

TPC Benchmark™ H Full Disclosure Report
for
IBM® @server™ xSeries® 445
using
IBM DB2® Universal Database 8.1

Submitted for Review

March 2, 2004



First Edition - March 2004

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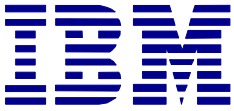
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Notes

¹ GHz only measures microprocessor internal clock speed, not application performance. Many factors affect application performance.

² When referring to hard disk capacity, one GB equals one billion bytes. Total user-accessible capacity may be less.



IBM® @server® xSeries® 445
with
IBM DB2® UDB 8.1

TPC-H Rev 2.1.0

Report Date: March 2, 2004

Total System Cost

Composite Query-per-Hour Metric

Price/Performance

\$431,836

6551.8
QphH @ 300GB

\$66
per QphH @ 300GB

Database Size

Database Manager

Operating System

Other Software

Availability Date

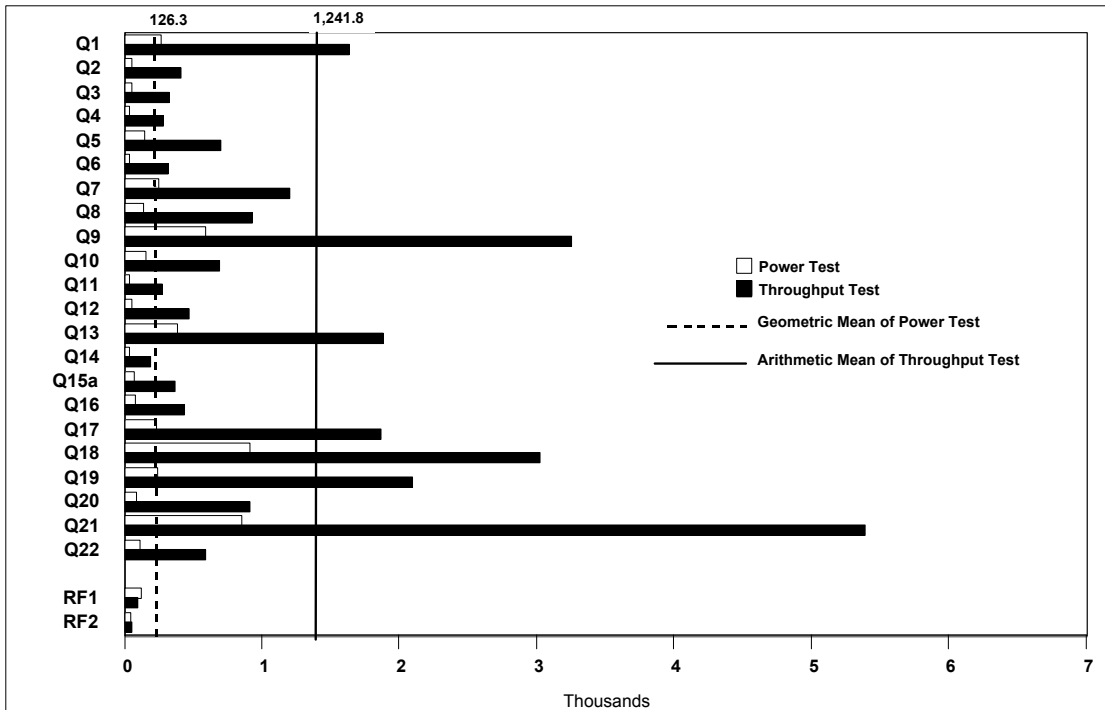
300GB

IBM DB2 UDB 8.1

Microsoft®
Windows® Server
2003 Enterprise
Edition

Microsoft
Visual C++
.NET
Standard

Aug. 31, 2004



Database Load Time: 03:26:00

Load Included Backup: Y

Total Data Storage /
Database Size: 15.59

RAID (Base Tables Only): N

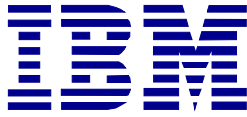
RAID (Base Tables and Auxiliary
Data Structures): N

