16,771,345,920 bytes)
 Total Cylinders 2,039
 Total Sectors 32,756,535
 Total Tracks 519,945
 Tracks/Cylinder 255
 Partition Disk #1, Partition #0
 Partition Size 15.62 GB (16,774,070,272 bytes)
 Partition Starting Offset 131,072 bytes

Total Tracks 1,279,845
 Tracks/Cylinder 255
 Partition Disk #9, Partition #0
 Partition Size 19.53 GB (20,968,374,272 bytes)
 Partition Starting Offset 131,072 bytes

Description Disk drive
 Manufacturer (Standard disk drives)
 Model HP LOGICAL VOLUME SCSI Disk Device
 Bytes/Sector 512
 Media Loaded Yes
 Media Type Fixed hard disk
 Partitions 1
 SCSI Bus 0
 SCSI Logical Unit 0
 SCSI Port 4
 SCSI Target ID 7
 Sectors/Track 32
 Size 498.05 MB (522,240,000 bytes)
 Total Cylinders 125
 Total Sectors 1,020,000
 Total Tracks 31,875
 Tracks/Cylinder 255
 Partition Disk #10, Partition #0
 Partition Size 494.00 MB (517,996,544 bytes)
 Partition Starting Offset 131,072 bytes

Description Disk drive
 Manufacturer (Standard disk drives)
 Model HP LOGICAL VOLUME SCSI Disk Device
 Bytes/Sector 512
 Media Loaded Yes
 Media Type Fixed hard disk
 Partitions 1
 SCSI Bus 0
 SCSI Logical Unit 0
 SCSI Port 2
 SCSI Target ID 4
 Sectors/Track 32
 Size 31.25 GB (33,552,875,520 bytes)
 Total Cylinders 8,031
 Total Sectors 65,532,960
 Total Tracks 2,047,905
 Tracks/Cylinder 255
 Partition Disk #0, Partition #0
 Partition Size 31.25 GB (33,552,334,848 bytes)
 Partition Starting Offset 131,072 bytes

Description Disk drive
 Manufacturer (Standard disk drives)
 Model HP LOGICAL VOLUME SCSI Disk Device
 Bytes/Sector 512
 Media Loaded Yes
 Media Type Fixed hard disk
 Partitions 1
 SCSI Bus 0
 SCSI Logical Unit 0
 SCSI Port 2
 SCSI Target ID 5
 Sectors/Track 63
 Size 15.62 GB (16,771,345,920 bytes)
 Total Cylinders 2,039
 Total Sectors 32,756,535
 Total Tracks 519,945
 Tracks/Cylinder 255
 Partition Disk #1, Partition #0
 Partition Size 15.62 GB (16,774,070,272 bytes)
 Partition Starting Offset 131,072 bytes

Description Disk drive
 Manufacturer (Standard disk drives)
 Model HP LOGICAL VOLUME SCSI Disk Device
 Bytes/Sector 512
 Media Loaded Yes
 Media Type Fixed hard disk
 Partitions 1
 SCSI Bus 0
 SCSI Logical Unit 0
 SCSI Port 2
 SCSI Target ID 5
 Sectors/Track 63
 Size 15.62 GB (16,771,345,920 bytes)
 Total Cylinders 2,039
 Total Sectors 32,756,535
 Total Tracks 519,945
 Tracks/Cylinder 255
 Partition Disk #1, Partition #0
 Partition Size 15.62 GB (16,774,070,272 bytes)
 Partition Starting Offset 131,072 bytes

Description Disk drive

Manufacturer (Standard disk drives)
 Model HP LOGICAL VOLUME SCSI Disk Device
 Bytes/Sector 512
 Media Loaded Yes
 Media Type Fixed hard disk
 Partitions 1
 SCSI Bus 0
 SCSI Logical Unit 0
 SCSI Port 2
 SCSI Target ID 6
 Sectors/Track 63
 Size 97.65 GB (104,855,869,440 bytes)
 Total Cylinders 12,748
 Total Sectors 204,796,620
 Total Tracks 3,250,740
 Tracks/Cylinder 255
 Partition Disk #2, Partition #0
 Partition Size 97.65 GB (104,855,837,184 bytes)
 Partition Starting Offset 32,256 bytes

Description Disk drive
 Manufacturer (Standard disk drives)
 Model HP LOGICAL VOLUME SCSI Disk Device
 Bytes/Sector 512
 Media Loaded Yes
 Media Type Fixed hard disk
 Partitions 1
 SCSI Bus 0
 SCSI Logical Unit 0
 SCSI Port 2
 SCSI Target ID 7
 Sectors/Track 63
 Size 1.95 GB (2,089,221,120 bytes)
 Total Cylinders 254
 Total Sectors 4,080,510
 Total Tracks 64,770
 Tracks/Cylinder 255
 Partition Disk #3, Partition #0
 Partition Size 1.95 GB (2,088,763,392 bytes)
 Partition Starting Offset 131,072 bytes

[SCSI]

Item Value
 Name Smart Array P800 Controller
 Manufacturer Hewlett-Packard Company
 Status OK
 PNP Device ID
 PCI\VEN_103C&DEV_3230&SUBSYS_3223103C&REV_02\6
 &356D7036&0&00000010
 Memory Address 0xFD500000-0xFD5FFFFF
 I/O Port 0x00005000-0x00006FFF
 Memory Address 0xFD4F0000-0xFD4F0FFF
 IRQ Channel IRQ 16
 Driver c:\windows\system32\drivers\hpciss2.sys (6.2.0.64 Build 8 (x86-64) built by: buildsrv, 59.80 KB (61,240 bytes), 2/28/2007 10:04 AM)

Name Smart Array P400 Controller
 Manufacturer Hewlett-Packard Company
 Status OK
 PNP Device ID
 PCI\VEN_103C&DEV_3230&SUBSYS_3234103C&REV_01\6
 &14CDF429&0&00080010
 Memory Address 0xFD700000-0xFD7FFFFF
 I/O Port 0x00006000-0x00006FFF
 Memory Address 0xFD6F0000-0xFD6F0FFF
 IRQ Channel IRQ 17

Driver c:\windows\system32\drivers\hpciss2.sys (6.2.0.64 Build 8 (x86-64) built by: buildsrv, 59.80 KB (61,240 bytes), 2/28/2007 10:04 AM)

Name Smart Array P800 Controller
 Manufacturer Hewlett-Packard Company
 Status OK
 PNP Device ID
 PCI\VEN_103C&DEV_3230&SUBSYS_3223103C&REV_01\4
 &EFC3E79&0&0018
 Memory Address 0xFD200000-0xFD2FFFFF
 I/O Port 0x00004000-0x00004FFF
 Memory Address 0xFD1F0000-0xFD1F0FFF
 IRQ Channel IRQ 18
 Driver c:\windows\system32\drivers\hpciss2.sys (6.2.0.64 Build 8 (x86-64) built by: buildsrv, 59.80 KB (61,240 bytes), 2/28/2007 10:04 AM)

Name Smart Array P800 Controller
 Manufacturer Hewlett-Packard Company
 Status OK
 PNP Device ID
 PCI\VEN_103C&DEV_3230&SUBSYS_3223103C&REV_03\4
 &237315C2&0&0020
 Memory Address 0xFD900000-0xFD9FFFFF
 I/O Port 0x00007000-0x00007FFF
 Memory Address 0xFD8F0000-0xFD8F0FFF
 IRQ Channel IRQ 19
 Driver c:\windows\system32\drivers\hpciss2.sys (6.2.0.64 Build 8 (x86-64) built by: buildsrv, 59.80 KB (61,240 bytes), 2/28/2007 10:04 AM)

Name Smart Array P800 Controller
 Manufacturer Hewlett-Packard Company
 Status OK
 PNP Device ID
 PCI\VEN_103C&DEV_3230&SUBSYS_3223103C&REV_03\4
 &1AB8B18D&0&0028
 Memory Address 0xFDB00000-0xFDBFFFFF
 I/O Port 0x00008000-0x00008FFF
 Memory Address 0xFDAF0000-0xFDAF0FFF
 IRQ Channel IRQ 18
 Driver c:\windows\system32\drivers\hpciss2.sys (6.2.0.64 Build 8 (x86-64) built by: buildsrv, 59.80 KB (61,240 bytes), 2/28/2007 10:04 AM)

Name Smart Array P800 Controller
 Manufacturer Hewlett-Packard Company
 Status OK
 PNP Device ID
 PCI\VEN_103C&DEV_3230&SUBSYS_3223103C&REV_03\4
 &79C23&0&0030
 Memory Address 0xFDD00000-0xFDDFFFFF
 I/O Port 0x00009000-0x00009FFF
 Memory Address 0xFDCF0000-0xFDCF0FFF
 IRQ Channel IRQ 19
 Driver c:\windows\system32\drivers\hpciss2.sys (6.2.0.64 Build 8 (x86-64) built by: buildsrv, 59.80 KB (61,240 bytes), 2/28/2007 10:04 AM)

Name Smart Array P800 Controller
 Manufacturer Hewlett-Packard Company
 Status OK
 PNP Device ID
 PCI\VEN_103C&DEV_3230&SUBSYS_3223103C&REV_03\4
 &8C20058&0&0038
 Memory Address 0xFDF00000-0xFDFFFFFF
 I/O Port 0x0000A000-0x0000AFFF
 Memory Address 0xFDEF0000-0xFDEF0FFF
 IRQ Channel IRQ 18

Driver c:\windows\system32\drivers\hpciss2.sys (6.2.0.64 Build 8 (x86-64) built by: buildsrv, 59.80 KB (61,240 bytes), 2/28/2007 10:04 AM)

[IDE]

Item Value
 Name Standard Dual Channel PCI IDE Controller
 Manufacturer (Standard IDE ATA/ATAPI controllers)
 Status OK
 PNP Device ID PCI\VEN_8086&DEV_269E&SUBSYS_31FE103C&REV_09\3&61AAA01&0&F9
 I/O Port 0x00000500-0x0000050F
 Driver c:\windows\system32\drivers\pciide.sys (5.2.3790.1830 (srv03_sp1_rtm.050324-1447), 6.00 KB (6,144 bytes), 3/25/2005 6:00 AM)

Name Primary IDE Channel
 Manufacturer (Standard IDE ATA/ATAPI controllers)
 Status OK
 PNP Device ID PCIIDE\IDECHANNEL\4&56E2F28&0&0
 I/O Port 0x000001F0-0x000001F7
 I/O Port 0x000003F6-0x000003F6
 IRQ Channel IRQ 14
 Driver c:\windows\system32\drivers\atapi.sys (5.2.3790.3959 (srv03_sp2_rtm.070216-1710), 146.50 KB (150,016 bytes), 3/25/2005 6:00 AM)

Name Secondary IDE Channel
 Manufacturer (Standard IDE ATA/ATAPI controllers)
 Status OK
 PNP Device ID PCIIDE\IDECHANNEL\4&56E2F28&0&1
 I/O Port 0x00000170-0x00000177
 I/O Port 0x00000376-0x00000376
 Driver c:\windows\system32\drivers\atapi.sys (5.2.3790.3959 (srv03_sp2_rtm.070216-1710), 146.50 KB (150,016 bytes), 3/25/2005 6:00 AM)

[Printing]

Name Driver Port Name Server Name

[Problem Devices]

Device PNP Device ID Error Code
 Base System Device
 PCI\VEN_0E11&DEV_B203&SUBSYS_3305103C&REV_03\4&2014205D&0&20F0 The drivers for this device are not installed.

Base System Device
 PCI\VEN_0E11&DEV_B204&SUBSYS_3305103C&REV_03\4&2014205D&0&22F0 The drivers for this device are not installed.

PCI Device
 PCI\VEN_103C&DEV_3302&SUBSYS_3305103C&REV_00\4&2014205D&0&26F0 The drivers for this device are not installed.

Not Available ACPI\IPI0001\0 The drivers for this device are not installed.

[USB]

Device PNP Device ID
 Standard Universal PCI to USB Host Controller
 PCI\VEN_8086&DEV_2688&SUBSYS_31FE103C&REV_09\3&61AAA01&0&E8
 Standard Universal PCI to USB Host Controller
 PCI\VEN_8086&DEV_2689&SUBSYS_31FE103C&REV_09\3&61AAA01&0&E9

Standard Universal PCI to USB Host Controller
 PCI\VEN_8086&DEV_268A&SUBSYS_31FE103C&REV_09\3&61AAA01&0&EA
 Standard Universal PCI to USB Host Controller
 PCI\VEN_8086&DEV_268B&SUBSYS_31FE103C&REV_09\3&61AAA01&0&EB
 Standard Enhanced PCI to USB Host Controller
 PCI\VEN_8086&DEV_268C&SUBSYS_31FE103C&REV_09\3&61AAA01&0&EF
 Standard Universal PCI to USB Host Controller
 PCI\VEN_103C&DEV_3300&SUBSYS_3305103C&REV_00\4&2014205D&0&24F0

[Software Environment]

[System Drivers]

Name	Description	File	Type	Started	Start
Mode	State	Status	Error Control	Accept	Pause
	Accept Stop				
abiosdsk	Abiosdsk	Not Available	Kernel Driver	No	No
	Disabled	Stopped	OK	Ignore	No
acpi	Microsoft ACPI Driver				
	c:\windows\system32\drivers\acpi.sys		Kernel Driver		
	Yes	Boot	Running	OK	Normal
	Yes				No
acpiec	ACPIEC				
Driver	c:\windows\system32\drivers\acpiec.sys		Kernel		
	No	Disabled	Stopped	OK	Normal
	No				No
adpu160m	adpu160m	Not Available	Kernel Driver	No	No
	Disabled	Stopped	OK	Normal	No
adpu320	adpu320	Not Available	Kernel Driver	No	No
	Disabled	Stopped	OK	Normal	No
afd	AFD				
Driver	c:\windows\system32\drivers\afd.sys		Kernel		
	Yes	System	Running	OK	Normal
	Yes				No
aic78u2	aic78u2	Not Available	Kernel Driver	No	No
	Disabled	Stopped	OK	Normal	No
aic78xx	aic78xx	Not Available	Kernel Driver	No	No
	Disabled	Stopped	OK	Normal	No
aliide	AliIde	Not Available	Kernel Driver	No	No
	Disabled	Stopped	OK	Normal	No
amdide	AmdIde	Not Available	Kernel Driver	No	No
	Disabled	Stopped	OK	Normal	No
arc	arc	Not Available	Kernel Driver	No	No
	Disabled	Stopped	OK	Normal	No
asynctac	RAS Asynchronous Media Driver				
	c:\windows\system32\drivers\asynctac.sys		Kernel Driver		
	No	Manual	Stopped	OK	Normal
	No				No
atapi	Standard IDE/ESDI Hard Disk Controller				
	c:\windows\system32\drivers\atapi.sys		Kernel Driver		
	Yes	Boot	Running	OK	Normal
	Yes				No
atdisk	Atdisk	Not Available	Kernel Driver	No	No
	Disabled	Stopped	OK	Ignore	No
ati2mtag	ati2mtag				
Driver	c:\windows\system32\drivers\ati2mtag.sys		Kernel		
	Yes	Manual	Running	OK	Ignore
	Yes				No

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


```

sqlwriter.exe      c:\program files\microsoft sql
server\90\shared\sqlwriter.exe 1176 8 200 1380
4/4/2007 9:32 AM 2005.090.3042.00 152.36 KB (156,016
bytes) 2/10/2007 10:03 AM
svchost.exe       c:\windows\system32\svchost.exe 1408
8 200 1380 4/4/2007 9:33 AM
5.2.3790.3959 (srv03_sp2_rtm.070216-1710) 25.00 KB
(25,600 bytes) 3/23/2007 3:42 PM
wmiprvse.exe     Not Available 1664 8 Not
Available Not Available 4/4/2007 9:34 AM Not Available
Not Available Not Available
csrss.exe        Not Available 1752 13 Not Available
Not Available 4/4/2007 9:35 AM Not Available
Not Available Not Available
winlogon.exe     c:\windows\system32\winlogon.exe 1780
13 200 1380 4/4/2007 9:35 AM
5.2.3790.3959 (srv03_sp2_rtm.070216-1710) 922.00
KB (944,128 bytes) 3/23/2007 3:42 PM
rdpclip.exec:c:\windows\system32\rdpclip.exe 1936 8 200
1380 4/4/2007 9:35 AM 5.2.3790.3959
(srv03_sp2_rtm.070216-1710) 99.00 KB (101,376 bytes)
3/23/2007 3:42 PM
explorer.exe     c:\windows\explorer.exe 2004 8
200 1380 4/4/2007 9:35 AM 6.00.3790.3959
(srv03_sp2_rtm.070216-1710) 1.30 MB (1,364,480 bytes)
3/23/2007 3:43 PM
sqlservr.exe    c:\program files\microsoft sql
server\mssql.1\mssql\bin\sqlservr.exe 372 13 200
1380 4/4/2007 9:35 AM 2005.090.3042.00 36.72
MB (38,507,376 bytes) 2/10/2007 10:03 AM
logon.scr       Not Available 2580 4 Not Available
Not Available 4/4/2007 9:43 AM Not Available
Not Available Not Available
csrss.exe        Not Available 992 13 Not Available
Not Available 4/4/2007 2:37 PM Not Available
Not Available Not Available
winlogon.exe     c:\windows\system32\winlogon.exe 2212
13 200 1380 4/4/2007 2:37 PM
5.2.3790.3959 (srv03_sp2_rtm.070216-1710) 922.00
KB (944,128 bytes) 3/23/2007 3:42 PM
rdpclip.exec:c:\windows\system32\rdpclip.exe 2072 8 200
1380 4/4/2007 2:37 PM 5.2.3790.3959
(srv03_sp2_rtm.070216-1710) 99.00 KB (101,376 bytes)
3/23/2007 3:42 PM
explorer.exe     c:\windows\explorer.exe 2148 8
200 1380 4/4/2007 2:37 PM 6.00.3790.3959
(srv03_sp2_rtm.070216-1710) 1.30 MB (1,364,480 bytes)
3/23/2007 3:43 PM
taskmgr.exe     c:\windows\system32\taskmgr.exe 2964
13 200 1380 4/4/2007 2:38 PM
5.2.3790.3959 (srv03_sp2_rtm.070216-1710) 231.50
KB (237,056 bytes) 3/25/2005 6:00 AM
cmd.exe         c:\windows\system32\cmd.exe 1056 8 200
1380 4/12/2007 7:03 PM 5.2.3790.3959
(srv03_sp2_rtm.070216-1710) 538.00 KB (550,912 bytes)
3/25/2005 6:00 AM
regedit.exe:c:\windows\regedit.exe 1520 8 200
1380 4/13/2007 10:26 AM 5.2.3790.3959
(srv03_sp2_rtm.070216-1710) 219.50 KB (224,768 bytes)
3/25/2005 6:00 AM
helpctr.exec:c:\windows\pchealth\helpctr\binaries\helpctr.exe 2828
8 200 1380 4/13/2007 10:29 AM
5.2.3790.3959 (srv03_sp2_rtm.070216-1710) 1.30 MB
(1,363,456 bytes) 2/15/2007 11:00 AM
helpsvc.exe     c:\windows\pchealth\helpctr\binaries\helpsvc.exe
2484 8 200 1380 4/13/2007 10:29 AM
5.2.3790.3959 (srv03_sp2_rtm.070216-1710) 1.52 MB
(1,591,296 bytes) 2/15/2007 11:00 AM