RAID (All): N

Configuration

Processors/Cores/Threads 8/8/16
Memory 32
Disk Controllers 5
Disk Drives 136
2
Total Disk Storage

Intel Xeon MP 3.0GHz / 4MB ECC L3 Cache
512MB PC2100 DDR ECC SDRAM RDIMM
ServeRAID-6M Ultra320 SCSI Adapter
36.4GB 15K Ultra160 SCSI Drive
36.4GB 15K Ultra320 SCSI Drive
4678.2GB

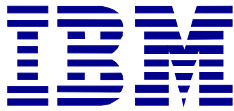


IBM @server xSeries 445 with IBM DB2 UDB 8.1

TPC-H 2.1.0 Executive Summary

Report Date: March 2, 2004

Description	Part Number	Third Party Brand	Pricing	Unit Price	Quantity	Extended Price	3-Yr. Maint. Price	
Server Hardware								
IBM e(logo)server xSeries 445 w/3.0GHz Xeon MP w/4 x 3.0GHz/4MB Xeon MP Processors w/4 x 512MB ECC SDRAM RDIMMs	8870-42X	IBM	1	40,799	1	40,799	3,221	
xSeries 3.0GHz/4MB Processor	13N0721	IBM	1	6,599	4	26,396		
xSeries 445 SMP Expansion Module	02R1870	IBM	1	4,849	1	4,849		
512MB PC2100 DDR ECC SDRAM RDIMM	33L5038	IBM	1	249	28	6,972		
36.4GB 15K Ultra320 SCSI Hot-Swap Drive	32P0734	IBM	1	495	2	990		
ServeRAID-6M Ultra320 SCSI Contoller	32P0033	IBM	1	999	5	4,995		
APC Smart-UPS Model 1400	32P1020	IBM	1	855	1	855		
Netfinity 4.2M Ultra2 SCSI Cable	03K9311	IBM	1	105	10	1,050		
IBM Preferred Pro Full-Size Keyboard	31P7415	IBM	1	29	1	29		
IBM Sleek 2-Button Mouse	28L3673	IBM	1	15	1	15		
E54 15" (13.8" Viewable) Color Monitor	633147N	IBM	1	119	1	119	90	
NetBAY42S Enterprise Rack	9306421	IBM	1	1,439	1	1,439	168	
Subtotal						88,508	3,479	
Server Storage								
IBM RXE-100 Remote Expansion Enclosure	8684-2RX	IBM	2	4,569	1	4,569	1,330	
IBM EXP400 Rack Storage Exp. Enclosure	17331RU	IBM	1	3,099	10	30,990	7,600	
36.4GB 15K Ultra320 SCSI Hot-Swap Drive	32P0734	IBM	1	495	136	67,320		
Subtotal						102,879	8,930	
Server Software								
DB2 UDB ESE 8.1 SW Lic.& Maintenance 12 Months	D518GLL	IBM	1	21,425	8	171,400		
SW Maintenance Renewal - 1 Year	E00BILL	IBM	1	1,020	16		16,320	
DPF SW License & Maintenance 12 Months	D518JLL	IBM	1	6,436	8	51,488		
DPF SW Maintenance Renewal - 1 Year	E00BILL	IBM	1	306	16		4,896	
Microsoft Windows Server 2003 Enterprise Edition	P7200264	Microsoft	3	2,399	1	2,399	Incl Below	
Operating System Support Package	PRO-PRORS-16U-01	Microsoft	3	1,950	3		5,850	
Microsoft Visual C++ .NET Standard		Microsoft	4	92	1	92		
Subtotal						225,379	27,066	
Compsat Technology discount						Discount	23,076	1,329
						Total	393,690	38,146
Three-Year Cost of Ownership:							431,836	
Pricing: 1 - Compsat Technology; 2 - IBM 919-254-0367; 3 - Microsoft; 4 - Amazon.com					QphH@300GB:		6,551.8	
Warranty and Maintenance: The standard warranty has been upgraded to 3 years of 24x7x4 coverage.					\$/QphH@300GB:		\$66	
Audited by Francois Raab, InfoSizing, 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 stated prices are not available according to these terms, please inform the TPC at pricing@tpc.org. Thank you.								



**IBM @server xSeries 445
with
IBM DB2 UDB 8.1**

TPC-H Rev 2.1.0

Report Date: March 2, 2004

Measurement Results:

Database Scale Factor	300
Total Data Storage/Database Size	15:59
Start of Database Load	23:54:27
End of Database Load	03:19:43
Database Load Time	03:26:00
Query Streams for Throughput Test	6
TPC-H Power	8,551.1
TPC-H Throughput	5,019.9
TPC-H Composite Query-per-Hour (QphH@300GB)	6,551.8
Total System Price over 3 Years	\$431,836
TPC-H Price/Performance Metric (\$/QphH@300GB)	\$66

Measurement Interval:

Measurement Interval in Throughput Test (Ts) = 28,399

Duration of Stream Execution:

	Seed	Query Start Date/Time Query End Date/Time	RF1 Start Date/Time RF1 End Date/Time	RF2 Start Date/Time RF2 End Date/Time	Duration
Stream 00	222031943	02/20/04 03:54:56 02/20/04 05:18:52	02/20/04 03:54:56 02/20/04 03:56:55	02/20/04 05:18:03 02/20/04 05:18:52	01:23:56
Stream 01	222031944	02/20/04 05:18:56 02/20/04 12:52:01	02/20/04 05:18:56 02/20/04 12:58:17	02/20/04 12:58:17 02/20/04 12:59:14	07:33:05
Stream 02	222031945	02/20/04 05:18:56 02/20/04 12:55:46	02/20/04 12:59:14 02/20/04 13:00:50	02/20/04 13:00:50 02/20/04 13:01:46	07:36:50
Stream 03	222031946	02/20/04 05:18:56 02/20/04 12:54:22	02/20/04 13:01:46 02/20/04 13:03:27	02/20/04 13:03:27 02/20/04 13:04:29	07:35:26
Stream 04	222031947	02/20/04 05:18:56 02/20/04 12:51:14	02/20/04 13:04:29 02/20/04 13:06:11	02/20/04 13:06:11 02/20/04 13:07:04	07:32:18
Stream 05	222031948	02/20/04 05:18:56 02/20/04 12:55:12	02/20/04 13:07:04 02/20/04 13:08:40	02/20/04 13:08:40 02/20/04 13:09:36	07:36:16
Stream 06	222031949	02/20/04 05:18:56 02/20/04 12:56:57	02/20/04 13:09:36 02/20/04 13:11:19	02/20/04 13:11:19 02/20/04 13:12:15	07:38:01



IBM @server xSeries 445
with
IBM DB2 UDB 8.1

TPC-H Rev 2.1.0

Report Date: March 2, 2004

TPC-H Timing Intervals (in seconds):