```

```

wmiprvse.exe     Not Available 2888 8 Not
Available Not Available 4/13/2007 10:29 AM Not Available
Not Available Not Available
[Loaded Modules]
Name Version Size File Date Manufacturer Path
winlogon 5.2.3790.3959 (srv03_sp2_rtm.070216-1710) 922.00
KB (944,128 bytes) 3/23/2007 3:42 PM Microsoft Corporation
c:\windows\system32\winlogon.exe
ntdll 5.2.3790.3959 (srv03_sp2_rtm.070216-1710) 1.20 MB
(1,254,400 bytes) 3/25/2005 6:00 AM Microsoft Corporation
c:\windows\system32\ntdll.dll
kernel32 5.2.3790.3959 (srv03_sp2_rtm.070216-1710) 1.43 MB
(1,503,232 bytes) 3/23/2007 3:42 PM Microsoft Corporation
c:\windows\system32\kernel32.dll
advapi32 5.2.3790.3959 (srv03_sp2_rtm.070216-1710) 1.00 MB
(1,051,648 bytes) 3/25/2005 6:00 AM Microsoft Corporation
c:\windows\system32\advapi32.dll
rpcrt4 5.2.3790.3959 (srv03_sp2_rtm.070216-1710) 1.58 MB
(1,653,248 bytes) 3/23/2007 3:42 PM Microsoft Corporation
c:\windows\system32\rpcrt4.dll
secur32 5.2.3790.3959 (srv03_sp2_rtm.070216-1710) 120.00
KB (122,880 bytes) 3/23/2007 3:42 PM Microsoft Corporation
c:\windows\system32\secur32.dll
crypt32 5.131.3790.3959 (srv03_sp2_rtm.070216-1710) 1.36 MB
(1,429,504 bytes) 3/23/2007 3:42 PM Microsoft Corporation
c:\windows\system32\crypt32.dll
msvcrt 7.0.3790.3959 (srv03_sp2_rtm.070216-1710) 508.00
KB (520,192 bytes) 3/23/2007 3:42 PM Microsoft Corporation
c:\windows\system32\msvcrt.dll
user32 5.2.3790.3959 (srv03_sp2_rtm.070216-1710) 1.04 MB
(1,086,976 bytes) 3/23/2007 3:42 PM Microsoft Corporation
c:\windows\system32\user32.dll
gdi32 5.2.3790.3959 (srv03_sp2_rtm.070216-1710) 603.50
KB (617,984 bytes) 3/23/2007 3:42 PM Microsoft Corporation
c:\windows\system32\gdi32.dll
msasn1 5.2.3790.3959 (srv03_sp2_rtm.070216-1710) 152.50
KB (156,160 bytes) 3/23/2007 3:42 PM Microsoft Corporation
c:\windows\system32\msasn1.dll
nddeapi 5.2.3790.3959 (srv03_sp2_rtm.070216-1710) 25.00 KB
(25,600 bytes) 3/23/2007 3:42 PM Microsoft Corporation
c:\windows\system32\nddeapi.dll
profmap 5.2.3790.3959 (srv03_sp2_rtm.070216-1710) 36.00 KB
(36,864 bytes) 3/23/2007 3:42 PM Microsoft Corporation
c:\windows\system32\profmap.dll
netapi32 5.2.3790.3959 (srv03_sp2_rtm.070216-1710) 589.00
KB (603,136 bytes) 3/23/2007 3:42 PM Microsoft Corporation
c:\windows\system32\netapi32.dll
userenv 5.2.3790.3959 (srv03_sp2_rtm.070216-1710) 1.02 MB
(1,071,104 bytes) 3/25/2005 6:00 AM Microsoft Corporation
c:\windows\system32\userenv.dll
psapi 5.2.3790.3959 (srv03_sp2_rtm.070216-1710) 29.00 KB
(29,696 bytes) 3/23/2007 3:42 PM Microsoft Corporation
c:\windows\system32\psapi.dll
regapi 5.2.3790.3959 (srv03_sp2_rtm.070216-1710) 108.50
KB (111,104 bytes) 3/23/2007 3:42 PM Microsoft Corporation
c:\windows\system32\regapi.dll
setupapi 5.2.3790.3959 (srv03_sp2_rtm.070216-1710) 1.45 MB
(1,524,224 bytes) 3/25/2005 6:00 AM Microsoft Corporation
c:\windows\system32\setupapi.dll
version 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 28.00 KB
(28,672 bytes) 3/25/2005 6:00 AM Microsoft Corporation
c:\windows\system32\version.dll
winsta 5.2.3790.3959 (srv03_sp2_rtm.070216-1710) 89.00 KB
(91,136 bytes) 3/23/2007 3:42 PM Microsoft Corporation
c:\windows\system32\winsta.dll

```

ws2_32	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	174.50 KB (178,688 bytes)	3/23/2007 3:42 PM	Microsoft Corporation	c:\windows\system32\ws2_32.dll
ws2help	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	30.50 KB (31,232 bytes)	3/25/2005 6:00 AM	Microsoft Corporation	c:\windows\system32\ws2help.dll
msgina	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	1.14 MB (1,193,472 bytes)	3/23/2007 3:42 PM	Microsoft Corporation	c:\windows\system32\msgina.dll
shsvcs	6.00.3790.3959 (srv03_sp2_rtm.070216-1710)	194.00 KB (198,656 bytes)	3/23/2007 3:42 PM	Microsoft Corporation	c:\windows\system32\shsvcs.dll
shlwapi	6.00.3790.3959 (srv03_sp2_rtm.070216-1710)	607.00 KB (621,568 bytes)	3/23/2007 3:42 PM	Microsoft Corporation	c:\windows\system32\shlwapi.dll
sfc	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	6.00 KB (6,144 bytes)	3/25/2005 6:00 AM	Microsoft Corporation	c:\windows\system32\sfc.dll
sfc_os	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	183.50 KB (187,904 bytes)	3/23/2007 3:42 PM	Microsoft Corporation	c:\windows\system32\sfc_os.dll
wintrust	5.131.3790.3959 (srv03_sp2_rtm.070216-1710)	297.50 KB (304,640 bytes)	3/23/2007 3:42 PM	Microsoft Corporation	c:\windows\system32\wintrust.dll
imagehlp	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	57.50 KB (58,880 bytes)	3/25/2005 6:00 AM	Microsoft Corporation	c:\windows\system32\imagehlp.dll
ole32	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	2.50 MB (2,622,976 bytes)	3/23/2007 3:42 PM	Microsoft Corporation	c:\windows\system32\ole32.dll
comctl32	6.0 (srv03_sp2_rtm.070216-1710)	1.51 MB (1,584,640 bytes)	2/18/2007 11:24 AM	Microsoft Corporation	c:\windows\winsxs\amd64_microsoft.windows.common-controls_6595b64144ccf1df_6.0.3790.3959_x-ww_0a7b2435\comctl32.dll
winscard	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	229.50 KB (235,008 bytes)	3/23/2007 3:42 PM	Microsoft Corporation	c:\windows\system32\winscard.dll
wtsapi32	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	29.00 KB (29,696 bytes)	3/23/2007 3:42 PM	Microsoft Corporation	c:\windows\system32\wtsapi32.dll
winmm	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	303.50 KB (310,784 bytes)	3/23/2007 3:42 PM	Microsoft Corporation	c:\windows\system32\winmm.dll
sxs	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	1.89 MB (1,977,856 bytes)	3/23/2007 3:42 PM	Microsoft Corporation	c:\windows\system32\sxs.dll
shell32	6.00.3790.3959 (srv03_sp2_rtm.070216-1710)	10.02 MB (10,505,728 bytes)	3/23/2007 3:42 PM	Microsoft Corporation	c:\windows\system32\shell32.dll
wldap32	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	390.50 KB (399,872 bytes)	3/23/2007 3:42 PM	Microsoft Corporation	c:\windows\system32\wldap32.dll
rsaenh	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	298.84 KB (306,008 bytes)	3/23/2007 3:42 PM	Microsoft Corporation	c:\windows\system32\rsaenh.dll
csdll	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	151.50 KB (155,136 bytes)	3/23/2007 3:42 PM	Microsoft Corporation	c:\windows\system32\csdll.dll
dimsntfy	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	28.00 KB (28,672 bytes)	3/23/2007 3:42 PM	Microsoft Corporation	c:\windows\system32\dimsntfy.dll
wlnotify	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	148.50 KB (152,064 bytes)	3/23/2007 3:42 PM	Microsoft Corporation	c:\windows\system32\wlnotify.dll
winspool	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	247.00 KB (252,928 bytes)	3/25/2005 6:00 AM	Microsoft Corporation	c:\windows\system32\winspool.drv
mpr	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	115.00 KB (117,760 bytes)	3/23/2007 3:42 PM	Microsoft Corporation	c:\windows\system32\mpr.dll
oleaut32	5.2.3790.3959	1.07 MB (1,121,792 bytes)	3/25/2005 6:00 AM	Microsoft Corporation	c:\windows\system32\oleaut32.dll
comctl32	5.82 (srv03_sp2_rtm.070216-1710)	935.00 KB (957,440 bytes)	2/18/2007 11:24 AM	Microsoft Corporation	c:\windows\winsxs\amd64_microsoft.windows.common-controls_6595b64144ccf1df_5.82.3790.3959_x-ww_ab06deb0\comctl32.dll
uxtheme	6.00.3790.3959 (srv03_sp2_rtm.070216-1710)	494.50 KB (506,368 bytes)	3/23/2007 3:42 PM	Microsoft Corporation	c:\windows\system32\uxtheme.dll
clbcatq	2001.12.4720.3959 (srv03_sp2_rtm.070216-1710)	862.50 KB (883,200 bytes)	3/23/2007 3:42 PM	Microsoft Corporation	c:\windows\system32\clbcatq.dll
comres	2001.12.4720.3959 (srv03_sp2_rtm.070216-1710)	779.50 KB (798,208 bytes)	3/23/2007 3:42 PM	Microsoft Corporation	c:\windows\system32\comres.dll
wbemprox	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	38.00 KB (38,912 bytes)	2/15/2007 10:57 AM	Microsoft Corporation	c:\windows\system32\wbem\wbemprox.dll
wbemcomn	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	518.00 KB (530,432 bytes)	3/23/2007 3:43 PM	Microsoft Corporation	c:\windows\system32\wbem\wbemcomn.dll
xpsp2res	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	2.77 MB (2,899,456 bytes)	3/23/2007 3:42 PM	Microsoft Corporation	c:\windows\system32\xpsp2res.dll
wbemsvc	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	58.00 KB (59,392 bytes)	2/15/2007 10:57 AM	Microsoft Corporation	c:\windows\system32\wbem\wbemsvc.dll
fastprox	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	866.50 KB (887,296 bytes)	3/23/2007 3:43 PM	Microsoft Corporation	c:\windows\system32\wbem\fastprox.dll
msvcp60	7.0.3790.1830 (srv03_sp1_rtm.050324-1447)	919.50 KB (941,568 bytes)	3/25/2005 6:00 AM	Microsoft Corporation	c:\windows\system32\msvcp60.dll
ntdsapi	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	127.50 KB (130,560 bytes)	3/23/2007 3:42 PM	Microsoft Corporation	c:\windows\system32\ntdsapi.dll
dnsapi	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	298.50 KB (305,664 bytes)	3/23/2007 3:42 PM	Microsoft Corporation	c:\windows\system32\dnsapi.dll
services	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	219.00 KB (224,256 bytes)	3/25/2005 6:00 AM	Microsoft Corporation	c:\windows\system32\services.exe
scsvr	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	595.00 KB (609,280 bytes)	3/23/2007 3:42 PM	Microsoft Corporation	c:\windows\system32\scsvr.dll
authz	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	171.00 KB (175,104 bytes)	3/23/2007 3:42 PM	Microsoft Corporation	c:\windows\system32\authz.dll
umpnpgm	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	205.00 KB (209,920 bytes)	3/23/2007 3:42 PM	Microsoft Corporation	c:\windows\system32\umpnpgm.dll
ncobjapi	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	77.50 KB (79,360 bytes)	3/23/2007 3:42 PM	Microsoft Corporation	c:\windows\system32\ncobjapi.dll
eventlog	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	127.50 KB (130,560 bytes)	3/23/2007 3:42 PM	Microsoft Corporation	c:\windows\system32\eventlog.dll
lsass	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	14.00 KB (14,336 bytes)	3/25/2005 6:00 AM	Microsoft Corporation	c:\windows\system32\lsass.exe
lsasrv	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	1.49 MB (1,566,720 bytes)	3/25/2005 6:00 AM	Microsoft Corporation	c:\windows\system32\lsasrv.dll

samsrv	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	1.01 MB	psbase	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	124.00
(1,059,328 bytes)	3/25/2005 6:00 AM Microsoft Corporation		KB (126,976 bytes)	3/23/2007 3:42 PM Microsoft Corporation	
c:\windows\system32\samsrv.dll			c:\windows\system32\psbase.dll		
cryptdll	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	47.00 KB	hnetcfg	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	568.00
(48,128 bytes)	3/23/2007 3:42 PM Microsoft Corporation		KB (581,632 bytes)	3/23/2007 3:42 PM Microsoft Corporation	
c:\windows\system32\cryptdll.dll			c:\windows\system32\hnetcfg.dll		
samlib	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	69.50 KB	wshtcpip	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	29.00 KB
(71,168 bytes)	3/25/2005 6:00 AM Microsoft Corporation		(29,696 bytes)	3/23/2007 3:42 PM Microsoft Corporation	
c:\windows\system32\samlib.dll			c:\windows\system32\wshtcpip.dll		
msprivs	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	47.50 KB	dssenh	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	231.34
(48,640 bytes)	3/25/2005 6:00 AM Microsoft Corporation		KB (236,888 bytes)	3/23/2007 3:42 PM Microsoft Corporation	
c:\windows\system32\msprivs.dll			c:\windows\system32\dssenh.dll		
kerberos	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	706.00	wlbsctrl	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	137.50
KB (722,944 bytes)	3/23/2007 3:42 PM Microsoft Corporation		KB (140,800 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
c:\windows\system32\kerberos.dll			c:\windows\system32\wlbsctrl.dll		
msv1_0	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	253.00	svchost	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	25.00 KB
KB (259,072 bytes)	3/23/2007 3:42 PM Microsoft Corporation		(25,600 bytes)	3/23/2007 3:42 PM Microsoft Corporation	
c:\windows\system32\msv1_0.dll			c:\windows\system32\svchost.exe		
iphlpapi	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	178.50	rpcss	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	819.00
KB (182,784 bytes)	3/23/2007 3:42 PM Microsoft Corporation		KB (838,656 bytes)	3/23/2007 3:42 PM Microsoft Corporation	
c:\windows\system32\iphlpapi.dll			c:\windows\system32\rpcss.dll		
netlogon	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	665.50	ntmarta	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	222.50
KB (681,472 bytes)	3/23/2007 3:42 PM Microsoft Corporation		KB (227,840 bytes)	3/23/2007 3:42 PM Microsoft Corporation	
c:\windows\system32\netlogon.dll			c:\windows\system32\ntmarta.dll		
w32time	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	398.00	wzcsvc	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	644.50
KB (407,552 bytes)	3/23/2007 3:42 PM Microsoft Corporation		KB (659,968 bytes)	3/23/2007 3:42 PM Microsoft Corporation	
c:\windows\system32\w32time.dll			c:\windows\system32\wzcsvc.dll		
schannel	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	248.00	rtutils	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	66.00 KB
KB (253,952 bytes)	3/23/2007 3:42 PM Microsoft Corporation		(67,584 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
c:\windows\system32\schannel.dll			c:\windows\system32\rtutils.dll		
wdigest	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	131.00	wmi	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	5.50 KB
KB (134,144 bytes)	3/23/2007 3:42 PM Microsoft Corporation		(5,632 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
c:\windows\system32\wdigest.dll			c:\windows\system32\wmi.dll		
rassfm	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	36.00 KB	dhcpcsvc	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	220.50
(36,864 bytes)	3/25/2005 6:00 AM Microsoft Corporation		KB (225,792 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
c:\windows\system32\rassfm.dll			c:\windows\system32\dhcpcsvc.dll		
kdcsvc	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	410.00	atl	3.05.2284 96.50 KB (98,816 bytes)	3/25/2005 6:00 AM
KB (419,840 bytes)	3/23/2007 3:43 PM Microsoft Corporation		Microsoft Corporation	c:\windows\system32\atl.dll	
c:\windows\system32\kdcsvc.dll					
ntdsa	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	2.83 MB	rastls	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	238.50
(2,967,040 bytes)	3/23/2007 3:43 PM Microsoft Corporation		KB (244,224 bytes)	3/23/2007 3:42 PM Microsoft Corporation	
c:\windows\system32\ntdsa.dll			c:\windows\system32\rastls.dll		
ntdsatq	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	51.00 KB	cryptui	5.131.3790.3959 (srv03_sp2_rtm.070216-1710)	705.50
(52,224 bytes)	3/25/2005 6:00 AM Microsoft Corporation		KB (722,432 bytes)	3/23/2007 3:42 PM Microsoft Corporation	
c:\windows\system32\ntdsatq.dll			c:\windows\system32\cryptui.dll		
mswsock	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	480.50	mprapi	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	154.50
KB (492,032 bytes)	3/23/2007 3:42 PM Microsoft Corporation		KB (158,208 bytes)	3/23/2007 3:42 PM Microsoft Corporation	
c:\windows\system32\mswsock.dll			c:\windows\system32\mprapi.dll		
esent	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	2.26 MB	activeds	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	348.50
(2,367,488 bytes)	3/23/2007 3:42 PM Microsoft Corporation		KB (356,864 bytes)	3/23/2007 3:42 PM Microsoft Corporation	
c:\windows\system32\esent.dll			c:\windows\system32\activeds.dll		
scecli	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	308.00	adslldpc	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	240.50
KB (315,392 bytes)	3/23/2007 3:42 PM Microsoft Corporation		KB (246,272 bytes)	3/23/2007 3:42 PM Microsoft Corporation	
c:\windows\system32\scecli.dll			c:\windows\system32\adslldpc.dll		
ws03res	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	794.00	credui	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	202.00
KB (813,056 bytes)	3/23/2007 3:42 PM Microsoft Corporation		KB (206,848 bytes)	3/23/2007 3:42 PM Microsoft Corporation	
c:\windows\system32\ws03res.dll			c:\windows\system32\credui.dll		
ipsecsvc	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	361.50	rasapi32	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	410.00
KB (370,176 bytes)	3/23/2007 3:42 PM Microsoft Corporation		KB (419,840 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
c:\windows\system32\ipsecsvc.dll			c:\windows\system32\rasapi32.dll		
oakley	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	385.00	rasman	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	95.50 KB
KB (394,240 bytes)	3/23/2007 3:42 PM Microsoft Corporation		(97,792 bytes)	3/25/2005 6:00 AM Microsoft Corporation	
c:\windows\system32\oakley.dll			c:\windows\system32\rasman.dll		
winipsec	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	52.50 KB	tapi32	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	332.50
(53,760 bytes)	3/23/2007 3:42 PM Microsoft Corporation		KB (340,480 bytes)	3/23/2007 3:42 PM Microsoft Corporation	
c:\windows\system32\winipsec.dll			c:\windows\system32\tapi32.dll		
pstorsvc	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	36.00 KB	raschap	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	141.00
(36,864 bytes)	3/23/2007 3:42 PM Microsoft Corporation		KB (144,384 bytes)	3/23/2007 3:42 PM Microsoft Corporation	
c:\windows\system32\pstorsvc.dll			c:\windows\system32\raschap.dll		