Query	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12
Stream 00	269.9	54.4	55.3	37.1	150.6	34.1	249.5	141.5	594.5	154.1	41.1	59.4
Stream 01	1,538.5	263.2	229.8	147.4	938.8	279.1	986.2	925.3	2,930.2	803.3	261.3	394.2
Stream 02	1,535.2	578.0	878.7	200.8	635.8	246.2	1,718.5	823.6	3,424.5	607.8	249.0	412.3
Stream 03	1,766.8	390.0	133.9	162.5	668.4	194.1	787.4	866.7	3,750.4	741.2	352.5	354.5
Stream 04	1,494.8	337.2	189.5	823.1	563.4	686.9	823.4	1,269.6	3,322.2	424.0	206.0	464.4
Stream 05	1,884.5	280.8	347.3	187.9	556.8	311.0	1,167.9	855.4	2,694.6	1,031.5	322.5	604.8
Stream 06	1,603.9	624.0	208.9	202.5	821.3	206.1	1,731.0	843.7	3,431.6	545.8	294.3	624.3
Minimum	269.9	54.4	55.3	37.1	150.6	34.1	249.5	141.5	594.5	154.1	41.1	59.4
Average	1,637.3	412.2	331.4	287.4	704.9	320.6	1,202.4	930.7	3,258.9	692.3	280.9	475.8
Maximum	1,884.5	624.0	878.7	823.1	983.8	686.9	1,731.0	1,269.6	3,750.4	1,031.5	352.5	624.3

Stream ID	Q13	Q14	Q15a	Q16	Q17	Q18	Q19	Q20	Q21	Q22	RF1	RF2
Stream 00	389.8	39.6	68.6	80.6	230.6	913.9	246.4	86.8	852.8	117.3	119.3	48.4
Stream 01	1,511.8	134.1	328.8	571.5	2,276.0	3,128.2	1,733.2	1,489.5	5,519.3	750.4	80.0	57.1
Stream 02	1,895.5	157.9	640.6	486.0	1,771.8	2,670.8	1,509.0	962.0	5,325.8	680.6	96.0	56.6
Stream 03	2,511.7	95.8	426.3	229.6	1,392.9	3,550.9	1,798.0	668.3	5,917.0	567.5	100.3	62.7
Stream 04	1,707.8	238.1	267.2	350.1	2,088.5	2,097.4	3,164.7	673.1	5,471.3	465.7	101.6	53.2
Stream 05	1,485.7	122.7	317.4	503.4	1,594.8	3,434.4	2,776.6	1,016.1	5,350.2	529.8	96.0	56.2
Stream 06	2,213.9	397.9	254.9	492.1	2,072.9	3,287.6	1,590.3	697.4	4,786.9	549.2	102.7	56.0
Minimum	389.8	39.6	68.6	80.6	230.6	913.9	246.4	86.8	852.8	117.3	80.0	48.4
Average	1,887.7	191.1	372.5	438.8	1,866.2	3,028.2	2,095.3	917.7	5,395.1	592.2	96.1	57.0
Maximum	2,511.7	397.9	640.6	571.5	2,276.0	3,550.9	3,164.7	1,489.5	5,917.0	750.4	102.7	62.7

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Preface

TPC Benchmark H Standard Specification was developed by the Transaction Processing Performance Council (TPC). It was released on February 26, 1999, and most recently revised (Revision 2.0) October 29, 2002. This is the full disclosure report for benchmark testing of the IBM *@server* xSeries 445 according to the TPC Benchmark H Standard Specification.

The TPC Benchmark H is a decision support benchmark. It consists of a suite of business-oriented ad hoc queries and concurrent data modifications. The queries and the data populating the database have been chosen to have broad industrywide relevance while maintaining a sufficient degree of ease of implementation. This benchmark illustrates decision support systems that:

- Examine large volumes of data;
- Execute queries with a high degree of complexity;
- Give answers to critical business questions.

TPC-H evaluates the performance of various decision support systems by the execution of set of queries against a standard database under controlled conditions. The TPC-H queries:

- Give answers to real-world business questions;
- Simulate generated ad-hoc queries (e.g., via a point-and-click GUI interface);
- Are far more complex than most OLTP transactions;
- Include a rich breadth of operators and selectivity constraints;
- Generate intensive activity on the part of the database server component of the system under test;
- Are executed against a database complying with specific population and scaling requirements;
- Are implemented with constraints derived from staying closely synchronized with an on-line production database.

The TPC-H operations are modeled as follows:

- The database is continuously available 24 hours a day, 7 days a week, for ad-hoc queries from multiple end users and data modifications against all tables, except possibly during infrequent (e.g., once a month) maintenance sessions.
- The TPC-H database tracks, possibly with some delay, the state of the OLTP database through ongoing refresh functions, which batch together a number of modifications impacting some part of the decision support database.
- Due to the worldwide nature of the business data stored in the TPC-H database, the queries and the refresh functions may be executed against the database at any time, especially in relation to each other. In addition, this mix of queries and refresh functions is subject to specific ACIDity requirements, since queries and refresh functions may execute concurrently.
- To achieve the optimal compromise between performance and operational requirements, the database administrator can set, once and for all, the locking levels and the concurrent scheduling rules for queries and refresh functions.

The minimum database required to run the benchmark holds business data from 10,000 suppliers. It contains almost 10 million rows representing a raw storage capacity of about 1 gigabyte. Compliant benchmark implementations may also use one of the larger permissible database populations (e.g., 100 gigabytes), as defined in Clause 4.1.3).

The performance metrics reported by TPC-H is called the TPC-H Composite Query-per-Hour Performance Metric (QphH@Size), and reflects multiple aspects of the capability of the system to process queries. These aspects include the selected database size against which the queries are executed, the query processing power when queries are submitted by a single stream, and the query throughput when queries are submitted by multiple concurrent users. The TPC-H Price/Performance metric is expressed as \$/QphH@Size. To be compliant with the TPC-H standard, all references to TPC-H results for a given configuration must include all required reporting components (see Clause 5.4.6). The TPC believes that comparisons of TPC-H results measured against different database sizes are misleading and discourages such comparisons.

The TPC-H database must be implemented using a commercially available database management system (DBMS), and the queries executed via an interface using dynamic SQL. The specification provides for variants of SQL, as implementers are not required to have implemented a specific SQL standard in full.

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

1 General Items

1.1 Benchmark Sponsor

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

IBM Corporation sponsored this TPC-H benchmark.

1.2 Parameter Settings

Settings must be provided for all customer-tunable parameters and options that have been changed from the defaults found in actual products, including but not limited to:

- *Database tuning options*
- *Optimizer/Query execution options*
- *Query Processing tool/language configuration parameters*
- *Recovery/commit options*
- *Consistency/locking options*
- *Operating system and configuration parameters*
- *Configuration parameters and options for any other software component incorporated into the pricing structure*
- *Compiler optimization options.*

Appendix A, “Tunable Parameters,” contains a list of all DB2 parameters and operating system parameters. Session initialization parameters can be set during or immediately after establishing the connection to the database within the tpcdbatch program documented in Appendix D, “Driver Source Code.” This result uses the default session initialization parameters established during preprocessing/binding of the tpcdbatch program.