schedsvc	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	308.00 KB (315,392 bytes)	3/23/2007 3:42 PM	Microsoft Corporation	c:\windows\system32\schedsvc.dll
msidle	6.00.3790.1830 (srv03_sp1_rtm.050324-1447)	9.00 KB (9,216 bytes)	3/25/2005 6:00 AM	Microsoft Corporation	c:\windows\system32\msidle.dll
wkssvc	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	221.00 KB (226,304 bytes)	3/23/2007 3:42 PM	Microsoft Corporation	c:\windows\system32\wkssvc.dll
wiarpc	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	57.00 KB (58,368 bytes)	3/23/2007 3:42 PM	Microsoft Corporation	c:\windows\system32\wiarpc.dll
aelupsvc	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	31.50 KB (32,256 bytes)	3/25/2005 6:00 AM	Microsoft Corporation	c:\windows\system32\aelupsvc.dll
apphelp	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	241.00 KB (246,784 bytes)	3/23/2007 3:42 PM	Microsoft Corporation	c:\windows\system32\apphelp.dll
cryptsvc	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	114.00 KB (116,736 bytes)	3/23/2007 3:42 PM	Microsoft Corporation	c:\windows\system32\cryptsvc.dll
certcli	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	371.50 KB (380,416 bytes)	3/23/2007 3:42 PM	Microsoft Corporation	c:\windows\system32\certcli.dll
vssapi	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	1.26 MB (1,320,960 bytes)	3/23/2007 3:43 PM	Microsoft Corporation	c:\windows\system32\vssapi.dll
dmserver	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	36.50 KB (37,376 bytes)	3/23/2007 3:42 PM	Microsoft Corporation	c:\windows\system32\dmserver.dll
es	2001.12.4720.3959 (srv03_sp2_rtm.070216-1710)	357.00 KB (365,568 bytes)	3/23/2007 3:42 PM	Microsoft Corporation	c:\windows\system32\es.dll
pchsvc	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	75.50 KB (77,312 bytes)	3/23/2007 3:43 PM	Microsoft Corporation	c:\windows\pchealth\helpctr\binaries\pchsvc.dll
srvsvc	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	156.50 KB (160,256 bytes)	3/25/2005 6:00 AM	Microsoft Corporation	c:\windows\system32\srvsvc.dll
seclogon	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	27.50 KB (28,160 bytes)	3/23/2007 3:42 PM	Microsoft Corporation	c:\windows\system32\seclogon.dll
sens	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	63.50 KB (65,024 bytes)	3/23/2007 3:42 PM	Microsoft Corporation	c:\windows\system32\sens.dll
trkwks	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	177.50 KB (181,760 bytes)	3/23/2007 3:42 PM	Microsoft Corporation	c:\windows\system32\trkwks.dll
comsvcs	2001.12.4720.3959 (srv03_sp2_rtm.070216-1710)	2.13 MB (2,234,880 bytes)	3/23/2007 3:42 PM	Microsoft Corporation	c:\windows\system32\comsvcs.dll
wmisvc	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	227.50 KB (232,960 bytes)	3/23/2007 3:43 PM	Microsoft Corporation	c:\windows\system32\wbem\wmisvc.dll
wuauerv	5.7.3790.1830 (srv03_sp1_rtm.050324-1447)	12.00 KB (12,288 bytes)	2/15/2007 11:00 AM	Microsoft Corporation	c:\windows\system32\wuauerv.dll
wuaueng	5.7.3790.3959 (srv03_sp2_rtm.070216-1710)	2.16 MB (2,269,184 bytes)	3/23/2007 3:42 PM	Microsoft Corporation	c:\windows\system32\wuaueng.dll
advpack	6.00.3790.3959 (srv03_sp2_rtm.070216-1710)	146.00 KB (149,504 bytes)	3/23/2007 3:42 PM	Microsoft Corporation	c:\windows\system32\advpack.dll
shfolder	6.00.3790.1830 (srv03_sp1_rtm.050324-1447)	34.00 KB (34,816 bytes)	3/25/2005 6:00 AM	Microsoft Corporation	c:\windows\system32\shfolder.dll
winhttp	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	511.50 KB (523,776 bytes)	2/18/2007 11:24 AM	Microsoft Corporation	c:\windows\winsxs\amd64_microsoft.windows.winhttp_6595b64144ccf1df_5.1.3790.3959_x-ww_03aca661\winhttp.dll
cabinet	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	138.50 KB (141,824 bytes)	2/18/2007 10:50 AM	Microsoft Corporation	c:\windows\system32\cabinet.dll
mspatach	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	48.00 KB (49,152 bytes)	3/25/2005 6:00 AM	Microsoft Corporation	c:\windows\system32\mspatach.dll
browser	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	125.50 KB (128,512 bytes)	3/23/2007 3:42 PM	Microsoft Corporation	c:\windows\system32\browser.dll
netrap	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	26.00 KB (26,624 bytes)	3/25/2005 6:00 AM	Microsoft Corporation	c:\windows\system32\netrap.dll
wbemcore	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	1.22 MB (1,282,560 bytes)	3/23/2007 3:43 PM	Microsoft Corporation	c:\windows\system32\wbem\wbemcore.dll
esscli	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	626.50 KB (641,536 bytes)	3/23/2007 3:43 PM	Microsoft Corporation	c:\windows\system32\wbem\esscli.dll
wmiutils	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	171.00 KB (175,104 bytes)	3/23/2007 3:43 PM	Microsoft Corporation	c:\windows\system32\wbem\wmiutils.dll
repdrvfs	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	353.50 KB (361,984 bytes)	3/23/2007 3:43 PM	Microsoft Corporation	c:\windows\system32\wbem\repdrvfs.dll
wmiprvsd	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	743.00 KB (760,832 bytes)	3/23/2007 3:43 PM	Microsoft Corporation	c:\windows\system32\wbem\wmiprvsd.dll
wbemess	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	532.50 KB (545,280 bytes)	3/23/2007 3:43 PM	Microsoft Corporation	c:\windows\system32\wbem\wbemess.dll
ncprov	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	73.00 KB (74,752 bytes)	2/15/2007 10:57 AM	Microsoft Corporation	c:\windows\system32\wbem\ncprov.dll
netman	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	454.50 KB (465,408 bytes)	3/23/2007 3:42 PM	Microsoft Corporation	c:\windows\system32\netman.dll
netshell	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	2.33 MB (2,438,656 bytes)	3/23/2007 3:42 PM	Microsoft Corporation	c:\windows\system32\netshell.dll
clusapi	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	127.00 KB (130,048 bytes)	3/23/2007 3:42 PM	Microsoft Corporation	c:\windows\system32\clusapi.dll
wininet	6.00.3790.3959 (srv03_sp2_rtm.070216-1710)	1.14 MB (1,190,912 bytes)	3/23/2007 3:42 PM	Microsoft Corporation	c:\windows\system32\wininet.dll
wzcsapi	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	50.50 KB (51,712 bytes)	3/23/2007 3:42 PM	Microsoft Corporation	c:\windows\system32\wzcsapi.dll
rasdlg	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	859.50 KB (880,128 bytes)	3/25/2005 6:00 AM	Microsoft Corporation	c:\windows\system32\rasdlg.dll
rasadhlp	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	12.00 KB (12,288 bytes)	3/23/2007 3:42 PM	Microsoft Corporation	c:\windows\system32\rasadhlp.dll
ntlsapi	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	11.00 KB (11,264 bytes)	3/25/2005 6:00 AM	Microsoft Corporation	c:\windows\system32\ntlsapi.dll
xactsrv	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	134.50 KB (137,728 bytes)	3/25/2005 6:00 AM	Microsoft Corporation	c:\windows\system32\xactsrv.dll
spoolsv	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	107.50 KB (110,080 bytes)	3/23/2007 3:42 PM	Microsoft Corporation	c:\windows\system32\spoolsv.exe
spoolss	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	164.00 KB (167,936 bytes)	3/23/2007 3:42 PM	Microsoft Corporation	c:\windows\system32\spoolss.dll
localspl	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	732.50 KB (750,080 bytes)	3/25/2005 6:00 AM	Microsoft Corporation	c:\windows\system32\localspl.dll

cnbjmon	5.2.3790.1224 (dnsvr(skatar).040514-1058)	63.00 KB (64,512 bytes)	3/24/2005 11:15 AM	Microsoft Corporation	c:\windows\system32\cnbjmon.dll
pjlmon	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	25.50 KB (26,112 bytes)	3/24/2005 11:22 AM	Microsoft Corporation	c:\windows\system32\pjlmon.dll
tcpmon	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	90.50 KB (92,672 bytes)	3/23/2007 3:42 PM	Microsoft Corporation	c:\windows\system32\tcpmon.dll
wsnmp32	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	67.50 KB (69,120 bytes)	3/23/2007 3:42 PM	Microsoft Corporation	c:\windows\system32\wsnmp32.dll
tcpmib	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	25.00 KB (25,600 bytes)	3/23/2007 3:42 PM	Microsoft Corporation	c:\windows\system32\tcpmib.dll
wsock32	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	24.50 KB (25,088 bytes)	3/25/2005 6:00 AM	Microsoft Corporation	c:\windows\system32\wsock32.dll
mgmtapi	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	22.50 KB (23,040 bytes)	3/25/2005 6:00 AM	Microsoft Corporation	c:\windows\system32\mgmtapi.dll
snmpapi	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	31.50 KB (32,256 bytes)	3/25/2005 6:00 AM	Microsoft Corporation	c:\windows\system32\snmpapi.dll
usbmon	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	28.50 KB (29,184 bytes)	3/23/2007 3:42 PM	Microsoft Corporation	c:\windows\system32\usbmon.dll
winrrr	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	30.00 KB (30,720 bytes)	3/23/2007 3:42 PM	Microsoft Corporation	c:\windows\system32\winrrr.dll
wshqos	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	33.50 KB (34,304 bytes)	3/25/2005 6:00 AM	Microsoft Corporation	c:\windows\system32\wshqos.dll
win32spl	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	167.00 KB (171,008 bytes)	3/25/2005 6:00 AM	Microsoft Corporation	c:\windows\system32\win32spl.dll
inetpp	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	148.50 KB (152,064 bytes)	3/23/2007 3:42 PM	Microsoft Corporation	c:\windows\system32\inetpp.dll
icmp	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	3.50 KB (3,584 bytes)	3/25/2005 6:00 AM	Microsoft Corporation	c:\windows\system32\icmp.dll
ersvc	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	31.00 KB (31,744 bytes)	3/25/2005 6:00 AM	Microsoft Corporation	c:\windows\system32\ersvc.dll
sqlwriter	2005.090.3042.00	152.36 KB (156,016 bytes)	2/10/2007 10:03 AM	Microsoft Corporation	c:\program files\microsoft sql server\90\shared\sqlwriter.exe
msvcr80	8.00.50727.42	803.50 KB (822,784 bytes)	9/23/2005 12:26 AM	Microsoft Corporation	c:\windows\winsxs\amd64_microsoft.vc80.crt_1fc8b3b9a1e18e3b_8.0.50727.42_x-ww_3fea50ad\msvcr80.dll
sqlwvss	2005.090.3042.00	365.86 KB (374,640 bytes)	2/10/2007 10:03 AM	Microsoft Corporation	c:\program files\microsoft sql server\90\shared\sqlwvss.dll
msvcp80	8.00.50727.42	1.05 MB (1,097,728 bytes)	9/23/2005 12:28 AM	Microsoft Corporation	c:\windows\winsxs\amd64_microsoft.vc80.crt_1fc8b3b9a1e18e3b_8.0.50727.42_x-ww_3fea50ad\msvcp80.dll
termsrv	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	355.50 KB (364,032 bytes)	3/23/2007 3:42 PM	Microsoft Corporation	c:\windows\system32\termsrv.dll
icaapi	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	27.50 KB (28,160 bytes)	2/15/2007 10:57 AM	Microsoft Corporation	c:\windows\system32\icaapi.dll
mstlsapi	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	188.00 KB (192,512 bytes)	3/23/2007 3:42 PM	Microsoft Corporation	c:\windows\system32\mstlsapi.dll
rdpwsx	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	170.13 KB (174,216 bytes)	3/23/2007 3:42 PM	Microsoft Corporation	c:\windows\system32\rdpwsx.dll
rdpsnd	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	25.00 KB (25,600 bytes)	3/25/2005 6:00 AM	Microsoft Corporation	c:\windows\system32\rdpsnd.dll
scredir	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	38.50 KB (39,424 bytes)	3/23/2007 3:42 PM	Microsoft Corporation	c:\windows\system32\scredir.dll
csoui	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	441.00 KB (451,584 bytes)	3/23/2007 3:42 PM	Microsoft Corporation	c:\windows\system32\csoui.dll
msacm32	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	31.00 KB (31,744 bytes)	3/25/2005 6:00 AM	Microsoft Corporation	c:\windows\system32\msacm32.drv
msacm32	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	112.00 KB (114,688 bytes)	3/23/2007 3:42 PM	Microsoft Corporation	c:\windows\system32\msacm32.dll
imaadp32	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	24.00 KB (24,576 bytes)	3/25/2005 6:00 AM	Microsoft Corporation	c:\windows\system32\imaadp32.acm
msadp32	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	23.50 KB (24,064 bytes)	3/25/2005 6:00 AM	Microsoft Corporation	c:\windows\system32\msadp32.acm
msg711	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	13.50 KB (13,824 bytes)	3/25/2005 6:00 AM	Microsoft Corporation	c:\windows\system32\msg711.acm
msgsm32	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	34.50 KB (35,328 bytes)	3/25/2005 6:00 AM	Microsoft Corporation	c:\windows\system32\msgsm32.acm
tssoft32	1.01	13.50 KB (13,824 bytes)	3/25/2005 6:00 AM	DSP GROUP, INC.	c:\windows\system32\tssoft32.acm
tsd32	1.03	24.50 KB (25,088 bytes)	3/25/2005 6:00 AM	DSP GROUP, INC.	c:\windows\system32\tsd32.dll
printui	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	928.00 KB (950,272 bytes)	3/25/2005 6:00 AM	Microsoft Corporation	c:\windows\system32\printui.dll
cfgmgr32	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	18.00 KB (18,432 bytes)	3/25/2005 6:00 AM	Microsoft Corporation	c:\windows\system32\cfgmgr32.dll
rdpclip	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	99.00 KB (101,376 bytes)	3/23/2007 3:42 PM	Microsoft Corporation	c:\windows\system32\rdpclip.exe
urlmon	6.00.3790.3959 (srv03_sp2_rtm.070216-1710)	1.04 MB (1,088,000 bytes)	3/23/2007 3:42 PM	Microsoft Corporation	c:\windows\system32\urlmon.dll
explorer	6.00.3790.3959 (srv03_sp2_rtm.070216-1710)	1.30 MB (1,364,480 bytes)	3/23/2007 3:43 PM	Microsoft Corporation	c:\windows\explorer.exe
browseui	6.00.3790.3959 (srv03_sp2_rtm.070216-1710)	1.53 MB (1,605,120 bytes)	3/23/2007 3:42 PM	Microsoft Corporation	c:\windows\system32\browseui.dll
shdocvw	6.00.3790.3959 (srv03_sp2_rtm.070216-1710)	2.33 MB (2,438,144 bytes)	3/23/2007 3:42 PM	Microsoft Corporation	c:\windows\system32\shdocvw.dll
themeui	6.00.3790.3959 (srv03_sp2_rtm.070216-1710)	531.50 KB (544,256 bytes)	3/23/2007 3:42 PM	Microsoft Corporation	c:\windows\system32\themeui.dll
msimg32	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	6.50 KB (6,656 bytes)	3/25/2005 6:00 AM	Microsoft Corporation	c:\windows\system32\msimg32.dll
linkinfo	5.2.3790.3959 (srv03_sp2_rtm.070216-1710)	31.00 KB (31,744 bytes)	3/23/2007 3:42 PM	Microsoft Corporation	c:\windows\system32\linkinfo.dll
ntshrui	6.00.3790.3959 (srv03_sp2_rtm.070216-1710)	184.00 KB (188,416 bytes)	3/23/2007 3:42 PM	Microsoft Corporation	c:\windows\system32\ntshrui.dll

webcheck 6.00.3790.3959 (srv03_sp2_rtm.070216-1710) 438.50 KB (449,024 bytes) 3/23/2007 3:42 PM Microsoft Corporation c:\windows\system32\webcheck.dll	c:\program files\microsoft sql server\mssql.1\mssql\binn\sqlos.dll
stobject 5.2.3790.3959 (srv03_sp2_rtm.070216-1710) 142.50 KB (145,920 bytes) 3/23/2007 3:42 PM Microsoft Corporation c:\windows\system32\stobject.dll	mscoree 2.0.50727.42 (RTM.050727-4200) 441.00 KB (451,584 bytes) 9/23/2005 12:37 AM Microsoft Corporation c:\windows\system32\mscoree.dll
batmeter 6.00.3790.3959 (srv03_sp2_rtm.070216-1710) 41.50 KB (42,496 bytes) 3/23/2007 3:42 PM Microsoft Corporation c:\windows\system32\batmeter.dll	xolehlp 2001.12.4720.3959 (srv03_sp2_rtm.070216-1710) 10.50 KB (10,752 bytes) 3/23/2007 3:42 PM Microsoft Corporation c:\windows\system32\xolehlp.dll
powrprof 6.00.3790.1830 (srv03_sp1_rtm.050324-1447) 32.50 KB (33,280 bytes) 3/25/2005 6:00 AM Microsoft Corporation c:\windows\system32\powrprof.dll	msdtcprx 2001.12.4720.3959 (srv03_sp2_rtm.070216-1710) 814.00 KB (833,536 bytes) 3/23/2007 3:42 PM Microsoft Corporation c:\windows\system32\msdtcprx.dll
drprov 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 24.00 KB (24,576 bytes) 3/25/2005 6:00 AM Microsoft Corporation c:\windows\system32\drprov.dll	mtxclu 2001.12.4720.3959 (srv03_sp2_rtm.070216-1710) 142.00 KB (145,408 bytes) 3/23/2007 3:42 PM Microsoft Corporation c:\windows\system32\mtxclu.dll
ntlanman 5.2.3790.3959 (srv03_sp2_rtm.070216-1710) 72.00 KB (73,728 bytes) 3/23/2007 3:42 PM Microsoft Corporation c:\windows\system32\ntlanman.dll	resutils 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 98.50 KB (100,864 bytes) 3/25/2005 6:00 AM Microsoft Corporation c:\windows\system32\resutils.dll
netui0 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 130.00 KB (133,120 bytes) 3/25/2005 6:00 AM Microsoft Corporation c:\windows\system32\netui0.dll	security 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 6.00 KB (6,144 bytes) 3/25/2005 6:00 AM Microsoft Corporation c:\windows\system32\security.dll
netui1 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 338.50 KB (346,624 bytes) 3/25/2005 6:00 AM Microsoft Corporation c:\windows\system32\netui1.dll	msfte 12.0.6828.0 3.63 MB (3,804,952 bytes) 8/28/2006 5:17 AM Microsoft Corporation c:\program files\microsoft sql server\mssql.1\mssql\binn\msfte.dll
davclnt 5.2.3790.3959 (srv03_sp2_rtm.070216-1710) 39.50 KB (40,448 bytes) 3/23/2007 3:42 PM Microsoft Corporation c:\windows\system32\davclnt.dll	dbghelp 6.6.0007.5 (debuggers\dbg).051022-1733) 1.27 MB (1,329,520 bytes) 2/10/2007 9:56 AM Microsoft Corporation c:\program files\microsoft sql server\90\shared\dbghelp.dll
browsecl 6.00.3790.1830 (srv03_sp1_rtm.050324-1447) 63.00 KB (64,512 bytes) 3/25/2005 6:00 AM Microsoft Corporation c:\windows\system32\browsecl.dll	sqlncli 2005.090.3042.00 2.74 MB (2,868,592 bytes) 2/10/2007 10:03 AM Microsoft Corporation c:\windows\system32\sqlncli.dll
shdoclc 6.00.3790.1830 (srv03_sp1_rtm.050324-1447) 589.50 KB (603,648 bytes) 3/25/2005 6:00 AM Microsoft Corporation c:\windows\system32\shdoclc.dll	sqlnclir 2005.090.1399.00 201.21 KB (206,040 bytes) 10/14/2005 3:31 PM Microsoft Corporation c:\windows\system32\sqlnclir.rll
mydocs 6.00.3790.3959 (srv03_sp2_rtm.070216-1710) 101.00 KB (103,424 bytes) 3/25/2005 6:00 AM Microsoft Corporation c:\windows\system32\mydocs.dll	sendmail 6.00.3790.3959 (srv03_sp2_rtm.070216-1710) 64.00 KB (65,536 bytes) 3/25/2005 6:00 AM Microsoft Corporation c:\windows\system32\sendmail.dll
zipfldr 6.00.3790.3959 (srv03_sp2_rtm.070216-1710) 449.50 KB (460,288 bytes) 3/25/2005 6:00 AM Microsoft Corporation c:\windows\system32\zipfldr.dll	taskmgr 5.2.3790.3959 (srv03_sp2_rtm.070216-1710) 231.50 KB (237,056 bytes) 3/25/2005 6:00 AM Microsoft Corporation c:\windows\system32\taskmgr.exe
mlang 6.00.3790.3959 (srv03_sp2_rtm.070216-1710) 686.00 KB (702,464 bytes) 3/25/2005 6:00 AM Microsoft Corporation c:\windows\system32\mlang.dll	utildll 5.2.3790.3959 (srv03_sp2_rtm.070216-1710) 37.00 KB (37,888 bytes) 3/25/2005 6:00 AM Microsoft Corporation c:\windows\system32\utildll.dll
wshext 5.6.0.8832 80.00 KB (81,920 bytes) 3/25/2005 6:00 AM Microsoft Corporation c:\windows\system32\wshext.dll	cmd 5.2.3790.3959 (srv03_sp2_rtm.070216-1710) 538.00 KB (550,912 bytes) 3/25/2005 6:00 AM Microsoft Corporation c:\windows\system32\cmd.exe
comdlg32 6.00.3790.3959 (srv03_sp2_rtm.070216-1710) 447.00 KB (457,728 bytes) 3/25/2005 6:00 AM Microsoft Corporation c:\windows\system32\comdlg32.dll	regedit 5.2.3790.3959 (srv03_sp2_rtm.070216-1710) 219.50 KB (224,768 bytes) 3/25/2005 6:00 AM Microsoft Corporation c:\windows\regedit.exe
actxprxy 6.00.3790.3959 (srv03_sp2_rtm.070216-1710) 220.50 KB (225,792 bytes) 3/23/2007 3:42 PM Microsoft Corporation c:\windows\system32\actxprxy.dll	aclui 5.2.3790.3959 (srv03_sp2_rtm.070216-1710) 176.50 KB (180,736 bytes) 3/25/2005 6:00 AM Microsoft Corporation c:\windows\system32\aclui.dll
sqlservr 2005.090.3042.00 36.72 MB (38,507,376 bytes) 2/10/2007 10:03 AM Microsoft Corporation c:\program files\microsoft sql server\mssql.1\mssql\binn\sqlservr.exe	ulib 5.2.3790.3959 (srv03_sp2_rtm.070216-1710) 343.00 KB (351,232 bytes) 3/25/2005 6:00 AM Microsoft Corporation c:\windows\system32\ulib.dll
opens60 2005.090.1399.00 22.21 KB (22,744 bytes) 10/14/2005 3:31 PM Microsoft Corporation c:\program files\microsoft sql server\mssql.1\mssql\binn\opens60.dll	clb 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 17.00 KB (17,408 bytes) 3/25/2005 6:00 AM Microsoft Corporation c:\windows\system32\clb.dll
instapi 2005.090.1399.00 40.71 KB (41,688 bytes) 10/14/2005 3:23 PM Microsoft Corporation c:\program files\microsoft sql server\90\shared\instapi.dll	helpctr 5.2.3790.3959 (srv03_sp2_rtm.070216-1710) 1.30 MB (1,363,456 bytes) 2/15/2007 11:00 AM Microsoft Corporation c:\windows\pchealth\helpctr\binaries\helpctr.exe
sqllevn70 2005.090.3042.00 1.66 MB (1,740,656 bytes) 2/10/2007 10:02 AM Microsoft Corporation c:\program files\microsoft sql server\mssql.1\mssql\binn\resources\1033\sqllevn70.rll	hcappres 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 7.50 KB (7,680 bytes) 2/15/2007 11:00 AM Microsoft Corporation c:\windows\pchealth\helpctr\binaries\hcappres.dll
sqlos 2005.090.3042.00 17.86 KB (18,288 bytes) 2/10/2007 10:03 AM Microsoft Corporation	itss 5.2.3790.3959 (srv03_sp2_rtm.070216-1710) 208.50 KB (213,504 bytes) 3/25/2005 6:00 AM Microsoft Corporation c:\windows\system32\itss.dll
	msxml3 8.80.1185.0 2.04 MB (2,144,256 bytes) 3/23/2007 3:42 PM Microsoft Corporation c:\windows\system32\msxml3.dll

pchshell 5.2.3790.3959 (srv03_sp2_rtm.070216-1710) 155.00 KB (158,720 bytes) 2/15/2007 11:00 AM Microsoft Corporation c:\windows\pchealth\helpctr\binaries\pchshell.dll

mshtml 6.00.3790.3959 (srv03_sp2_rtm.070216-1710) 5.72 MB (5,999,616 bytes) 3/25/2005 6:00 AM Microsoft Corporation c:\windows\system32\mshtml.dll

msls31 3.10.349.0 357.00 KB (365,568 bytes) 3/25/2005 6:00 AM Microsoft Corporation c:\windows\system32\msls31.dll

msimtf 5.2.3790.3959 (srv03_sp2_rtm.070216-1710) 380.50 KB (389,632 bytes) 3/25/2005 6:00 AM Microsoft Corporation c:\windows\system32\msimtf.dll

msctf 5.2.3790.3959 (srv03_sp2_rtm.070216-1710) 617.50 KB (632,320 bytes) 3/25/2005 6:00 AM Microsoft Corporation c:\windows\system32\msctf.dll

jscript 5.6.0.8832 976.00 KB (999,424 bytes) 3/25/2005 6:00 AM Microsoft Corporation c:\windows\system32\jscript.dll

imm32 5.2.3790.3959 (srv03_sp2_rtm.070216-1710) 208.00 KB (212,992 bytes) 3/23/2007 3:42 PM Microsoft Corporation c:\windows\system32\imm32.dll

mshtml 6.00.3790.3959 (srv03_sp2_rtm.070216-1710) 905.50 KB (927,232 bytes) 3/25/2005 6:00 AM Microsoft Corporation c:\windows\system32\mshtml.dll

vbscript 5.6.0.8832 647.00 KB (662,528 bytes) 3/25/2005 6:00 AM Microsoft Corporation c:\windows\system32\vbscript.dll

msinfo 5.2.3790.3959 (srv03_sp2_rtm.070216-1710) 635.50 KB (650,752 bytes) 2/15/2007 11:00 AM Microsoft Corporation c:\windows\pchealth\helpctr\binaries\msinfo.dll

mfc42u 6.50.9146.0 1.39 MB (1,460,992 bytes) 3/25/2005 6:00 AM Microsoft Corporation c:\windows\system32\mfc42u.dll

riched32 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 7.00 KB (7,168 bytes) 3/25/2005 6:00 AM Microsoft Corporation c:\windows\system32\riched32.dll

riched20 5.31.23.1225 1.11 MB (1,160,192 bytes) 3/25/2005 6:00 AM Microsoft Corporation c:\windows\system32\riched20.dll

helpsvc 5.2.3790.3959 (srv03_sp2_rtm.070216-1710) 1.52 MB (1,591,296 bytes) 2/15/2007 11:00 AM Microsoft Corporation c:\windows\pchealth\helpctr\binaries\helpsvc.exe