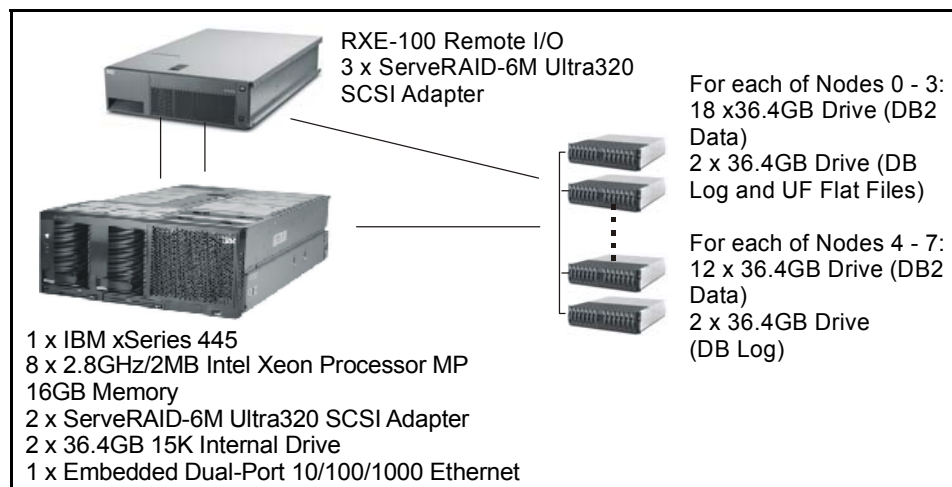
1.3 Configuration Diagrams

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 and type of disk units (and controllers, if applicable)*
- *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 run-time execution location of software components (e.g., DBMS, query processing tools/languages, middleware components, software drivers, etc.).*

The configuration diagram for the tested and priced system is provided on the following page.

1.3.1 Priced and Measured Configurations



The priced configuration for the xSeries 445 contained:

- Eight Intel Xeon MP 3.0GHz processors, each with 4MB of ECC L3 cache
- 16GB of memory
- One embedded dual-port 10/100/1000 Ethernet interface
- Five ServeRAID-6M Ultra320 SCSI adapters
- One hundred thirty-six (136) 36.4GB 15K Ultra320 SCSI disk drives
- Ten (10) EXP400 Storage Expansion Enclosures
- Two (2) 36.4GB 15K Ultra320 SCSI Disk Drives
- One RXE-100 Remote I/O Expansion Enclosure

The measured configuration was different in that it contained one additional EXP300 Storage Expansion unit, which held fourteen 36.4GB 15K Ultra320 SCSI drives that held raw data files. A sixth ServeRAID adapter was used to attach these drives. This hardware was not priced.

2 Clause 1: Logical Database Design Related Items

2.1 Database 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 contains the scripts that were used to set up the TPC-H test and qualification databases.

2.2 Database Organization

The physical organization of tables and indexes 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 contains the scripts that were used to create the indexes on the test and qualification databases.

2.3 Horizontal Partitioning

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

Horizontal partitioning was used for all tables except for the nation and region tables. See Appendix B, “Database Build Scripts.”

2.4 Replication

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

Replication was not used.

3 Clause 2: Queries and Update 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 1.3.0 and QGEN version 1.3.0 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 1.3.0 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 output for each of the qualification queries. The functional query definitions and variants used in this disclosure use the following minor query modifications:

- Table names and view names are fully qualified. For example, the nation table is referred to as “TPCD.NATION.”
- The standard IBM SQL date syntax is used for date arithmetic. For example, DATE(‘1996-01-01’)+3 MONTHS.
- The semicolon (;) is used as a command delimiter.

3.5 Query Substitution Parameters and Seeds Used

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

Appendix C contains the seed and query substitution parameters used.

3.6 Query 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 isolation level used to run the queries was “repeatable read.”

3.7 Refresh Function Implementation

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

The refresh functions are part of the implementation-specific layer/driver code included in Appendix D, “Driver Source Code.”

4 Clause 3: Database System Properties Related Items

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 specifications. The Atomicity, Isolation, Consistency and Durability tests were performed on the xSeries 445 server. Appendix E contains the ACID transaction source code.

4.1 Atomicity Requirements

The system under test must guarantee that transactions are atomic; the system will either perform all individual operations on the data, or will assure that no partially completed operations leave any effects on the data.

4.1.1 Atomicity of Completed Transactions

Perform the ACID transactions 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. The number of records in the HISTORY table was also retrieved.
2. The ACID Transaction T1 was executed for the order key used in step 1.
3. The total price and extended price were retrieved for the same order key used in step 1 and step 2. It was verified that:
$$T1.EXTENDEDPRICE=OLD.EXTENDEDPRICE+((T1.DELTA)*$$
$$(OLD.EXTENDEDPRICE/OLD.QUANTITY)), T1.TOTALPRICE=OLD.TOTALPRICE+$$
$$((T1.EXTENDEDPRICE-OLD.EXTENDEDPRICE)*(1-DISCOUNT))*(1+TAX)),$$
 and that the number of records in the History table had increased by 1.