[Services]

Display Name	Name	State	Start Mode	Service Type	Type
Path	Error Control		Start Name	Tag ID	
Application Experience Lookup Service	AeLookupSvc	Running			
Auto Share Process					
c:\windows\system32\svchost.exe -k netsvcs	Normal				
LocalSystem	0				
Alerter	Alerter	Stopped	Disabled	Share Process	Normal
c:\windows\system32\svchost.exe -k localservice					
NT AUTHORITY\LocalService	0				
Application Layer Gateway Service	ALG	Stopped	Manual		
Own Process					
c:\windows\system32\alg.exe					
NT AUTHORITY\LocalService	0				
Application Management Process	AppMgmt	Stopped	Manual	Share	
c:\windows\system32\svchost.exe -k netsvcs	Normal				
LocalSystem	0				
ASP.NET State Service	aspnet_state	Stopped	Manual		
Own Process					
c:\windows\microsoft.net\framework64\v2.0.50727\aspnet_state.exe					
Normal	NT AUTHORITY\NetworkService	0			
Windows Audio	AudioSrv	Stopped	Disabled	Share Process	
c:\windows\system32\svchost.exe -k netsvcs	Normal				
LocalSystem	0				

Background Intelligent Transfer Service BITS Stopped Manual

Share Process c:\windows\system32\svchost.exe -k

netsh Normal LocalSystem 0

Computer Browser Browser Running Auto Share Process

c:\windows\system32\svchost.exe -k netsvcs Normal

LocalSystem 0

Indexing Service CiSvc Stopped Disabled Share Process

c:\windows\system32\cisvc.exe Normal LocalSystem

0

ClipBook ClipSrv Stopped Disabled Own Process

c:\windows\system32\clipsrv.exe Normal LocalSystem

0

.NET Runtime Optimization Service v2.0.50727_X86

clr_optimization_v2.0.50727_32 Stopped Manual Own

Process c:\windows\microsoft.net\framework\v2.0.50727\mscorsvw.exe

Ignore LocalSystem 0

.NET Runtime Optimization Service v2.0.50727_x64

clr_optimization_v2.0.50727_64 Stopped Manual Own

Process

c:\windows\microsoft.net\framework64\v2.0.50727\mscorsvw.exe

Ignore LocalSystem 0

COM+ System Application COMSysApp Stopped Manual

Own Process c:\windows\system32\dllhost.exe

/processid:{02d4b3f1-fd88-11d1-960d-00805fc79235} Normal

LocalSystem 0

Cryptographic Services CryptSvc Running Auto Share

Process c:\windows\system32\svchost.exe -k netsvcs Normal

LocalSystem 0

DCOM Server Process Launcher DcomLaunch Running Auto

Share Process c:\windows\system32\svchost.exe -k

dcomlaunch Normal LocalSystem 0

Distributed File System Dfs Stopped Manual Own

Process c:\windows\system32\dfssvc.exe Normal LocalSystem

0

DHCP Client Dhcp Running Auto Share Process

c:\windows\system32\svchost.exe -k networkservice Normal

NT AUTHORITY\NetworkService 0

Logical Disk Manager Administrative Service dmadmin Stopped

Manual Share Process

c:\windows\system32\dmadmin.exe /com Normal

LocalSystem 0

Logical Disk Managerdmsrvr Running Auto Share Process

c:\windows\system32\svchost.exe -k netsvcs Normal

LocalSystem 0

DNS Client Dnscache Running Auto Share Process

c:\windows\system32\svchost.exe -k networkservice Normal

NT AUTHORITY\NetworkService 0

Error Reporting Service ERSvc Running Auto Share

Process c:\windows\system32\svchost.exe -k winerr Ignore

LocalSystem 0

Event Log Eventlog Running Auto Share Process

c:\windows\system32\services.exe Normal

LocalSystem 0

COM+ Event System EventSystem Running Auto Share

Process c:\windows\system32\svchost.exe -k netsvcs Normal

LocalSystem 0

Help and Support helpsvc Running Auto Share Process

c:\windows\system32\svchost.exe -k netsvcs Normal

LocalSystem 0

Human Interface Device Access HidServ Stopped Disabled Share

Process c:\windows\system32\svchost.exe -k netsvcs Normal

LocalSystem 0

HTTP SSLHTTPFilter Stopped Manual Share Process

c:\windows\system32\lsass.exe Normal LocalSystem

0

IAS Jet Database Access IASJet Stopped Manual Share

Process c:\windows\syswow64\svchost.exe -k iasjet Normal

LocalSystem 0

IMAPI CD-Burning COM Service	ImapiService	Stopped	Disabled	Own Process	c:\windows\system32\imapi.exe	Office Source Engine	ose	Stopped	Manual	Own Process
Normal	LocalSystem	0				"c:\program files (x86)\common files\microsoft shared\source engine\ose.exe"	Normal	LocalSystem	0	
Intersite Messaging	IsmServ	Stopped	Disabled	Own Process	c:\windows\system32\ismserv.exe	Plug and Play	PlugPlay	Running	Auto	Share Process
LocalSystem	0			Normal		c:\windows\system32\services.exe	LocalSystem	0		Normal
Kerberos Key Distribution Center	kdc	Stopped	Disabled	Share Process	c:\windows\system32\lsass.exe	IPSEC Services	PolicyAgent	Running	Auto	Share
LocalSystem	0			Normal		Process	c:\windows\system32\lsass.exe	Normal	LocalSystem	0
Server	lanmanserver	Running	Auto	Share Process	c:\windows\system32\svchost.exe -k netsvcs	Protected Storage	ProtectedStorage	Running	Auto	Share
LocalSystem	0			Normal		Process	c:\windows\system32\lsass.exe	Normal	LocalSystem	0
Workstation	lanmanworkstation	Running	Auto	Share	c:\windows\system32\svchost.exe -k netsvcs	Remote Access Auto Connection Manager	RasAuto	Stopped	Manual	
Process	LocalSystem	0		Normal		Share Process	c:\windows\system32\svchost.exe -k netsvcs	Normal	LocalSystem	0
License Logging	LicenseService	Stopped	Disabled	Own	c:\windows\system32\llsrv.exe	Remote Access Connection Manager	RasMan	Stopped	Manual	
Process	NT AUTHORITY\NetworkService	0		NT		Share Process	c:\windows\system32\svchost.exe -k netsvcs	Normal	LocalSystem	0
TCP/IP NetBIOS Helper	LmHosts	Running	Auto	Share	c:\windows\system32\svchost.exe -k localservice	Remote Desktop Help Session Manager	RDSessMgr		Stopped	
Process	NT AUTHORITY\LocalService	0		Normal		Manual	Own Process	c:\windows\system32\sessmgr.exe	Normal	
Messenger Messenger	Stopped	Disabled	Share Process		c:\windows\system32\svchost.exe -k netsvcs	Routing and Remote Access	RemoteAccess	Stopped	Disabled	
LocalSystem	0			Normal		Share Process	c:\windows\system32\svchost.exe -k netsvcs	Normal	LocalSystem	0
NetMeeting Remote Desktop Sharing	mnmsrv	Stopped	Disabled	Own Process	c:\windows\system32\mnmsrv.exe	Remote Registry	RemoteRegistry	Running	Auto	Share
Normal	LocalSystem	0				Process	c:\windows\system32\svchost.exe -k regsvc	Normal	NT	
Distributed Transaction Coordinator	MSDTC	Stopped	Manual	Own Process	c:\windows\system32\msdtc.exe	Remote Procedure Call (RPC) Locator	RpcLocator		Stopped	
NT AUTHORITY\NetworkService	0			Normal		Manual	Own Process	c:\windows\system32\locator.exe	Normal	NT
SQL Server FullText Search (MSSQLSERVER)	msftesql	Stopped	Disabled	Own Process	"c:\program files\microsoft sql server\mssql.1\mssql\bin\msftesql.exe" -s:mssql.1 -f:mssqlserver	Remote Procedure Call (RPC) Authority\NetworkService	RpcSs	Running	Auto	Share
NT AUTHORITY\NetworkService	0			Normal		Process	c:\windows\system32\svchost.exe -k rpcss	Normal	NT	
Windows Installer	MSIServer	Stopped	Manual	Share Process	c:\windows\system32\msiexec.exe /v	Resultant Set of Policy Provider	RSOPProv	Stopped	Manual	Share
LocalSystem	0			Normal		Process	c:\windows\system32\rsopprov.exe	LocalSystem	0	Normal
SQL Server (MSSQLSERVER)	MSSQLSERVER	Stopped	Manual	Own Process	"c:\program files\microsoft sql server\mssql.1\mssql\bin\sqlservr.exe" -smssqlserver	Special Administration Console Helper	sacsvr	Stopped	Manual	
LocalSystem	0			Normal		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"	Security Accounts Manager	SamSs	Running	Auto	Share
NT AUTHORITY\NetworkService	0			Normal		Process	c:\windows\system32\lsass.exe	Normal	LocalSystem	0
Network DDE	NetDDE	Stopped	Disabled	Share Process	c:\windows\system32\netdde.exe	Smart Card	SCardSvr	Stopped	Manual	Share Process
LocalSystem	0			Normal		c:\windows\system32\scardsvr.exe	LocalSystem	0		Ignore
Network DDE DSDM	NetDDEdsdm	Stopped	Disabled	Share	c:\windows\system32\netdde.exe	Task Scheduler	Schedule	Running	Auto	Share Process
Process	LocalSystem	0		Normal		c:\windows\system32\svchost.exe -k netsvcs	LocalSystem	0		Normal
Net Logon	Netlogon	Stopped	Manual	Share Process	c:\windows\system32\lsass.exe	Secondary Logon	seclogon	Running	Auto	Share Process
LocalSystem	0			Normal		LocalSystem	0			Ignore
Network Connections	Netman	Running	Manual	Share Process	c:\windows\system32\svchost.exe -k netsvcs	System Event Notification	SENS	Running	Auto	Share
LocalSystem	0			Normal		Process	c:\windows\system32\svchost.exe -k netsvcs	LocalSystem	0	Normal
Network Location Awareness (NLA)	Nla	Running	Manual	Share Process	c:\windows\system32\svchost.exe -k netsvcs	Windows Firewall/Internet Connection Sharing (ICS)	SharedAccess	Stopped	Disabled	Share Process
LocalSystem	0			Normal		LocalSystem	0			Normal
File Replication	NtFrs	Stopped	Manual	Own Process	c:\windows\system32\ntfrs.exe	Shell Hardware Detection	ShellHWDetection	Running	Auto	
LocalSystem	0			Ignore		Share Process	c:\windows\system32\svchost.exe -k netsvcs	Ignore	LocalSystem	0
NT LM Security Support Provider	NtLmSsp	Stopped	Manual	Share Process	c:\windows\system32\lsass.exe	Print Spooler	Spooler	Running	Auto	Own Process
LocalSystem	0			Normal		c:\windows\system32\spoolsv.exe	LocalSystem	0		Normal
Removable Storage	NtmsSvc	Stopped	Manual	Share Process	c:\windows\system32\svchost.exe -k netsvcs	SQL Server Browser	SQLBrowser	Stopped	Disabled	Own
LocalSystem	0			Normal		Process	"c:\program files (x86)\microsoft sql server\90\shared\sqlbrowser.exe"	Normal	NT AUTHORITY\LocalService	0

SQL Server Agent (MSSQLSERVER)	SQLSERVERAGENT	Stopped	Manual	Own Process	"c:\program files\microsoft sql server\mssql.1\mssql\bin\sqlagent90.exe" -i mssqlserver	WMI Performance Adapter	WmiApSrv	Stopped	Manual	c:\windows\system32\wbem\wmiapsrv.exe
SQL Server VSS Writer	SQLWriter	Running	Auto	Own Process	"c:\program files\microsoft sql server\90\shared\sqlwriter.exe"	Automatic Updates	wuauserv	Running	Auto	Share Process
Windows Image Acquisition (WIA)	stisvc	Stopped	Disabled	Share Process	c:\windows\system32\svchost.exe -k	Wireless Configuration	WZCSVC	Running	Auto	Share
imgsvc	Normal	NT AUTHORITY\LocalSystem	0	Microsoft Software Shadow Copy Provider	swprv	Network Provisioning Service	xmlprov	Stopped	Manual	Share
Microsoft Software Shadow Copy Provider	swprv	Stopped	Manual	Own Process	c:\windows\system32\svchost.exe -k swprv	Process	c:\windows\system32\svchost.exe -k netsvcs	Normal	LocalSystem	0
Performance Logs and Alerts	SysmonLog	Stopped	Auto	Own Process	c:\windows\system32\smlogsvc.exe	[Program Groups]				
Telephony TapiSrv	Stopped	Manual	Share Process	Normal	c:\windows\system32\svchost.exe -k tapisrv	Group Name	Name	User Name		
Terminal Services	TermService	Running	Manual	Share	c:\windows\system32\svchost.exe -k termsvcs	Accessories	Default User:Accessories	Default User		
Themes	Themes	Stopped	Disabled	Share Process	c:\windows\system32\svchost.exe -k netsvcs	Accessories\Accessibility	Default User:Accessories\Accessibility	Default User		
Telnet	TlntSvr	Stopped	Disabled	Own Process	c:\windows\system32\tlntsvr.exe	Accessories\Entertainment	Default User:Accessories\Entertainment	Default User		
AUTHORITY\LocalService	0	Distributed Link Tracking Server	TrkSvr	Stopped	Disabled	Startup	Default User:Startup	Default User		
Distributed Link Tracking Client	TrkWks	Running	Auto	Share	c:\windows\system32\svchost.exe -k netsvcs	Accessories	All Users:Accessories	All Users		
Terminal Services Session Directory	Tssdis	Stopped	Disabled	Own Process	c:\windows\system32\tssdis.exe	Accessories\Accessibility	All Users:Accessories\Accessibility	All Users		
Windows User Mode Driver Framework	UMWdf	Stopped	Manual	Own Process	c:\windows\system32\wdfmgr.exe	Accessories\Communications	All Users:Accessories\Communications	All Users		
Uninterruptible Power Supply	UPS	Stopped	Manual	Own Process	c:\windows\system32\ups.exe	Accessories\Entertainment	All Users:Accessories\Entertainment	All Users		
Virtual Disk Service	vds	Stopped	Manual	Own Process	c:\windows\system32\vds.exe	Accessories\System Tools	All Users:Accessories\System Tools	All Users		
Volume Shadow Copy	VSS	Stopped	Manual	Own Process	c:\windows\system32\vssvc.exe	Administrative Tools	All Users:Administrative Tools	All Users		
Windows Time	W32Time	Running	Auto	Share Process	c:\windows\system32\svchost.exe -k localservice	HP System Tools	All Users:HP System Tools	All Users		
WebClient	WebClient	Stopped	Disabled	Share Process	c:\windows\system32\svchost.exe -k localservice	HP System Tools\HP Array Configuration Utility	All Users:HP System Tools\HP Array Configuration Utility	All Users		
WinHTTP	Web Proxy Auto-Discovery Service	WinHttpAutoProxySvc	Stopped	Manual	Share	Microsoft SQL Server 2005	All Users:Microsoft SQL Server 2005	All Users		
Windows Management Instrumentation	winmgmt	Running	Auto	Share Process	c:\windows\system32\svchost.exe -k	Microsoft SQL Server 2005\Analysis Services	All Users:Microsoft SQL Server 2005\Analysis Services	All Users		
Portable Media Serial Number Service	WmdmPmSN	Stopped	Manual	Share Process	c:\windows\system32\svchost.exe -k netsvcs	Microsoft SQL Server 2005\Configuration Tools	All Users:Microsoft SQL Server 2005\Configuration Tools	All Users		
Windows Management Instrumentation Driver Extensions	Wmi	Stopped	Manual	Share Process	c:\windows\system32\svchost.exe -k netsvcs	Microsoft SQL Server 2005\Documentation and Tutorials	All Users:Microsoft SQL Server 2005\Documentation and Tutorials	All Users		
						Microsoft SQL Server 2005\Documentation and Tutorials\Tutorials	All Users:Microsoft SQL Server 2005\Documentation and Tutorials\Tutorials	All Users		
						Microsoft SQL Server 2005\Performance Tools	All Users:Microsoft SQL Server 2005\Performance Tools	All Users		
						Microsoft Visual Studio 2005	All Users:Microsoft Visual Studio 2005	All Users		
						Microsoft Visual Studio 2005\Visual Studio Tools	All Users:Microsoft Visual Studio 2005\Visual Studio 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	DELLSEYE\Administrator:Accessories	DELLSEYE\Administrator		
						Accessories\Accessibility	DELLSEYE\Administrator:Accessories\Accessibility	DELLSEYE\Administrator		

Accessories\Entertainment
 DELLSEYE\Administrator:Accessories\Entertainment
 DELLSEYE\Administrator
 Administrative Tools DELLSEYE\Administrator:Administrative Tools
 DELLSEYE\Administrator
 Iometer 2004.07.30 DELLSEYE\Administrator:Iometer 2004.07.30
 DELLSEYE\Administrator
 Startup DELLSEYE\Administrator:Startup
 DELLSEYE\Administrator

[Startup Programs]

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

[OLE Registration]

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

[Windows Error Reporting]

Time	Type	Details

[Internet Settings]

[Internet Explorer]