4.1.2 Atomicity of Aborted Transactions

Perform the ACID transactions 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 the aborted ACID transaction:

1. The ACID application is passed a parameter to execute a rollback of the transaction instead of performing the commit.
2. The total price from the ORDER table and the extended price from the LINEITEM table were retrieved for a random order key. The number of records in the HISTORY table was also retrieved.
3. The ACID transaction was executed for the orderkey used in step 2. The transaction was rolled back.
4. The total price and the extended price were retrieved for the same orderkey used in step 2 and step 3. It was verified that the extended price and the total price were the same as in step 2.

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.

4.2.1 Consistency Condition

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

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

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

The following queries were executed before and after a measurement to show that the database was always in a consistent state both initially and after a measurement.

```
SELECT DECIMAL(SUM(DECIMAL(INTEGER(INTEGER(DECIMAL
(INTEGER(100*DECIMAL(L_EXTENDEDPRICE,20,2)),20,3)*
(1-L_DISCOUNT))*(1+L_TAX)),20,3)/100.0),20,3)
FROM TPCD.LINEITEM WHERE L_ORDEYKEY=okey
SELECT DECIMAL(SUM(O_TOTALPRICE,20,3)) from TPCD.ORDERS WHERE O_ORDERKEY =
okey
```

4.2.2 Consistency Tests

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

The queries defined in 4.2.1, “Consistency Condition,” were run after initial database build and prior to executing the ACID transaction. The queries showed that the database was in a consistent condition.

After executing 7 streams of 100 ACID transactions each, the queries defined in 4.2.1, “Consistency Condition,” were run again. The queries showed that the database was still in a consistent state.

4.3 Isolation Requirements

4.3.1 Isolation Test 1

This test demonstrates 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. First session: Start an ACID transaction with a randomly selected O_KEY, L_KEY and DELTA. The transaction is delayed for 60 seconds just prior to the Commit.
2. Second session: Start an ACID query for the same O_KEY as in the ACID transaction.
3. Second session: The ACID query attempts to read the file but is locked out by the ACID transaction waiting to complete.
4. First session: The ACID transaction is released and the Commit is executed releasing the record. With the LINEITEM record now released, the ACID query can now complete.
5. Second session: Verify that the ACID query delays for approximately 60 seconds and that the results displayed for the ACID query match the input for the ACID transaction.

4.3.2 Isolation Test 2

This test demonstrates isolation for the read-write conflict of read-write transaction and 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. First session: Perform the ACID transaction for a random O_KEY, L_KEY and DELTA. The transaction is delayed for 60 seconds just prior to the Rollback.
2. Second session: Start an ACID query for the same O_KEY as in the ACID transaction. The ACID query attempts to read the LINEITEM table but is locked out by the ACID transaction.
3. First session: The ACID transaction is released and the Rollback is executed, releasing the read.

4. Second session: With the LINEITEM record now released, the ACID query completes.

4.3.3 Isolation Test 3

This test demonstrates isolation for the write-write conflict of two refresh transactions when the first transaction is committed.

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

1. First session: Start an ACID transaction T1 for a randomly selected O_KEY, L_KEY and DELTA. The transaction is delayed for 60 seconds just prior to the COMMIT.
2. Second session: Start a second ACID transaction T2 for the same O_KEY, L_KEY, and for a randomly selected DELTA2. This transaction is forced to wait while the 1st session holds a lock on the LINEITEM record requested by the second session.
3. First session: The ACID transaction T1 is released and the Commit is executed, releasing the record. With the LINEITEM record now released, the ACID transaction T2 can now complete.
4. Verify that:

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

4.3.4 Isolation Test 4

This test demonstrates isolation for write-write conflict of two ACID transactions when the first transaction is rolled back.