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

Item	Value
Version	6.0.3790.3959
Build	63790.3959
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	6.0.3790.3959	221 KB	2/17/2007 1:02:52 AM	C:\WINDOWS\system32	Microsoft Corporation
advpack.dll	6.0.3790.3959	146 KB	2/17/2007 1:03:10 AM	C:\WINDOWS\system32	Microsoft Corporation
asctrls.ocx	6.0.3790.1830	147 KB	3/25/2005 7:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
browsecl.dll	6.0.3790.1830	63 KB	3/25/2005 7:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation

browseui.dll	6.0.3790.3959	1,568 KB	2/17/2007 1:05:24 AM	C:\WINDOWS\system32	Microsoft Corporation
cdfview.dll	6.0.3790.3959	216 KB	2/17/2007 1:05:40 AM	C:\WINDOWS\system32	Microsoft Corporation
comctl32.dll	5.82.3790.3959	935 KB	2/17/2007 1:09:08 AM	C:\WINDOWS\system32	Microsoft Corporation
dxtrans.dll	6.3.3790.3959	325 KB	2/17/2007 1:18:34 AM	C:\WINDOWS\system32	Microsoft Corporation
dxtrans.dll	6.3.3790.3959	549 KB	2/17/2007 1:18:32 AM	C:\WINDOWS\system32	Microsoft Corporation
iecont.dll	<File Missing>	Not Available	Not Available		
iecont.dll	<File Missing>	Not Available	Not Available		
iedkcs32.dll	16.0.3790.3959	417 KB	2/17/2007 1:29:36 AM	C:\WINDOWS\system32	Microsoft Corporation
iepeers.dll	6.0.3790.3959	362 KB	2/17/2007 1:29:38 AM	C:\WINDOWS\system32	Microsoft Corporation
iesetup.dll	6.0.3790.1830	71 KB	3/25/2005 7:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
ieuinit.inf	Not Available	24 KB	3/25/2005 7:00:00 AM	C:\WINDOWS\system32	Not Available
ieexplore.exe	6.0.3790.1830	94 KB	3/25/2005 7:00:00 AM	C:\Program Files\Internet Explorer	Microsoft Corporation
imgutil.dll	6.0.3790.3959	61 KB	2/17/2007 1:30:36 AM	C:\WINDOWS\system32	Microsoft Corporation
inetctl.cpl	6.0.3790.3959	431 KB	2/17/2007 1:30:40 AM	C:\WINDOWS\system32	Microsoft Corporation
inetctl.dll	6.0.3790.1830	110 KB	3/25/2005 7:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
inseng.dll	6.0.3790.3959	147 KB	2/17/2007 1:30:52 AM	C:\WINDOWS\system32	Microsoft Corporation
mlang.dll	6.0.3790.3959	686 KB	2/17/2007 1:36:42 AM	C:\WINDOWS\system32	Microsoft Corporation
msencode.dll	<File Missing>	Not Available	Not Available		
mshta.exe	6.0.3790.1830	38 KB	3/25/2005 7:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
mshtml.dll	6.0.3790.3959	5,859 KB	2/17/2007 1:38:38 AM	C:\WINDOWS\system32	Microsoft Corporation
mshtml.tlb	6.0.3790.1830	1,320 KB	3/25/2005 7:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
mshtml.dll	6.0.3790.3959	906 KB	2/17/2007 1:38:42 AM	C:\WINDOWS\system32	Microsoft Corporation
mshtml.dll	6.0.3790.1830	56 KB	3/25/2005 7:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
msident.dll	6.0.3790.1830	69 KB	3/25/2005 7:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation

msidntld.dll	6.0.3790.1830	16 KB	3/25/2005 7:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation	Proxy Disabled	
msieftp.dll	6.0.3790.3959	369 KB	2/17/2007 1:38:50 AM	C:\WINDOWS\system32	Microsoft Corporation	ProxyServer ProxyOverride	
msrating.dll	6.0.3790.3959	240 KB	2/17/2007 1:39:20 AM	C:\WINDOWS\system32	Microsoft Corporation	[Cache]	
mstime.dll	6.0.3790.3959	880 KB	2/17/2007 1:39:26 AM	C:\WINDOWS\system32	Microsoft Corporation	[Following are sub-categories of this main category] [Summary]	
occache.dll	6.0.3790.3959	126 KB	2/17/2007 1:41:48 AM	C:\WINDOWS\system32	Microsoft Corporation	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	
proctexe.ocx	<File Missing>	Not Available	Not Available			[List of Objects]	
sendmail.dll	6.0.3790.3959	64 KB	2/17/2007 1:54:24 AM	C:\WINDOWS\system32	Microsoft Corporation	Program File Status CodeBase No cached object information available	
shdoclc.dll	6.0.3790.1830	590 KB	3/25/2005 7:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation	[Content]	
shdocvw.dll	6.0.3790.3959	2,381 KB	2/17/2007 1:54:58 AM	C:\WINDOWS\system32	Microsoft Corporation	[Following are sub-categories of this main category] [Summary]	
shfolder.dll	6.0.3790.1830	34 KB	3/25/2005 7:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation	Item Value Content Advisor Disabled	
shlwapi.dll	6.0.3790.3959	607 KB	2/17/2007 1:55:32 AM	C:\WINDOWS\system32	Microsoft Corporation	[Personal Certificates]	
tdc.ocx	1.3.0.3130	91 KB	3/25/2005 7:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation	Issued To Issued By Validity Signature Algorithm No personal certificate information available	
url.dll	6.0.3790.1830	40 KB	3/25/2005 7:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation	[Other People Certificates]	
urlmon.dll	6.0.3790.3959	1,063 KB	2/17/2007 2:00:44 AM	C:\WINDOWS\system32	Microsoft Corporation	Issued To Issued By Validity Signature Algorithm No other people certificate information available	
webcheck.dll	6.0.3790.3959	439 KB	2/17/2007 2:02:26 AM	C:\WINDOWS\system32	Microsoft Corporation	[Publishers]	
wininet.dll	6.0.3790.3959	1,163 KB	2/17/2007 2:02:54 AM	C:\WINDOWS\system32	Microsoft Corporation	Name No publisher information available	
[Connectivity]						[Security]	
Item	Value					Zone	Security Level
Connection Preference	Never dial					My Computer	Custom
LAN Settings						Local intranet	Custom
AutoConfigProxy wininet.dll						Trusted sites	Custom
AutoProxyDetectMode Disabled						Internet	Custom
AutoConfigURL						Restricted sites	Custom

Appendix B: Database Build Scripts

B.1 CreateDatabase.sql

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

--
-- Drop the existing database
--
if exists (select name from sysdatabases where name = 'tpch100g')
    drop database tpch100g

CREATE DATABASE tpch100g
ON PRIMARY
(
    NAME            = tpch100g_root,
    FILENAME        = "c:\dev\tpch100g.mdf",
    SIZE            = 10MB,
    FILEGROWTH      = 10MB),
FILEGROUP DATA_FG

(name=tpch100g_data1,filename='c:\dev\tpch_1\',size=31900mb,filegrowt
h=0),

(name=tpch100g_data2,filename='c:\dev\tpch_2\',size=31900mb,filegrowt
h=0),

(name=tpch100g_data3,filename='c:\dev\tpch_3\',size=31900mb,filegrowt
h=0),

(name=tpch100g_data4,filename='c:\dev\tpch_4\',size=31900mb,filegrowt
h=0),

(name=tpch100g_data5,filename='c:\dev\tpch_5\',size=31900mb,filegrowt
h=0),

(name=tpch100g_data6,filename='c:\dev\tpch_6\',size=31900mb,filegrowt
h=0),

FILEGROUP LOAD_FG
(name=tpch100g_load1,
filename='z:\load\load1.ldf',size=32000mb,filegrowth=0),
(name=tpch100g_load2,
filename='z:\load\load2.ldf',size=32000mb,filegrowth=0),
(name=tpch100g_load3,
filename='z:\load\load3.ldf',size=32000mb,filegrowth=0),
(name=tpch100g_load4,
filename='z:\load\load4.ldf',size=32000mb,filegrowth=0),
(name=tpch100g_load5,
filename='z:\load\load5.ldf',size=32000mb,filegrowth=0),
(name=tpch100g_load6,
filename='z:\load\load6.ldf',size=32000mb,filegrowth=0)

LOG ON
(
    NAME            = tpchlog1,
    FILENAME        = 'c:\dev\tpchlog\',
    SIZE            = 19500MB,
    FILEGROWTH      = 0)
```

B.2 CreateTables.sql

```
-- 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 LOAD_FG

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

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

create table LINEITEM
(L_SHIPDATE datetime not null,
L_ORDERKEY bigint not null,
L_DISCOUNT float not null,
```

```

L_EXTENDEDPRI 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 LOAD_FG

```

```

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

```

```

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

```

B.3 CreateIndexes_1.sql

```

-- 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 DATA_FG

```

```

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

```

```

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

```

```

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

```

```

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

```

```

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

```

```

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

```

```

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

```

```
ON DATA_FG
```

```

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

```

```

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

```

B.4 CreateIndexes_2.sql

```

-- 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 DATA_FG

```

```

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

```

```

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

```

```

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

```

B.5 CreateFK.sql

```

-- 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)
```

B.6 BackupDatabase.sql

```
backup database tpch100g to
disk='z:\hp_backup\hp_backup1.bak',
disk='z:\hp_backup\hp_backup2.bak',
disk='z:\hp_backup\hp_backup3.bak',
disk='z:\hp_backup\hp_backup4.bak',
disk='z:\hp_backup\hp_backup5.bak',
disk='z:\hp_backup\hp_backup6.bak',
disk='z:\hp_backup\hp_backup7.bak',
disk='z:\hp_backup\hp_backup8.bak'
with init,format, maxtransfersize=1048576,
BUFFERCOUNT=1000,stats=1
```

B.7 RestoreDatabase.sql

```
restore database tpch100g from
disk='z:\hp_backup\hp_backup1.bak',
disk='z:\hp_backup\hp_backup2.bak',
disk='z:\hp_backup\hp_backup3.bak',
disk='z:\hp_backup\hp_backup4.bak',
disk='z:\hp_backup\hp_backup5.bak',
disk='z:\hp_backup\hp_backup6.bak',
disk='z:\hp_backup\hp_backup7.bak',
disk='z:\hp_backup\hp_backup8.bak'
with stats=1, maxtransfersize=1048576, BUFFERCOUNT=1000, replace
```

B.8 MoveTempDB.sql

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

```
alter database tempdb modify file
(name=tempdev,filename='c:\dev\tempdev\',size=125MB)
alter database tempdb modify file
(name=templog,filename='c:\dev\templog\',size=125MB)
```

B.9 ResizeTempDB.sql

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

```
alter database tempdb modify file
(name=tempdev, filename='c:\dev\tempdev\',size=15500mb,filegrowth=0)
alter database tempdb modify file
(name=templog, filename='c:\dev\templog\',size=7500mb,filegrowth=0)
alter database tempdb add file
```

```
(name=tempdev2,
filename='c:\dev\tempdev_2\',size=15500mb,filegrowth=0),
(name=tempdev3,
filename='c:\dev\tempdev_3\',size=15500mb,filegrowth=0),
(name=tempdev4,
filename='c:\dev\tempdev_4\',size=15500mb,filegrowth=0),
(name=tempdev5,
filename='c:\dev\tempdev_5\',size=15500mb,filegrowth=0),
(name=tempdev6,
filename='c:\dev\tempdev_6\',size=15500mb,filegrowth=0)
```

B.10 DelLoadFg.sql

```
alter database tpch100g remove file tpch100g_load1
alter database tpch100g remove file tpch100g_load2
alter database tpch100g remove file tpch100g_load3
alter database tpch100g remove file tpch100g_load4
alter database tpch100g remove file tpch100g_load5
alter database tpch100g remove file tpch100g_load6
alter database tpch100g remove filegroup LOAD_FG
```

Appendix C: Query Text and Output

C.1 Qualification Queries and Output

Qualification Query 1

-- using default substitutions

/* TPC_H Query 1 - Pricing Summary Report */

```

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

L_RETURNFLAG L_LINESTATUS SUM_QTY
SUM_BASE_PRICE  SUM_DISC_PRICE  SUM_CHARGE
AVG_QTY        AVG_PRICE        AVG_DISC
COUNT_ORDER
-----

```

```

A      F      37734107.000000      56586554400.730301
53758257134.870041      55909065222.827415      25.522006
38273.129735      0.049985      1478493
N      F      991417.000000      1487504710.380000
1413082168.054097      1469649223.194375      25.516472
38284.467761      0.050093      38854
N      O      74476040.000000      111701729697.739110
106118230307.605260      110367043872.498210      25.502227
38249.117989      0.049997      2920374
R      F      37719753.000000      56568041380.899857
53741292684.604156      55889619119.832260      25.505794
38250.854626      0.050009      1478870

```

(4 row(s) affected)

Qualification Query 2

-- using default substitutions

/* TPC_H Query 2 - Minimum Cost Supplier */

```

SELECT  TOP 100
        S_ACCTBAL,
        S_NAME,
        N_NAME,
        P_PARTKEY,
        P_MFGR,
        S_ADDRESS,
        S_PHONE,
        S_COMMENT
FROM    PART,
        SUPPLIER,
        PARTSUPP,
        NATION,
        REGION
WHERE   P_PARTKEY      = PS_PARTKEY AND
        S_SUPPKEY      = PS_SUPPKEY AND
        P_SIZE         = 15 AND
        P_TYPE         LIKE '%%BRASS' AND
        S_NATIONKEY    = N_NATIONKEY AND
        N_REGIONKEY    = R_REGIONKEY AND
        R_NAME         = 'EUROPE' AND
        PS_SUPPLYCOST = (
        SELECT
        MIN(PS_SUPPLYCOST)
        FROM  PARTSUPP,
        SUPPLIER,
        NATION,
        REGION
        WHERE P_PARTKEY
        = PS_PARTKEY AND
        S_SUPPKEY
        = PS_SUPPKEY AND
        S_NATIONKEY
        = N_NATIONKEY AND
        N_REGIONKEY
        = R_REGIONKEY AND
        R_NAME
        = 'EUROPE'
        )
ORDER  BY  S_ACCTBAL DESC,
          N_NAME,
          S_NAME,
          P_PARTKEY
S_ACCTBAL      S_NAME      N_NAME
P_PARTKEY P_MFGR      S_ADDRESS
S_PHONE      S_COMMENT
-----
9938.530000      Supplier#000005359      UNITED KINGDOM
185358      Manufacturer#4      QKuHYh,vZGiwu2FWEJoLDx04
33-429-790-6131 blithely silent pinto beans are furiously. slyly final deposits
acros
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 J8fcXW5TqM 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

```

..... additional rows deleted

```

7887.080000 Supplier#000009792 GERMANY
164759 Manufacturer#3 Y28ITVeYriT3kIGdV2K8fSZ
V2UqT5HI0tz 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 2Z0JGkiv01Y0oCFwUGfviIbhZCdy 16-464-
517-8943 carefully bold accounts doub

```

(100 row(s) affected)

Qualification Query 3

-- 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_SHIPRIORITY
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_SHIPRIORITY
ORDER BY REVENUE DESC,
          O_ORDERDATE

```

```

L_ORDERKEY REVENUE O_ORDERDATE
O_SHIPRIORITY
-----

```

```

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

```

(10 row(s) affected)

Qualification Query 4

-- using default substitutions

/* TPC_H Query 4 - Order Priority Checking */

```

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

```

```

O_ORDERPRIORITY ORDER_COUNT
-----

```

```

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

```

(5 row(s) affected)

Qualification Query 5

-- 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(YEAR, 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)

Qualification Query 6

-- 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)

Qualification Query 7

-- 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,
          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)

Qualification Query 8

-- 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)

```

Qualification Query 9

```

-- 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

```

```

O_ORDERKEY = L_ORDERKEY
AND
S_NATIONKEY = N_NATIONKEY
AND
P_NAME LIKE '%green%'
) AS PROFIT
GROUP BY NATION,
O_YEAR
ORDER BY NATION,
O_YEAR DESC
NATION O_YEAR SUM_PROFIT
-----
ALGERIA 1998 31342867.234500
ALGERIA 1997 57138193.023300
ALGERIA 1996 56140140.133000
ALGERIA 1995 53051469.653400
ALGERIA 1994 53867582.128600
ALGERIA 1993 54942718.132400
ALGERIA 1992 54628034.712700
ARGENTINA 1998 30211185.708100
ARGENTINA 1997 50805741.752300
ARGENTINA 1996 51923746.575500
ARGENTINA 1995 49298625.766600
ARGENTINA 1994 50835610.109500
ARGENTINA 1993 51646079.177500
ARGENTINA 1992 50410314.994800
BRAZIL 1998 27217924.383200
BRAZIL 1997 48378669.198900
BRAZIL 1996 50482870.357200
BRAZIL 1995 47623383.634900
BRAZIL 1994 47840165.725600
BRAZIL 1993 49054694.035100
BRAZIL 1992 48667639.084200
CANADA 1998 30379833.768500
CANADA 1997 50465052.311400
CANADA 1996 52560501.390400
CANADA 1995 52375332.809200
CANADA 1994 52600364.658700

```

..... additional rows deleted

```

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)

Qualification Query 10

```

-- using default substitutions
/* TPC_H Query 10 - Returned Item Reporting */
SELECT TOP 20
C_CUSTKEY,
C_NAME,
SUM(L_EXTENDEDPRI*(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 64EaJ5vMAHWJIBOXkIpNc2RJiWE 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 S29ODD6bceJ8QSuuEJznkNaK 17-582-
695-5962 quickly express requests wake quickly blithely
25501 Customer#000025501 620269.784900 7725.040000
ETHIOPIA W556MXuoiaYCCZamJI,Rn0B4ACUGdkQ8DZ
15-874-808-6793 quickly special requests sleep evenly among the special
deposits. special deposi
115831 Customer#000115831 596423.867200 5098.100000
FRANCE rFeBbEEyk dl ne7zV5fDrmiq1oK09wV7pxqCgIc 16-
715-386-3788 carefully bold excuses sleep alongside of the thinly idle
84223 Customer#000084223 594998.023900 528.650000
UNITED KINGDOM nAVZCs6BaWap rrM27N 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 Az9RFaut7NkPnc5zSD2PwHgVvr4JRzq 17-
945-916-9648 boldly final requests cajole blith
147946 Customer#000147946 576455.132000 2030.130000
ALGERIA iANyZHjqhyy7AJahOpTrYyhJ 10-886-956-
3143 furiously even accounts are blithely above the furiousl
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 ChqEoK43OysjdHbtKCP6dKqjNyyvi9 19-
955-562-2398 regular, unusual dependencies boost slyly; ironic attainments
nag fluffily into the unusual packages?
146149 Customer#000146149 557254.986500 1791.550000
ROMANIA s87fvzFQpU 29-744-164-6487
silent, unusual requests detect quickly slyly regul
52528 Customer#000052528 556397.350900 551.790000
ARGENTINA NFztyTOR10UOJ 11-208-192-
3205 unusual requests detect. slyly dogged theodolites use slyly. deposit
23431 Customer#000023431 554269.536000 3381.860000
ROMANIA HgiV0phqhaIa9aydNoIib 29-915-458-
2654 instructions nag quickly. furiously bold accounts cajol

```

(20 row(s) affected)

Qualification Query 11

-- using default substitutions

/* TPC_H Query 11 - Important Stock Identification */

```

SELECT PS_PARTKEY,
SUM(PS_SUPPLYCOST*PS_AVAILQTY) AS
VALUE
FROM PARTSUPP,
SUPPLIER,
NATION
WHERE PS_SUPPKEY = S_SUPPKEY AND
S_NATIONKEY = N_NATIONKEY AND
N_NAME = 'GERMANY'
GROUP BY PS_PARTKEY
HAVING SUM(PS_SUPPLYCOST*PS_AVAILQTY) >
(
SELECT
SUM(PS_SUPPLYCOST*PS_AVAILQTY) * 0.0001000000
FROM PARTSUPP,
SUPPLIER,
NATION
WHERE PS_SUPPKEY =
S_SUPPKEY AND
S_NATIONKEY =
N_NATIONKEY AND
N_NAME =
'GERMANY'
)
ORDER BY VALUE DESC

PS_PARTKEY VALUE
-----
129760 17538456.860000
166726 16503353.920000

```

```

191287 16474801.970000
161758 16101755.540000
34452 15983844.720000
139035 15907078.340000
9403 15451755.620000
154358 15212937.880000
38823 15064802.860000
85606 15053957.150000
33354 14408297.400000
154747 14407580.680000
82865 14235489.780000
76094 14094247.040000
222 13937777.740000
121271 13908336.000000
55221 13716120.470000
22819 13666434.280000
76281 13646853.680000
85298 13581154.930000
85158 13554904.000000
139684 13535538.720000
31034 13498025.250000

```

... additional rows deleted ...

```

122819 7888881.020000
154731 7888301.330000
101674 7879324.600000
51968 7879102.210000
72073 7877736.110000
5182 7874521.730000

```

(1048 row(s) affected)

Qualification Query 12

-- 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)

Qualification Query 13

-- 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)
ORDER BY C_COUNT
        CUSTDIST DESC,
        C_COUNT DESC

```

C_COUNT CUSTDIST

```

-----
0 50004
9 6641
10 6566
11 6058
8 5949
12 5553
13 4989
19 4748
7 4707
18 4625
15 4552
17 4530
14 4484
20 4461
16 4323
21 4217
22 3730
6 3334
23 3129
24 2622
25 2079
5 1972
26 1593
27 1185
4 1033
28 869
29 559
3 398
30 373
31 235
2 144
32 128
33 71
34 48
35 33
1 23
36 17
37 7
40 4
38 4

```

39 2
41 1

(42 row(s) affected)

Qualification Query 14

-- using default substitutions

/* TPC_H Query 14 - Promotion Effect */

```

SELECT 100.00 * SUM ( CASE WHEN P_TYPE
LIKE 'PROMO%%' THEN
L_EXTENDEDPRI*(1-L_DISCOUNT) ELSE 0
END) /
SUM(L_EXTENDEDPRI*(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)

Qualification Query 15

-- 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_EXTENDEDPRI*(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)

Qualification Query 16

-- using default substitutions

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

```

SELECT P_BRAND,
P_TYPE,
P_SIZE,
COUNT(DISTINCT PS_SUPPKEY) AS
SUPPLIER_CNT
FROM PARTSUPP,
PART
WHERE P_PARTKEY = PS_PARTKEY
AND
P_BRAND <> 'Brand#45'
AND
P_TYPE NOT LIKE 'MEDIUM POLISHED%%'
AND
P_SIZE IN (49, 14, 23, 45, 19, 3, 36, 9) AND
PS_SUPPKEY NOT IN ( SELECT
S_SUPPKEY
FROM
SUPPLIER
WHERE
S_COMMENT LIKE '%%Customer%%Complaints%%'
)

```

```

GROUP BY P_BRAND,
P_TYPE,
P_SIZE
ORDER BY SUPPLIER_CNT DESC,
P_BRAND,
P_TYPE,
P_SIZE

```

```

P_BRAND P_TYPE P_SIZE SUPPLIER_CNT
-----

```

```

Brand#41 MEDIUM BRUSHED TIN 3 28
Brand#54 STANDARD BRUSHED COPPER 14 27
Brand#11 STANDARD BRUSHED TIN 23 24
Brand#11 STANDARD BURNISHED BRASS 36 24
Brand#15 MEDIUM ANODIZED NICKEL 3 24
Brand#15 SMALL ANODIZED BRASS 45 24
Brand#15 SMALL BURNISHED NICKEL 19 24
Brand#21 MEDIUM ANODIZED COPPER 3 24
Brand#22 SMALL BRUSHED NICKEL 3 24
Brand#22 SMALL BURNISHED BRASS 19 24
Brand#25 MEDIUM BURNISHED COPPER 36 24
Brand#31 PROMO POLISHED COPPER 36 24
Brand#33 LARGE POLISHED TIN 23 24
Brand#33 PROMO POLISHED STEEL 14 24

```

.... Additional rows deleted

```

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)

Qualification Query 17

-- using default substitutions

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

```

SELECT SUM(L_EXTENDEDPRI)/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)

Qualification Query 18

-- using default substitutions

/* TPC_H Query 18 - Large Volume Customer */

```

SELECT TOP 100
C_NAME,
C_CUSTKEY,
O_ORDERKEY,
O_ORDERDATE,
O_TOTALPRICE,
SUM(L_QUANTITY)
FROM CUSTOMER,
ORDERS,
LINEITEM
WHERE O_ORDERKEY IN ( SELECT
L_ORDERKEY
FROM
LINEITEM
GROUP BY
L_ORDERKEY HAVING SUM(L_QUANTITY) > 300
)
AND
C_CUSTKEY = O_CUSTKEY AND
O_ORDERKEY = L_ORDERKEY
GROUP BY C_NAME,
C_CUSTKEY,
O_ORDERKEY,
O_ORDERDATE,
O_TOTALPRICE
ORDER BY O_TOTALPRICE DESC,
O_ORDERDATE

```

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

Customer#000141823	141823	2806245	1996-12-29
00:00:00.000 446269.120000		310.000000	
Customer#000053029	53029	2662214	1993-08-13
00:00:00.000 446144.490000		302.000000	
Customer#000018188	18188	3037414	1995-01-25
00:00:00.000 443807.220000		308.000000	
Customer#000066533	66533	29158	1995-10-21
00:00:00.000 443576.500000		305.000000	
Customer#000037729	37729	4134341	1995-06-29
00:00:00.000 441082.970000		309.000000	
Customer#000003566	3566	2329187	1998-01-04
00:00:00.000 439803.360000		304.000000	
Customer#000045538	45538	4527553	1994-05-22
00:00:00.000 436275.310000		305.000000	
Customer#000081581	81581	4739650	1995-11-04
00:00:00.000 435405.900000		305.000000	
Customer#000119989	119989	1544643	1997-09-20
00:00:00.000 434568.250000		320.000000	
Customer#000003680	3680	3861123	1998-07-03
00:00:00.000 433525.970000		301.000000	
Customer#000113131	113131	967334	1995-12-15
00:00:00.000 432957.750000		301.000000	
Customer#000141098	141098	565574	1995-09-24
00:00:00.000 430986.690000		301.000000	
Customer#000093392	93392	5200102	1997-01-22
00:00:00.000 425487.510000		304.000000	
Customer#000015631	15631	1845057	1994-05-12
00:00:00.000 419879.590000		302.000000	
Customer#000112987	112987	4439686	1996-09-17
00:00:00.000 418161.490000		305.000000	
Customer#000012599	12599	4259524	1998-02-12
00:00:00.000 415200.610000		304.000000	
Customer#000105410	105410	4478371	1996-03-05
00:00:00.000 412754.510000		302.000000	
Customer#000149842	149842	5156581	1994-05-30
00:00:00.000 411329.350000		302.000000	
Customer#000010129	10129	5849444	1994-03-21
00:00:00.000 409129.850000		309.000000	
Customer#000069904	69904	1742403	1996-10-19
00:00:00.000 408513.000000		305.000000	
Customer#000017746	17746	6882	1997-04-09
00:00:00.000 408446.930000		303.000000	
Customer#000013072	13072	1481925	1998-03-15
00:00:00.000 399195.470000		301.000000	
Customer#000082441	82441	857959	1994-02-07
00:00:00.000 382579.740000		305.000000	
Customer#000088703	88703	2995076	1994-01-30
00:00:00.000 363812.120000		302.000000	

(57 row(s) affected)

Qualification Query 19

-- using default substitutions

/* TPC_H Query 19 - Discounted Revenue */

```

SELECT SUM(L_EXTENDEDPRI*(1 - L_DISCOUNT)) AS
REVENUE
FROM LINEITEM,
PART
WHERE ( P_PARTKEY = L_PARTKEY
AND
P_BRAND = 'Brand#12'
AND

```

```

P_CONTAINER IN ('SM CASE', 'SM BOX',
'SM PACK', 'SM PKG')
AND
L_QUANTITY >= 1
AND
L_QUANTITY <= 1 + 10
AND
P_SIZE BETWEEN 1 AND 5
AND
L_SHIPMODE IN ('AIR', 'AIR REG')
AND
L_SHIPINSTRUCT = 'DELIVER IN PERSON'
)
OR
( P_PARTKEY = L_PARTKEY
AND
P_BRAND = 'Brand#23'
AND
P_CONTAINER IN ('MED BAG', 'MED BOX',
'MED PKG', 'MED PACK')
AND
L_QUANTITY >= 10
AND
L_QUANTITY <= 10 + 10
AND
P_SIZE BETWEEN 1 AND 10
AND
L_SHIPMODE IN ('AIR', 'AIR REG')
AND
L_SHIPINSTRUCT = 'DELIVER IN PERSON'
)
OR
( P_PARTKEY = L_PARTKEY
AND
P_BRAND = 'Brand#34'
AND
P_CONTAINER IN ('LG CASE', 'LG BOX', 'LG
PACK', 'LG PKG')
AND
L_QUANTITY >= 20
AND
L_QUANTITY <= 20 + 10
AND
P_SIZE BETWEEN 1 AND 15
AND
L_SHIPMODE IN ('AIR', 'AIR REG')
AND
L_SHIPINSTRUCT = 'DELIVER IN PERSON'
)

```

REVENUE

3083843.057800

(1 row(s) affected)

Qualification Query 20

-- using default substitutions

/* TPC_H Query 20 - Potential Part Promotion */

```

SELECT S_NAME,
S_ADDRESS
FROM SUPPLIER,
NATION

```

```

WHERE S_SUPPKEY IN ( SELECT
      PS_SUPPKEY FROM
      PARTSUPP WHERE
      PS_PARTKEY in ( SELECT P_PARTKEY
      FROM PART
      WHERE P_NAME like 'forest%'
      ) AND
      PS_AVAILQTY
      > ( SELECT 0.5 * sum(L_QUANTITY)
      FROM LINEITEM
      WHERE L_PARTKEY =
      PS_PARTKEY AND
      L_SUPPKEY =
      PS_SUPPKEY AND
      L_SHIPDATE >= '1994-
      01-01' AND
      L_SHIPDATE <
      dateadd(yy,1,'1994-01-01')
      ) AND
      S_NATIONKEY = N_NATIONKEY AND
      N_NAME = 'CANADA'
ORDER BY S_NAME
S_NAME S_ADDRESS
-----
Supplier#000000020 iybAE,RmTymrZVYafZva2SH,j
Supplier#000000091
YV45D7TkfdQanOOZ7q9QxkyGUapU1oOWU6q3
Supplier#000000197 YC2Acon6kjY3zj3Fbxs2k4Vdf7X0cdF
Supplier#000000226 83qOdU2EYRdPQAQhEtn GRZEd
Supplier#000000285 Br7e1nnt1yxrw6ImgpJ7YdhFDjuBf
Supplier#000000378 FfbhyCxWvcPrO8ltp9
Supplier#000000402 i9Sw4DoyMhzhKXCH9By,AYSgmD
Supplier#000000530 0qwCMwobKY OcmLyfRXlagA8ukENJv,
Supplier#000000688 D fw5ocppmZpYBBIP1718hCihLDZ5KhKX
Supplier#000000710 f19YPvOyb QoYwjKC,oPycpGfieBAcwKJo
Supplier#000000736 l6i2nMwVuovfKnuVgaSGK2rDy65DIAFLegiL7
Supplier#000000761 zLSLeIQUj2XrvTTFnv7WAcyZGvvMTx882d4
Supplier#000000884 bmhEShejaS
Supplier#000000887 urEaTejH5POADP2ARrf
Supplier#000000935 ij98czM 2KzWe7dDToxB8sq0UfCdvX
Supplier#000000975 ,AC e,tBpNwKb5xMUzeohxIRn, hdZJo73gFQF8y
Supplier#000001263 rQWr6nf8ZhB2TAiIDlvo5Io
... additional rows deleted ....
Supplier#000009812 APFRMy3lCbgFga53n5t9DxzFPQPgnjrGt32
Supplier#000009862 rJzweWeN58
Supplier#000009868 ROjGgx5gvtkmnUUoeyy7v
Supplier#000009869
ucLqxzrpBTRMewGSM29t0rNTM30g1Tu3Xgg3mKag
Supplier#000009899 7XdpaHrzr1t,UQFZE
Supplier#000009974 7wJ,J5DKcxSU4Kp1cQLpbcAvB5AsvKT
(204 row(s) affected)

```

Qualification Query 21

```

-- using default substitutions
/* TPC_H Query 21 - Suppliers Who Kept Orders Waiting */
SELECT TOP 100
      S_NAME,
      COUNT(*) AS NUMWAIT
FROM SUPPLIER,
      LINEITEM L1,
      ORDERS,
      NATION
WHERE S_SUPPKEY = L1.L_SUPPKEY
      AND
      O_ORDERKEY = L1.L_ORDERKEY
      AND
      O_ORDERSTATUS = 'F'
      AND
      L1.L_RECEIPTDATE > L1.L_COMMITDATE
      AND
      EXISTS ( SELECT *
      FROM LINEITEM L2
      WHERE L2.L_ORDERKEY =
      L1.L_ORDERKEY AND
      L2.L_SUPPKEY <>
      L1.L_SUPPKEY
      ) AND
      ( SELECT *
      FROM LINEITEM L3
      WHERE L3.L_ORDERKEY =
      L1.L_ORDERKEY
      AND
      L3.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
... additional rows deleted ...
Supplier#00000811 12
Supplier#00000821 12
Supplier#00001337 12
Supplier#00001916 12
Supplier#00001925 12
Supplier#00002039 12
Supplier#00002357 12

```


Supplier#000002483 12

(100 row(s) affected)

Qualification Query 22

-- using default substitutions

/* TPC_H Query 22 - Global Sales Opportunity */

```

SELECT  CNTRYCODE,
        COUNT(*)          AS NUMCUST,
        SUM(C_ACCTBAL) AS TOTACCTBAL
FROM    (
        SELECT  SUBSTRING(C_PHONE,1,2) AS
        CNTRYCODE,
                C_ACCTBAL
        FROM    CUSTOMER
        WHERE   SUBSTRING(C_PHONE,1,2) IN
        ('13', '31', '23', '29', '30', '18', '17') AND
        (
        SELECT  AVG(C_ACCTBAL)
        FROM    CUSTOMER
        WHERE   C_ACCTBAL > 0.00 AND
                SUBSTRING(C_PHONE,1,2) IN
        ('13', '31', '23', '29', '30', '18', '17')
        )
        )
        AND
        *
        NOT EXISTS
        (
        SELECT
        FROM
        ORDERS
        WHERE
        O_CUSTKEY = C_CUSTKEY
        )
        )
        AS CUSTSALE
GROUP BY CNTRYCODE
ORDER BY CNTRYCODE

```

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

(7 row(s) affected)

Appendix D: Seeds and Query Substitution Parameters

Stream0 Seed : 403212042

14	1993-01-01						
2	46	STEEL	EUROPE				
9	cream						
20	dodger	1996-01-01	VIETNAM				
6	1996-01-01	0.07	25				
17	Brand#23	SM JAR					
18	313						
8	UNITED KINGDOM	EUROPE	SMALL BURNISHED BRASS				
21	CHINA						
13	pending	packages					
3	BUILDING	1995-03-22					
22	31	34	15	16	13	29	
	21						
16	Brand#42	MEDIUM BRUSHED			5	31	
	38	43	9	40	20	10	
4	1996-07-01						
11	ALGERIA	0.0000010000					
15	1995-01-01						
1	69						
10	1994-08-01						
19	Brand#12	Brand#45	Brand#54	4	14	21	
5	EUROPE	1996-01-01					
7	CHINA	UNITED KINGDOM					
12	REG AIR	AIR	1993-01-01				

Stream1 Seed : 403212043

21	IRAN						
3	HOUSEHOLD	1995-03-08					
18	315						
5	MIDDLE EAST	1997-01-01					
11	JORDAN	0.0000010000					
7	IRAN	KENYA					
6	1997-01-01	0.05	25				
20	peru	1995-01-01	IRAQ				
17	Brand#25	SM PKG					
12	SHIP	RAIL	1993-01-01				
16	Brand#22	PROMO ANODIZED8			35	22	
	23	47	15	24	25		
15	1993-01-01						
13	pending	packages					
10	1993-05-01						
2	34	BRASS	AMERICA				
8	KENYA	AFRICA	STANDARD BRUSHED BRASS				
14	1993-01-01						
19	Brand#14	Brand#33	Brand#54	10	15	28	
9	chartreuse						
22	21	33	34	11	22	28	
	19						
1	77						
4	1994-03-01						

Stream2 Seed : 403212044

6	1997-01-01	0.02	24				
17	Brand#22	LG CASE					
14	1993-01-01						
16	Brand#52	SMALL PLATED	44	14	2		
	18	40	39	23	19		
19	Brand#21	Brand#11	Brand#53	5	16	24	
10	1994-03-01						
9	blanched						
2	21	NICKEL	EUROPE				
15	1996-01-01						
8	FRANCE	EUROPE	STANDARD PLATED BRASS				
5	AFRICA	1997-01-01					
22	18	13	11	25	27	26	
	34						
12	MAIL	RAIL	1993-01-01				
7	BRAZIL	FRANCE					
13	pending	packages					
18	312						
1	85						
4	1996-10-01						
20	blush	1993-01-01	ALGERIA				
3	AUTOMOBILE	1995-03-24					
11	ARGENTINA	0.0000010000					
21	BRAZIL						

Stream3 Seed : 403212045

8	UNITED KINGDOM	EUROPE	STANDARD ANODIZED				
BRASS							
5	AMERICA	1997-01-01					
4	1994-07-01						
6	1997-01-01	0.08	25				
17	Brand#34	LG JAR					
7	ROMANIA	UNITED KINGDOM					
1	93						
18	314						
22	30	15	18	34	26	11	
	28						
14	1994-01-01						
9	antique						
10	1994-12-01						
15	1994-01-01						
11	KENYA	0.0000010000					
20	magenta	1997-01-01	MOROCCO				
2	9	COPPER	AMERICA				
21	SAUDI ARABIA						
19	Brand#23	Brand#54	Brand#42	10	17	20	
13	pending	packages					
16	Brand#43	LARGE POLISHED	39	48	9		
	32	16	17	43	34		
12	TRUCK	RAIL	1993-01-01				
3	HOUSEHOLD	1995-03-10					

Stream4 Seed : 403212046

5	ASIA	1997-01-01				
21	JAPAN					
14	1994-01-01					
19	Brand#25	Brand#32	Brand#41	6	18	27
15	1996-01-01					
17	Brand#31	LG PKG				
12	RAIL	AIR	1996-01-01			
6	1997-01-01		0.05	25		
4	1997-02-01					
9	turquoise					
8	MOROCCO	AFRICA	PROMO	POLISHED	STEEL	
16	Brand#23	STANDARD	ANODIZED	14	13	
	25	11	36	9	26	39
11	BRAZIL	0.0000010000				
2	47	STEEL	MIDDLE	EAST		
10	1993-09-01					
18	312					
1	101					
13	pending	packages				
7	IRAQ	MOROCCO				
22	34	27	14	22	29	12
	30					
3	AUTOMOBILE	1995-03-27				
20	tomato	1995-01-01		ETHIOPIA		

Stream5 Seed : 403212047

21	EGYPT					
15	1994-01-01					
4	1994-11-01					
6	1993-01-01		0.02	24		
7	CANADA	GERMANY				
16	Brand#53	MEDIUM	BURNISHED	21	7	
9	41	33	36	34	8	
19	Brand#32	Brand#15	Brand#41	1	19	23
18	313					
14	1994-01-01					
22	13	26	30	12	32	23
	27					
11	MOROCCO	0.0000010000				
13	pending	requests				
3	FURNITURE	1995-03-12				
1	109					
2	35	BRASS	AMERICA			
5	EUROPE	1993-01-01				
8	GERMANY	EUROPE	PROMO	BURNISHED	STEEL	
20	goldenrod	1993-01-01		SAUDI	ARABIA	
12	AIR	TRUCK	1994-01-01			
17	Brand#32	MED	CASE			
10	1994-06-01					
9	snow					

Appendix E: Refresh Function Source Code

E.1 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
        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 than 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_SHIPRIORITY, O_COMMENT)
    (SELECT O_ORDERKEY, O_CUSTKEY,
    O_ORDERSTATUS, O_TOTALPRICE,
    O_ORDERDATE,
    O_ORDERPRIORITY, O_CLERK, O_SHIPRIORITY, 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_LINENUMBER,L_QUAN
    TITY,
    L_EXTENDEDPRI,
    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_LINENUMBER,L_QUAN
    TITY,
```

```

                L_EXTENDEDPRI,
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

```

E.2 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
        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 than 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
        GO

```

Appendix F: Implementation Specific Layer and Source Code

F.1 Setup.cmd

```
echo off

rem
rem Modify the following parameters for your configuration
rem

set DB=tpch100g
rem
rem set sql's 'sa' user password here
rem
set PW=

set HOMEDRIVE=C:
set HOMEDIR=\HP_TPC_H_KIT\Setup
set OUTPUTDRIVE=C:
set OUTPUTDIR=\HP_TPC_H_KIT\Output
set SCALEFACTOR=100
set DBGEN_SEGMENTS=16
set DBGEN_PARALLELISM=8
set FLATFILEDRIVE=z:
set FLATFILEDIR=HP_Flatfiles\
set FLATFILESUBDIR=\
set RF1_PARALLELISM=16
set RF2_PARALLELISM=16
set UPDATEDRIVE=z:
set UPDATEDIR=\HP_UF_Flatfiles
set UPDATE_SETS=18

set DoDBGEN=FALSE
set DoDBCREATE=TRUE
set DoBULKINSERT=TRUE
set DoCREATEINDEX=TRUE
set DoCLEANUP=TRUE
set DoBACKUP=TRUE
set DoENDSTATS=TRUE

%HOMEDRIVE%
cd %HOMEDIR%

if %1 == 'DBGEN' goto :DBGEN
if %1 == 'BULKINSERTn' goto :BULKINSERTn

echo Checking for existence of HOMEDIR and OUTPUTDIR
if NOT EXIST %HOMEDRIVE%%HOMEDIR% goto :ERROR_EXIT
if NOT EXIST %OUTPUTDRIVE%%OUTPUTDIR% goto :ERROR_EXIT
if NOT EXIST %UPDATEDRIVE%%UPDATEDIR% goto :ERROR_EXIT

echo Finding next output directory in
%OUTPUTDRIVE%%OUTPUTDIR%
set OUTPUTNUMBER=1
:OUTPUTLOOP
if NOT EXIST
%HOMEDRIVE%%HOMEDIR%\%OUTPUTDRIVE%%OUTPUTDIR%\%OUTPUTNUMBER% goto
:OUTPUTLOOPEND
set /a OUTPUTNUMBER=%OUTPUTNUMBER%+1
goto :OUTPUTLOOP
:OUTPUTLOOPEND

set
OUTPUTPATH=%OUTPUTDRIVE%%OUTPUTDIR%\%OUTPUTNUMBER%
BER%
echo Output will be found at %OUTPUTPATH%
mkdir %OUTPUTPATH%

if NOT '%DoDBGEN%' == 'TRUE' goto :DBCREATE

rem
rem DBGEN invokes dbgen.exe in parallel
rem

echo Starting DBGEN of FlatFiles
for /1 %i in (1,1,%DBGEN_SEGMENTS%) do copy dists.dss
%FLATFILEDRIVE%\%FLATFILEDIR%%i%\%FLATFILESUBDIR%
copy dists.dss %UPDATEDRIVE%%UPDATEDIR%
for /1 %i in (1,%DBGEN_PARALLELISM%,%DBGEN_SEGMENTS%)
do call :DBGEN_ITERATE %i

echo Starting DBGEN of Update Files
%UPDATEDRIVE%
cd %UPDATEDIR%
%HOMEDRIVE%\%HOMEDIR%\dbgen -U %UPDATE_SETS% -s
%SCALEFACTOR% -qf -C %UPDATE_SETS% -i
%RF1_PARALLELISM% -d %RF2_PARALLELISM%
2>%OUTPUTPATH%\dbgen_Update.out
%HOMEDRIVE%
cd %HOMEDIR%
goto :DBCREATE

:DBGEN_ITERATE
set FIRST=%1
set /a LAST=%FIRST%+%DBGEN_PARALLELISM%-1
echo DBGening sets %FIRST% through %LAST%
for /1 %i in (%FIRST%,1,%LAST%) do start cmd /C Setup DBGEN %i
semaphore -wait DBGEN -count %DBGEN_PARALLELISM%
goto :EOF

:DBGEN
%FLATFILEDRIVE%
cd %FLATFILEDRIVE%\%FLATFILESUBDIR%
%HOMEDRIVE%\%HOMEDIR%\dbgen -qf -s%SCALEFACTOR% -
C%DBGEN_SEGMENTS% -S%2 2>%OUTPUTPATH%\dbgen_%2%.out
%HOMEDRIVE%
cd %HOMEDIR%
semaphore -release DBGEN
goto :EOF

:DBCREATE
if NOT '%DoDBCREATE%' == 'TRUE' goto :BULKINSERT
rem
rem DBCREATE invokes the file %DBNAME%\CreateDatabase.sql
rem
echo Starting database creation

osql -Usa -P%PW% -Q"if exists (select * from sysdatabases where
name='%DB%')drop database %DB%" -o
%OUTPUTPATH%\DropDatabase.out -b
if ERRORLEVEL 1 goto :ERROR_EXIT
osql -Usa -P%PW% -i %DB%\CreateDatabase.sql -o
%OUTPUTPATH%\CreateDatabase.out -b
if ERRORLEVEL 1 goto :ERROR_EXIT
```

```

osql -Usa -P%PW% -Q"sp_dboption %DB%, 'trunc. log on chkpt.', TRUE" -b
if ERRORLEVEL 1 goto :ERROR_EXIT
osql -Usa -P%PW% -Q"sp_dboption %DB%, 'auto create statistics', OFF" -b
if ERRORLEVEL 1 goto :ERROR_EXIT
osql -Usa -P%PW% -Q"sp_dboption %DB%, 'auto update statistics', OFF" -b
if ERRORLEVEL 1 goto :ERROR_EXIT
osql -Usa -P%PW% -Q"alter database %DB% set PAGE_VERIFY NONE" -
b
if ERRORLEVEL 1 goto :ERROR_EXIT

:BULKINSERT
if NOT %DoBULKINSERT% == 'TRUE' goto :CREATEINDEX
rem
rem BULKINSERT starts a process per %DBGEN_PARALLELISM%
rem Each process inserts one or more segments
rem

osql -Usa -P%PW% -Q"sp_dboption %DB%, 'trunc', TRUE" -b
if ERRORLEVEL 1 goto :ERROR_EXIT
osql -Usa -P%PW% -Q"sp_dboption %DB%, 'select into', TRUE" -b
if ERRORLEVEL 1 goto :ERROR_EXIT
osql -Usa -P%PW% -Q"sp_dboption %DB%, 'torn', FALSE" -b
if ERRORLEVEL 1 goto :ERROR_EXIT

echo Dropping and Re-Creating Tables
osql -Usa -P%PW% -d%DB% -Q"if exists (select * from sysobjects where
name = 'LOADTIMES') drop table LOADTIMES" -b -o
%OUTPUTPATH%\Drop_Loadtimes.out
if ERRORLEVEL 1 goto :ERROR_EXIT
osql -Usa -P%PW% -d%DB% -Q"create table LOADTIMES(STEP
char(35),TIMESTAMP datetime)" -b
if ERRORLEVEL 1 goto :ERROR_EXIT
osql -Usa -P%PW% -d%DB% -Q"insert into LOADTIMES values ('LOAD
begin',getdate())" -b
if ERRORLEVEL 1 goto :ERROR_EXIT
osql -Usa -P%PW% -d%DB% -Q"insert into LOADTIMES values ('Create
Tables begin',getdate())" -1 300
if ERRORLEVEL 1 goto :ERROR_EXIT
for %i in (REGION NATION SUPPLIER PARTSUPP PART
CUSTOMER ORDERS LINEITEM) do osql -Usa -P%PW% -d%DB% -
Q"drop table %i" -o %OUTPUTPATH%\Drop_Table_%i.out
osql -Usa -P%PW% -d%DB% -i%DB%\CreateTables.sql -o
%OUTPUTPATH%\CreateTables.out -b
if ERRORLEVEL 1 goto :ERROR_EXIT
osql -Usa -P%PW% -d%DB% -Q"insert into LOADTIMES values ('Create
Tables end',getdate())" -1 300
if ERRORLEVEL 1 goto :ERROR_EXIT

echo Starting bulk inserts
for %i in (LINEITEM ORDERS CUSTOMER PART PARTSUPP
SUPPLIER) do call :BULKINSERT %i
echo for NATION and REGION
osql -Usa -P%PW% -d%DB% -Q"insert into LOADTIMES values
('Nation/Region insert begin',getdate())" -b
if ERRORLEVEL 1 goto :ERROR_EXIT
osql -Usa -P%PW% -d%DB% -Q"bulk insert NATION from
%FLATFILEDRIVE%\%FLATFILEDIR%\%FLATFILESUBDIR%\Natio
n.tbl' with (FieldTerminator = '|', RowTerminator = '\n', tablock)" -o
%OUTPUTPATH%\BulkInsert_Nation.out -b -1 300
if ERRORLEVEL 1 goto :ERROR_EXIT
osql -Usa -P%PW% -d%DB% -Q"bulk insert REGION from
%FLATFILEDRIVE%\%FLATFILEDIR%\%FLATFILESUBDIR%\Regio
n.tbl' with (FieldTerminator = '|', RowTerminator = '\n', tablock)" -o
%OUTPUTPATH%\BulkInsert_Region.out -b -1 300
if ERRORLEVEL 1 goto :ERROR_EXIT
osql -Usa -P%PW% -d%DB% -Q"insert into LOADTIMES values
('Nation/Region insert end',getdate())" -b -1 300
if ERRORLEVEL 1 goto :ERROR_EXIT
goto :CREATEINDEX

:BULKINSERTi
echo Starting bulk inserts for %i
osql -Usa -P%PW% -d%DB% -Q"insert into LOADTIMES values (%i bulk
insert begin',getdate())" -1 300
for /l %j in (1,1,%DBGEN_PARALLELISM%) do start cmd /C Setup
BULKINSERTn %i %j
semaphore -wait %1 -count %DBGEN_PARALLELISM%
osql -Usa -P%PW% -d%DB% -Q"insert into LOADTIMES values (%i
end',getdate())" -b -1 300
if ERRORLEVEL 1 goto :ERROR_EXIT
goto :EOF

:BULKINSERTn
for /l %k in
(%3,%DBGEN_PARALLELISM%,%DBGEN_SEGMENTS%) do call
:BULKINSERTn2 BULKINSERTn2 %2 %k
semaphore -release %2
goto :EOF

:BULKINSERTn2
osql -Usa -P%PW% -d%DB% -Q"bulk insert %2 from
' %FLATFILEDRIVE%\%FLATFILEDIR%\%3%FLATFILESUBDIR%\%2.
tbl.%3' with (FieldTerminator = '|', RowTerminator = '\n', tablock)" -o
%OUTPUTPATH%\BulkInsert_%2_%3.out -b -1 300
goto :EOF

:CREATEINDEX
if NOT %DoCREATEINDEX% == 'TRUE' goto :CLEANUP
rem
rem Create indexes
rem

echo %TIME% Starting create indexes
osql -Usa -P%PW% -d%DB% -Q"insert into LOADTIMES values ('Create
indexes begin',getdate())" -b -1 300
if ERRORLEVEL 1 goto :ERROR_EXIT
osql -Usa -P%PW% -d%DB% -i %DB%\CreateIndexes_1.sql -o
%OUTPUTPATH%\CreateIndexes_1.out -b
if ERRORLEVEL 1 goto :ERROR_EXIT
osql -Usa -P%PW% -d%DB% -i %DB%\CreateFK.sql -o
%OUTPUTPATH%\CreateFK.out -b
if ERRORLEVEL 1 goto :ERROR_EXIT
osql -Usa -P%PW% -d%DB% -i %DB%\CreateIndexes_2.sql -o
%OUTPUTPATH%\CreateIndexes_2.out -b
if ERRORLEVEL 1 goto :ERROR_EXIT
echo Starting create indexes
osql -Usa -P%PW% -d%DB% -Q"insert into LOADTIMES values ('Create
indexes end',getdate())" -b -1 300
if ERRORLEVEL 1 goto :ERROR_EXIT
echo %TIME% Done creating indexes indexes

:CLEANUP
if NOT %DoCLEANUP% == 'TRUE' goto :BACKUP
rem
rem CLEANUP sets statistics and lock options
rem

echo Setting Cleanup Options
osql -Usa -P%PW% -d%DB% -Q"insert into LOADTIMES values ('Cleanup
start',getdate())" -b
if ERRORLEVEL 1 goto :ERROR_EXIT
osql -Usa -P%PW% -d%DB% -Q"sp_createstats" -o
%OUTPUTPATH%\CreateStats.out -b
if ERRORLEVEL 1 goto :ERROR_EXIT
osql -I -Usa -P%PW% -d%DB% -Q"alter database %DB% set
date_correlation_optimization ON" -o
%OUTPUTPATH%\DateCorrelation.out -b

```



```

if ERRORLEVEL 1 goto :ERROR_EXIT

osql -Usa -P%PW% -d%DB% -Q"sp_dboption '%DB%', 'auto create
statistics', 'OFF'" -o %OUTPUTPATH%\AutoCreateStats.out
if ERRORLEVEL 1 goto :ERROR_EXIT
osql -Usa -P%PW% -d%DB% -Q"sp_dboption '%DB%', 'auto update
statistics', 'OFF'" -o %OUTPUTPATH%\AutoUpdateStats.out
if ERRORLEVEL 1 goto :ERROR_EXIT
osql -Usa -P%PW% -d%DB% -Q"sp_indexoption 'LINEITEM',
'disallowpagelocks', 'FALSE'" -o
%OUTPUTPATH%\DisallowPageLocksLINEITEM.out -b
if ERRORLEVEL 1 goto :ERROR_EXIT
osql -Usa -P%PW% -d%DB% -Q"sp_indexoption 'ORDERS',
'disallowpagelocks', 'FALSE'" -o
%OUTPUTPATH%\DisallowPageLocksOrders.out -b
if ERRORLEVEL 1 goto :ERROR_EXIT
osql -Usa -P%PW% -I -d%DB% -i CreateRF1Proc.sql -o
%OUTPUTPATH%\CreateRF1Proc.out -b
if ERRORLEVEL 1 goto :ERROR_EXIT
osql -Usa -P%PW% -I -d%DB% -i CreateRF2Proc.sql -o
%OUTPUTPATH%\CreateRF2Proc.out -b
if ERRORLEVEL 1 goto :ERROR_EXIT
osql -Usa -P%PW% -d%DB% -Q"exec sp_tableoption
'NATION', 'pintable', '1'" -o %OUTPUTPATH%\pinNATION.out -b
if ERRORLEVEL 1 goto :ERROR_EXIT
osql -Usa -P%PW% -d%DB% -Q"exec sp_tableoption
'REGION', 'pintable', '1'" -o %OUTPUTPATH%\pinREGION.out -b
if ERRORLEVEL 1 goto :ERROR_EXIT
rem
rem osql -Usa -P%PW% -d%DB% -Q"exec sp_tableoption
'SUPPLIER', 'pintable', '1'" -o %OUTPUTPATH%\pinSUPPLIER.out -b
rem if ERRORLEVEL 1 goto :ERROR_EXIT
osql -Usa -P%PW% -Q"sp_dboption %DB%, 'torn', 'FALSE'" -b
>%OUTPUTPATH%\dboptionTornOFF.out
if ERRORLEVEL 1 goto :ERROR_EXIT
osql -Usa -P%PW% -Q"sp_dboption %DB%, 'trunc', 'FALSE'" -b
>%OUTPUTPATH%\dboptionTrunOFF.out
if ERRORLEVEL 1 goto :ERROR_EXIT
osql -Usa -P%PW% -Q"sp_dboption %DB%, 'select', 'FALSE'" -b
>%OUTPUTPATH%\dboptionSelOFF.out
if ERRORLEVEL 1 goto :ERROR_EXIT

osql -Usa -P%PW% -d%DB% -Q"insert into LOADTIMES values ('Cleanup
end', getdate())" -b
if ERRORLEVEL 1 goto :ERROR_EXIT

:BACKUP
rem
rem BACKUP is the final step, using a script
rem

if NOT '%DoBACKUP%' == 'TRUE' goto :ENDSTATS

echo Starting Backup
osql -Usa -P%PW% -d%DB% -Q"insert into LOADTIMES values ('Backup
start', getdate())" -b
if ERRORLEVEL 1 goto :ERROR_EXIT
echo Deleting LoadFg filegroup
REM osql -Usa -P%PW% -d%DB% -i %DB%\DelLoadFG.sql -o
%OUTPUTPATH%\DelLoadFG.out -b
REM if ERRORLEVEL 1 goto :ERROR_EXIT
osql -Usa -P%PW% -d%DB% -i %DB%\Backup.sql -o
%OUTPUTPATH%\Backup.out -b
if ERRORLEVEL 1 goto :ERROR_EXIT
osql -Usa -P%PW% -d%DB% -Q"insert into LOADTIMES values ('Backup
end', getdate())" -b
if ERRORLEVEL 1 goto :ERROR_EXIT

:ENDSTATS

```

```

if NOT '%DoENDSTATS%' == 'TRUE' goto :EOF

osql -Usa -P%PW% -d%DB% -Q"insert into LOADTIMES values ('LOAD
end', getdate())"
osql -Usa -P%PW% -d%DB% -Q"select TIMESTAMP from LOADTIMES
where STEP='LOAD end'" -o %OUTPUTPATH%\LoadEND.out
bcp %DB%..LOADTIMES out %OUTPUTPATH%\LOADTIMES.bcp -Usa
-P%PW% -n
osql -Usa -P%PW% -d%DB% -Q"select * from LOADTIMES" -o
%OUTPUTPATH%\LoadTimes.out
echo Last step is to run Francois' dbtables-ms.sql script
osql -Usa -P%PW% -d%DB% -i dbtables-ms.sql -o
%OUTPUTPATH%\dbtables-ms.out
osql -Usa -P%PW% -d%DB% -i SetupReport.sql -o
%OUTPUTPATH%\SetupReport.out
rem echo Optional step to check database validity
rem osql -Usa -P%PW% -dtpch300g -Q"dbcc checkdb('tpch300g') with
PHYSICAL_ONLY" -o %OUTPUTPATH%\CheckDb.out
rem echo Optional, and very expensive, step to check LINEITEM and
ORDERS validity
rem osql -Usa -P%PW% -dtpch300g -Q"dbcc checktable('LINEITEM')" -o
%OUTPUTPATH%\CheckLINEITEM.out
rem osql -Usa -P%PW% -dtpch300g -Q"dbcc checktable('ORDERS')" -o
%OUTPUTPATH%\CheckORDERS.out
echo Done! Check for output in %OUTPUTPATH%
goto :EOF

:ERROR_EXIT
echo Setup aborted due to errors
echo Check output in %OUTPUTPATH%
exit /B

F.2 Run.cmd

echo off

rem
rem Modify the following parameters for your configuration
rem
rem This version pulls the Update Files from
rem %UPDRIVE%\segment\%UPDATEDIR%
rem

set DB=tpch100g
set HOMEDRIVE=C:
set HOMEDIR=\HP_TPCH_KIT\Run
set OUTPUTDRIVE=C:
set OUTPUTDIR=\HP_TPCH_KIT\Output
set UPDRIVE=Z:
set UPDATEDIR=\HP_UF_Flatfiles
set UPDATESSET=7
set UPDATESEGMENTS=16
set SEED=403212042
set SCALEFACTOR=100
set STREAMS=5

set DoRESTORE=FALSE
set DoSETUP=TRUE
set DoPOWER=TRUE
set DoPOWERRefresh=TRUE
set DoPOWERStream0=TRUE
set DoTHROUGHPUT=TRUE

%HOMEDRIVE%
cd %HOMEDIR%

if %1 == 'RF1' goto RF1

```

```

if '%1' == 'RF1_LOAD' goto RF1_LOAD
if '%1' == 'RF2' goto RF2
if '%1' == 'RF2_LOAD' goto RF2_LOAD
if '%1' == 'THROUGHPUT_STREAM' goto :THROUGHPUT_STREAM

echo Checking for existence of HOMEDIR and OUTPUTDIR
if NOT EXIST %HOMEDRIVE%%HOMEDIR% goto :ERROR_EXIT
if NOT EXIST %OUTPUTDRIVE%%OUTPUTDIR% goto :ERROR_EXIT

set OUTPUTNUMBER=1
:OUTPUTLOOP
if NOT EXIST
%OUTPUTDRIVE%%OUTPUTDIR%\%OUTPUTNUMBER% goto
:OUTPUTLOOPEND
set /a OUTPUTNUMBER=%OUTPUTNUMBER%+1
goto :OUTPUTLOOP
:OUTPUTLOOPEND
set
OUTPUTPATH=%OUTPUTDRIVE%%OUTPUTDIR%\%OUTPUTNUM
BER%
echo Output will be found at %OUTPUTPATH%
mkdir %OUTPUTPATH%
rem
rem Create the TIMES table
rem
sqlcmd -I -E -d%DB% -Q"if exists (select * from sysindexes where name =
'TIMES') drop table TIMES"
sqlcmd -I -E -d%DB% -Q"create table TIMES(QUERY char(5),STREAM
int,START datetime)"

if NOT '%DoRESTORE%' == 'TRUE' goto :SETUP

rem
rem Use the Restore.sql script in SETUP
rem

echo Starting Restore
sqlcmd -I -E -i ..\Setup\%DB%\Restore.sql -b
sqlcmd -I -E -d%DB% -i ..\Setup\CreateRF1Proc.sql
sqlcmd -I -E -d%DB% -i ..\Setup\CreateRF2Proc.sql
if ERRORLEVEL 1 goto :ERROR_EXIT

:SETUP
if NOT '%DoSETUP%' == 'TRUE' goto :POWER

rem
rem Create the Power and five Throughput Streams
rem

echo QGening the Power and Throughput Streams
pushd templates
for /l %%i in (0,1,%STREAMS%) do call :SETUP1 %%i
for /l %%i in (1,1,%STREAMS%) do echo insert into TIMES values
('QXX',%%i,getdate())>> %HOMEDIR%\Stream%1.sql
for /l %%i in (1,1,%STREAMS%) do echo go>>
%HOMEDIR%\Stream%1.sql
for /l %%i in (0,1,%STREAMS%) do copy %HOMEDIR%\Stream%1.sql
%OUTPUTPATH%
popd
goto :SETUP2

:SETUP1
echo Qgening using seed %SEED%
%HOMEDIR%\qgen -s %SCALEFACTOR% -r %SEED% -p%1 >
%HOMEDIR%\Stream%1.sql
set /a SEED=%SEED% + 1
goto :EOF

:SETUP2

```

```

rem
rem Begin POWER run
rem

rem
rem Execute the RF1 Transaction set in parallel
rem

:POWER
if NOT '%DoPOWER%' == 'TRUE' goto :THROUGHPUT
sqlcmd -I -E -d%DB% -Q"truncate table TIMES"
echo Beginning Power Run
if NOT '%DoPOWERRefresh%' == 'TRUE' goto :STREAM0

echo Running the RF1s
set /a UPDATE_SEGMENT=%1+%UPDATESET%
sqlcmd -I -E -d%DB% -Q"insert into TIMES values ('RF1',0,getdate())"
sqlcmd -I -E -d%DB% -iRF_Procs\RF1_init.sql -o
%OUTPUTPATH%\RF1_%UPDATE_SEGMENT%_init.out -b
for /l %%i in (1,1,%UPDATESEGMENTS%) do start /HIGH cmd /c Run
RF1_LOAD %%i %UPDATE_SEGMENT%
semaphore -wait RF1_LOAD -count %UPDATESEGMENTS%
sqlcmd -I -E -d%DB% -iRF_Procs\RF1_index.sql -o
%OUTPUTPATH%\RF1_%UPDATE_SEGMENT%_index.out -b
for /l %%i in (1,1,%UPDATESEGMENTS%) do start /HIGH cmd /C Run
RF1 %%i 10 %UPDATESEGMENTS% %UPDATESEGMENTS%
%UPDATE_SEGMENT%
semaphore -wait RF1 -count %UPDATESEGMENTS%

rem
rem Execute the PowerRun Queries
rem

:STREAM0
if NOT '%DoPOWERStream0%' == 'TRUE' goto :STREAM0_DONE
echo Running Stream0
sqlcmd -I -E -d%DB% -iStream0.sql -o %OUTPUTPATH%\Stream0.out -b
if ERRORLEVEL 1 goto :ERROR_EXIT
:STREAM0_DONE

rem
rem Execute the RF2 Transaction set in Parallel
rem

if NOT '%DoPOWERRefresh%' == 'TRUE' goto :POWERDONE
echo Running the RF2s
sqlcmd -I -E -d%DB% -Q"insert into TIMES values ('RF2',0,getdate())"
sqlcmd -I -E -d%DB% -iRF_Procs\RF2_init.sql -o
%OUTPUTPATH%\RF2_%UPDATE_SEGMENT%_init.out -b
for /l %%i in (1,1,%UPDATESEGMENTS%) do start /HIGH cmd /c Run
RF2_LOAD %%i %UPDATE_SEGMENT%
semaphore -wait RF2_LOAD -count %UPDATESEGMENTS%
sqlcmd -I -E -d%DB% -iRF_Procs\RF2_index.sql -o
%OUTPUTPATH%\RF2_%UPDATE_SEGMENT%_index.out -b
for /l %%i in (1,1,%UPDATESEGMENTS%) do start /HIGH cmd /C Run
RF2 %%i 10 %UPDATESEGMENTS% %UPDATESEGMENTS%
%UPDATE_SEGMENT%
semaphore -wait RF2 -count %UPDATESEGMENTS%

:POWERDONE
sqlcmd -I -E -d%DB% -Q"insert into TIMES values ('QXX',0,getdate())" -
1300

rem
rem Execute the THROUGHPUT Run
rem

```

```

:THROUGHPUT
if NOT '%DoTHROUGHPUT%' == 'TRUE' goto :DONE
echo Running the Throughput Streams

for /l %%i in (1,1,%STREAMS%) do start /abovenormal cmd /C Run
THROUGHPUT_STREAM %%i
sqlcmd -I -E -d%DB% -Q"insert into TIMES values ('RF1',1,getdate())"
semaphore -wait THROUGHPUT_QUERIES -count %STREAMS%

for /l %%j in (1,1,%STREAMS%) do call :THROUGHPUT_REFRESH
%%j
goto :DONE

:THROUGHPUT_STREAM
sqlcmd -I -E -d%DB% -iStream%2.sql -o
%OUTPUTPATH%\Stream%2.out
semaphore -release THROUGHPUT_QUERIES
goto :EOF

:THROUGHPUT_REFRESH
if %1 neq 1 sqlcmd -I -E -d%DB% -Q"insert into TIMES values
('RF1',%1,getdate())"
set /a UPDATE_SEGMENT=%1+%UPDATESET%

sqlcmd -I -E -d%DB% -iRF_Procs\RF1_init.sql -o
%OUTPUTPATH%\RF1_%UPDATE_SEGMENT%_init.out -b
for /l %%i in (1,1,%UPDATESEGMENTS%) do start /HIGH cmd /c Run
RF1_LOAD %%i %UPDATE_SEGMENT%
semaphore -wait RF1_LOAD -count %UPDATESEGMENTS%
sqlcmd -I -E -d%DB% -iRF_Procs\RF1_index.sql -o
%OUTPUTPATH%\RF1_%UPDATE_SEGMENT%_index.out -b
for /l %%i in (1,1,%UPDATESEGMENTS%) do start /HIGH cmd /C Run
RF1 %%i 10 %UPDATESEGMENTS% %UPDATESEGMENTS%
%UPDATE_SEGMENT%
semaphore -wait RF1 -count %UPDATESEGMENTS%

sqlcmd -I -E -d%DB% -Q"insert into TIMES values ('RF2',%1,getdate())"
sqlcmd -I -E -d%DB% -iRF_Procs\RF2_init.sql -o
%OUTPUTPATH%\RF2_%UPDATE_SEGMENT%_init.out -b
for /l %%i in (1,1,%UPDATESEGMENTS%) do start /HIGH cmd /c Run
RF2_LOAD %%i %UPDATE_SEGMENT%
semaphore -wait RF2_LOAD -count %UPDATESEGMENTS%
sqlcmd -I -E -d%DB% -iRF_Procs\RF2_index.sql -o
%OUTPUTPATH%\RF2_%UPDATE_SEGMENT%_index.out -b
for /l %%i in (1,1,%UPDATESEGMENTS%) do start /HIGH cmd /C Run
RF2 %%i 10 %UPDATESEGMENTS% %UPDATESEGMENTS%
%UPDATE_SEGMENT%
semaphore -wait RF2 -count %UPDATESEGMENTS%

sqlcmd -I -E -d%DB% -Q"insert into TIMES values ('RFX',%1,getdate())"
goto :EOF

rem
rem Final Step -- Write out completion to Log
rem

:DONE
sqlcmd -E -d%DB% -iReport.sql -o%OUTPUTPATH%\Report.out -w120
bcp %DB%.TIMES out %OUTPUTPATH%\TIMES.bcp -Usa -P -n
osql -E -e -I -w300 -d %DB% -Q"select * from TIMES" -
o%OUTPUTPATH%\times.out
rem ----- Get SQL Configuration
sqlcmd -I -E -Q"sp_configure 'show advanced',1"
sqlcmd -I -E -Q"reconfigure with override"
sqlcmd -I -E -n -s, -w300 -Q"sp_configure" -
o%OUTPUTPATH%\configure.out
rem ----- Get SQL Version
sqlcmd -I -E -n -w300 -e -Q"select @@version" -
o%OUTPUTPATH%\sqlversion.out

```

```

sqlcmd -I -E -n -w300 -e -Q"sp_helpdb %DB%" -
o%OUTPUTPATH%\db.out
sqlcmd -I -E -n -w300 -e -Q"sp_dboption %DB%" -
o%OUTPUTPATH%\dboption.out
sqlcmd -I -E -n -w300 -e -Q"sp_helpsort" -o%OUTPUTPATH%\sort.out
sqlcmd -I -E -n -w300 -e -d%DB% -ilocking.sql -
o%OUTPUTPATH%\locking.out
rem ----- Get query plans
@echo set showplan_all on >%OUTPUTPATH%\stream.sql
@echo go >>%OUTPUTPATH%\stream.sql
type stream0.sql >>%OUTPUTPATH%\stream.sql
sqlcmd -I -E -d%DB% -n -w3000 -i%OUTPUTPATH%\stream.sql -
o%OUTPUTPATH%\plans.out

rem ----- Get Boot.ini
TYPE c:\boot.ini >%OUTPUTPATH%\boot.ini
reg query "HKLM\SYSTEM\CurrentControlSet\Control\Session
Manager\I/O System" /s >%OUTPUTPATH%\session.reg
reg query
"HKLM\SYSTEM\CurrentControlSet\Services\hpqcissb\Parameters" /s
>%OUTPUTPATH%\array.reg
reg query "HKLM\SYSTEM\CurrentControlSet\Control\PriorityControl" /s
>%OUTPUTPATH%\priority.reg

echo Done! Output can be found at %OUTPUTPATH%
goto :EOF

rem
rem Subroutine for Loading data for RF1s
rem called from RF1 and THROUGHPUT_RF1
rem

:RF1_LOAD
set "SQLTEXT=bulk insert NEWLINEITEM from
'%UPDRIVE%%%UPDIR%\Lineitem.tbl.u.3.%2' with
(FieldTerminator = '|', RowTerminator = '\n',tablock)"
OSQL -I -E -l 120 -d%DB% -Q"%SQLTEXT%" -o
%OUTPUTPATH%\RF1_load_lineitem_%2_%3.out
set "SQLTEXT=bulk insert NEWORDERS from
'%UPDRIVE%%%UPDIR%\Orders.tbl.u.3.%2' with
(FieldTerminator = '|', RowTerminator = '\n',tablock)"
OSQL -I -E -l 120 -d%DB% -Q"%SQLTEXT%" -o
%OUTPUTPATH%\RF1_load_orders_%2_%3.out
semaphore -release RF1_LOAD
goto :EOF

rem
rem Subroutine for Executing RF1s
rem called from RF1 and THROUGHPUT_RF1
rem

:RF1
OSQL -I -E -l 120 -d%DB% -Q"exec RF1 %2,%3,%4,%5" -o
%OUTPUTPATH%\RF1_%2_%6.out
semaphore -release RF1
goto :EOF

rem
rem Subroutine for Executing RF2s
rem called from RF2 and THROUGHPUT_RF2
rem

:RF2_LOAD
set "SQLTEXT=bulk insert OLDORDERS_%2 from
'%UPDRIVE%%%UPDIR%\Delete.u.3.%2' with
(FieldTerminator = '|', RowTerminator = '|',tablock)"

```

```

sqlcmd -I -E -I 120 -d%DB% -Q"%SQLTEXT%" -o
%OUTPUTPATH%\RF2_load_orders_%2_%3.out
sqlcmd -I -E -I 120 -d%DB% -Q"insert into MOD_OLDORDERS
(O_ORDERDATE, O_ORDERKEY) (select B.O_ORDERDATE,
B.O_ORDERKEY from OLDORDERS_%2 A, ORDERS B where
A.O_ORDERKEY = B.O_ORDERKEY)" -o
%OUTPUTPATH%\RF2_insert_orders_%2_%3.out
semaphore -release RF2_LOAD
goto :EOF

```

```

:RF2
OSQL -I -E -I 120 -d%DB% -Q"exec RF2 %2,%3,%4,%5" -o
%OUTPUTPATH%\RF2_%2_%6.out
semaphore -release RF2
goto :EOF

```

```

:ERROR_EXIT
echo Run aborted due to error
echo Check output in %OUTPUTPATH%
exit /B

```

F.3 Semaphore.cpp

```

#define _WIN32_WINNT 0x0400
#include <windows.h>
#include <string.h>
#include <iostream.h>
#include <stdlib.h>
#include <stdio.h>
#include <assert.h>
void main(int argc, char **argv)
{
    typedef enum { eUnknown, eWait, eSignal, eRelease, eWaitList,
eWaitGroup } OPERATION;
    OPERATION eOP = eUnknown;
    int iCount;
    int i;
    HANDLE hSemaphore;
    HANDLE *pHandles;
    SYSTEMTIME Time;
    if (argc < 3)
        goto usage;
    if (_stricmp(argv[1], "-wait") == 0)
        eOP = eWait;
    else if (_stricmp(argv[1], "-signal") == 0)
        eOP = eSignal;
    else if (_stricmp(argv[1], "-release") == 0)
        eOP = eRelease;
    else if (_stricmp(argv[1], "-waitlist") == 0)
        eOP = eWaitList;
    else if (_stricmp(argv[1], "-waitgroup") == 0)
        eOP = eWaitGroup;
    else goto usage;
    if ((eOP == eWait) || (eOP == eRelease))
    {
        // argv[2] is the semaphore name
        // if -count option specified, then there must be exactly 5 args
        if (argc == 5) && (_stricmp(argv[3], "-count") == 0)
        {
            iCount = atoi(argv[4]);
            if (iCount < 1)
                goto usage;
        }
    }
}

```

```

// check that
else if (argc != 3)
    goto usage;
else
    iCount = 1;
}
else if (eOP == eWaitGroup)
{
    if ((argc != 5) || (_stricmp(argv[3], "-count") != 0))
        goto usage;
    iCount = atoi(argv[4]);
    if (iCount < 1)
        goto usage;
}
else
    // eWaitList or eSignal
    iCount = argc - 2;
if (eOP == eWait)
{
    printf("semaphore name = %s\n", argv[2]);
    printf("semaphore count = %d\n", iCount);
    hSemaphore = CreateSemaphore(NULL, 0, 2000000000,
argv[2]);
    if (hSemaphore == NULL)
    {
        DWORD dwError = GetLastError();
        cout << "ERROR" CreateSemaphore returned "
<< dwError << endl;
        exit(EXIT_FAILURE);
    }
    for (i=0; i<iCount; i++)
    {
        WaitForSingleObject(hSemaphore, INFINITE);
        GetLocalTime(&Time);
        printf("%4.4d-%2.2d-%2.2d %2.2d:%2.2d:%2.2d
- released\n",
Time.wYear, Time.wMonth,
Time.wDay, Time.wHour, Time.wMinute, Time.wSecond);
    }
    CloseHandle(hSemaphore);
}
else if ((eOP == eWaitGroup) || (eOP == eWaitList))
{
    char **szEventNames;
    szEventNames = new char*[iCount];
    char szTmp[128];
    printf("event-list = ");
    for (i=0; i<iCount; i++)
    {
        if (eOP == eWaitGroup)
        {
            wsprintf(szTmp, "%s.%d", argv[2],
i+1);
            szEventNames[i] = new
char[strlen(szTmp)+1];
            strcpy(szEventNames[i], szTmp);
        }
        else
        {
            szEventNames[i] = new
char[strlen(argv[i+2])+1];
            strcpy(szEventNames[i], argv[i+2]);
        }
        printf(" %s", szEventNames[i]);
    }
    printf("\n");
    pHandles = new HANDLE[iCount-1];
    for (i=0; i<iCount; i++)
    {
        pHandles[i] = CreateEvent(NULL, TRUE /*

```

```

manual reset */, FALSE /* initially non-signaled */, szEventNames[i] );
if (pHandles[i] == NULL)
{
    DWORD dwError = GetLastError();
    cout << "ERROR" CreateEvent
    returned " << dwError << endl;
    exit(EXIT_FAILURE);
}
}
for (i=iCount; i>0;i--)
{
    int idx = WaitForMultipleObjects(i, pHandles,
    FALSE /* wait for all */, INFINITE) - WAIT_OBJECT_0;
    GetLocalTime( &Time );
    printf( "%4.4d-%2.2d-%2.2d %2.2d:%2.2d:%2.2d
    - signaled: %s\n",
    Time.wYear, Time.wMonth,
    Time.wDay, Time.wHour, Time.wMinute, Time.wSecond, szEventNames[idx] );
    HANDLE hTmp = pHandles[idx];
    pHandles[idx] = pHandles[i-1];
    pHandles[i-1] = hTmp;
    char* szTmp = szEventNames[idx];
    szEventNames[idx] = szEventNames[i-1];
    szEventNames[i-1] = szTmp;
}
for (i=0; i<iCount; i++)
    CloseHandle( pHandles[i] );
}
else if (eOP == eRelease)
{
    hSemaphore = OpenSemaphore(
    SEMAPHORE_MODIFY_STATE, FALSE, argv[2] );
    if (hSemaphore == NULL)
    {
        DWORD dwError = GetLastError();
        cout << "ERROR" OpenSemaphore returned "
        << dwError << endl;
        exit(EXIT_FAILURE);
    }
    if (!ReleaseSemaphore( hSemaphore, iCount, NULL ))
    {
        DWORD dwError = GetLastError();
        cout << "ERROR" ReleaseSemaphore returned
        " << dwError << endl;
        exit(EXIT_FAILURE);
    }
    CloseHandle( hSemaphore );
}
else if (eOP == eSignal)
{
    for (i=0; i<iCount; i++)
    {
        HANDLE hHandle = OpenEvent(
        EVENT_MODIFY_STATE, FALSE, argv[i+2] );
        if (hHandle == NULL)
        {
            DWORD dwError = GetLastError();
            cout << "ERROR" OpenEvent
            returned " << dwError << endl;
            exit(EXIT_FAILURE);
        }
        SetEvent( hHandle );
        CloseHandle( hHandle );
    }
}
exit(EXIT_SUCCESS);
// syntax was bad; show usage and quit
usage:
printf(
"Semaphore Utility - Ver. 1.2 - 26-Jul-99\n"

```

```

"Copyright (C) Microsoft Corp 1999. All rights reserved.\n\n"
"usage: \n"
" semaphore { -wait | -release } <semaphore-name> [ -count
<count> ] \n"
" semaphore { -waitlist | -signal } <event-list> \n"
" semaphore -waitgroup <event-prefix> -count <count>\n"
"\n"
"<semaphore-name> == alpha-numeric identifier \n"
"<count> == integer > 0; default value = 1 \n"
"<event-list> == { <event-name> ... } \n"
"<event-name> == alpha-numeric identifier \n"
"<event-prefix> == alpha-numeric identifier \n"
"\n"
"There are two modes to choose from: a semaphore or a list
of events. \n"
"\n"
"Semaphore mode: \n"
"A semaphore is a single identifier with an associated count.
Each time \n"
"the semaphore is released, the count is decremented by one
(or the amount \n"
"specified). When the count reaches zero, the waiter
completes. If there \n"
"are multiple waiters on the same semaphore, each release
releases only \n"
"the number of waiters specified in count.\n"
"\n"
"List of Events: \n"
"A list of events (alpha-numeric tags) is specified for the
waiter. The \n"
"waiter doesn't complete until all of the events have been
signaled. A \n"
"given event may be signaled more than once. There are two
ways to define \n"
"the list of events, either explicitly (-waitlist) by naming all of
them or \n"
"implicitly (-waitgroup) with a prefix and a count. Using the -waitgroup
\n"
"option, you provide an alpha-numeric tag which is used as
the prefix for a \n"
"group of events. The event names are generated by
concatenating the prefix \n"
"with \"<n>\", where <n> is 1 to the specified count. \n"
);
exit(EXIT_FAILURE);
}

```

F.4 Print.C for DBGEN

```

/*
 * $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
#if defined(SUN)
#include <unistd.h>
#endif
#include <math.h>

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

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

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

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

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

                            this_segment=++insert_orders_segment;
                        else

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

                            env_config(PATH_TAG, PATH_DFLT),

                                PATH_SEP,

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

                            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
        case DT_INT:
            if (columnar)
                fprintf(target, "%12ld", (long)data);
            else
                fprintf(target, "%ld", (long)data);
            break;
        case DT_HUGE:
            fprintf(target, HUGE_FORMAT, *(DSS_HUGE *)data);
            break;
        case DT_KEY:
            fprintf(target, "%ld", (long)data);
            break;
        case DT_MONEY:
            cents = (int)*(DSS_HUGE *)data;
            if (cents < 0)
                {
                    fprintf(target, "-");
                    cents = -cents;
                }
            dollars = cents / 100;
            cents %= 100;
            if (columnar)
                fprintf(target, "%12ld.%02ld", dollars, cents);
            else
                fprintf(target, "%ld.%02ld", dollars, cents);
        }
}

```

```

        break;
    case DT_CHR:
        if (columnar)
            fprintf(target, "%c ", *(char *)data);
        else
            fprintf(target, "%c", *(char *)data);
        break;
    }
}

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

    return(0);
}

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

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

    PR_START(fp);
    PR_HUGE(fp, &c->custkey);
    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->cflen);
    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_START(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].suppkey);
        PR_HUGE(fp_l, &o->l[i].quantity);
        PR_CHR(fp_l, &o->l[i].rflag[0]);
        PR_HUGE(fp_l, &o->l[i].partkey);
        PR_CHR(fp_l, &o->l[i].lstatus[0]);
        PR_MONEY(fp_l, &o->l[i].tax);
        PR_STR(fp_l, &o->l[i].cdate, DATE_LEN);
        PR_STR(fp_l, o->l[i].rdate, DATE_LEN);
        PR_STR(fp_l, o->l[i].shipmode, L_SMODE_LEN);
        PR_HUGE(fp_l, &o->l[i].lcnt);
        PR_STR(fp_l, o->l[i].shipinstruct, L_INST_LEN);
        PR_VSTR_LAST(fp_l, o->l[i].comment,
                    (columnar)?(long)(ceil(L_CMNT_LEN * V_STR_HGH)):o->l[i].cflen);
        PR_END(fp_l);
    }

    return(0);
}

/*
 * print the numbered order *and* its associated lineitems
 */
int
pr_order_line(order_t *o, int mode)
{
    tdefs[ORDER].name = tdefs[ORDER_LINE].name;
    pr_order(o, mode);
    pr_line(o, mode);

    return(0);
}

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

    if (p_fp == NULL)

```

```

    p_fp = print_prep(PART, 0);

PR_STRT(p_fp);
PR_HUGE(p_fp, &part->partkey);
PR_VSTR(p_fp, part->type,
    (columnar)?(long)P_TYPE_LEN:part->tlen);
PR_HUGE(p_fp, &part->size);
PR_STR(p_fp, part->brand, P_BRND_LEN);
PR_VSTR(p_fp, part->name,
    (columnar)?(long)P_NAME_LEN:part->nlen);
PR_STR(p_fp, part->container, P_CNTR_LEN);
PR_STR(p_fp, part->mfr, 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->clen);
PR_END(p_fp);

return(0);
}

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

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

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

```

```

    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_START(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);

                print_prep(tbl, -num);
                NULL) return(-1);
                num;

                rows_this_segment=1;

                PR_START(dfp);
                PR_HUGE(dfp, &new);
                PR_END(dfp);
            }
            start = new;
            last = new;
        }
        if (gen_rng)
        {
            PR_START(dfp);
            PR_HUGE(dfp, &start);
            PR_HUGE(dfp, &last);
            PR_END(dfp);
        }
        return(0);
    }
}

/*
 * verify functions: routines which replace the pr_routines and generate a pseudo
checksum
 * instead of generating the actual contents of the tables. Meant to allow large scale
data
 * validation without requiring a large amount of storage
 */
int
vrf_cust(customer_t *c, int mode)
{
    VRF_START(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_START(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_START(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);
}

```

Appendix G: Price Quotations & Verification

April 16, 2007

Hewlett-Packard Company
 Daniel Pol
 20555 SH 249
 Houston, TX 77070

Mr. Pol:

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 Server License with 25 CALs Discount Schedule: Open Program - No Level Unit Price reflects a 39% discount from the retail unit price of \$13,969.	\$8,487	1	\$8,487
359-01911	SQL Server 2005 Client License Discount Schedule: Open Program - No Level Unit Price reflects a 4% discount from the retail unit price of \$163.	\$156	25	\$3,900
P72-00274	Windows Server 2003, Enterprise x64 Edition Server License with 25 CALs Discount Schedule: Open Program - No Level Unit Price reflects a 41% discount from the retail unit price of \$3,999.	\$2,334	1	\$2,334
254-00170	Visual C++ Standard Edition No Discounts Applied	\$109	1	\$109
046-00856	Visual Basic 2003 .Net Professional No Discounts Applied	\$109	1	\$109
N/A	Microsoft Problem Resolution Services Professional Support (1 Incident)	\$245	1	\$245

All products are currently orderable through Microsoft's normal distribution channels. A list of Microsoft's authorized resellers can be found at:
<http://www.microsoft.com/products/info/render.aspx?view=22&type=mpn&content=22/licensing>.