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

1. First session: Start an ACID transaction T1 for a randomly selected O_KEY, L_KEY, and DELTA. The transaction is delayed for 60 seconds just prior to the rollback.
2. Second session: Start a second ACID transaction T2 for the same O_KEY, L_KEY used by the 1st session. This transaction is forced to wait while the 1st session holds a lock on the LINEITEM record requested by the second session.
3. First session: Rollback the ACID transaction T1. With the LINEITEM record now released, the ACID transaction T2 completes.
4. Verify that $T2.L_EXTENDEDPRICE = T1.L_EXTENDEDPRICE$

4.3.5 Isolation Test 5

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

1. First session: Start an ACID transaction, T1, for a randomly selected O_KEY, L_KEY and DELTA. The ACID transaction was suspended prior to COMMIT.
2. First session: Start a second ACID transaction, T2, which selects random values of PS_PARTKEY and PS_SUPPKEY and returns all columns of the PARTSUPP table for which PS_PARTKEY and PS_SUPPKEY are equal to the selected values.
3. T2 completed.
4. T1 was allowed to complete.
5. It was verified that the appropriate rows in the ORDERS, LINEITEM and HISTORY tables have been changed.

4.3.6 Isolation Test 6

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

1. First session: A transaction T1, which executes modified TPC-H query 1 with DELTA=0, was started.
2. Second session: Before T1 completed, an ACID transaction T2, with randomly selected values of O_KEY, L_KEY and DELTA, was started.
3. Third session: Before T1 completed, a transaction T3, which executes modified TPC-H query 1 with a randomly selected value of DELTA (not equal to 0), was started.
4. T1 completed.
5. T2 completed.
6. T3 completed.
7. It was verified that the appropriate rows in the ORDERS, LINEITEM and HISTORY tables were changed.

4.4 Durability Requirements

The SUT must guarantee durability: the ability to preserve the effects of committed transactions and ensure database consistency after recovery from any one of the failures listed in Clause 3.5.3.

4.4.1 Failure of a Durable Medium

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

The database log was stored on RAID-1 protected storage. The tables for the database were stored on RAID-0 storage, with the exception of the Nation and Region tables, which were stored on an internal drive. A backup of the database was taken to a separate array for drives than those used for the database.

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

1. The complete database was backed up once . The backup of the data was not on the same drive as the data itself.
2. Seven streams of ACID transactions were started. Each stream executed a minimum of 100 transactions.
3. One physical drive of a RAID-0 data volume was removed.
4. The seven streams of ACID transactions failed and recorded their number of committed transactions in success files.
5. The failed disk was replaced with a new drive. The database data partitions containing the failed disk were deleted and recreated. The junction points were recreated.
6. A database restore was issued using the backup taken at the beginning of this test.
7. A command was issued causing the database to run through its roll-forward recovery.
8. The counts in the success files and the HISTORY table count were compared and were found to match.

4.4.2 Loss of Log and System Crash

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.

1. Seven streams of ACID transactions were started. Each stream executed a minimum of 100 transactions.
2. While the test was running, one of the disks from the database RAID-1 log on Node 0 was removed.
3. The test continued running for approximately an additional 30 transactions per stream.
4. Then the system was powered off.
5. When the power was restored, the system rebooted and the database was restarted.
6. The database went through a recovery period.
7. The success file and the HISTORY table counts were compared and were found to match.

8. The database log disk was replaced and a rebuild function was initiated to restore the RAID-1 log array to its protected status. The rebuild completed successfully.

4.4.3 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.

This test was combined with the Loss of Log test. See the previous section.

4.4.4 Memory Failure

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

See the previous section.

5 Clause 4: Scaling and Database Population Related Items

5.1 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 Name	Rows
Order	450,000,000
Lineitem	1,799,989,091
Customer	45,000,000
Part	60,000,000
Supplier	3,000,000
Partsupp	240,000,000
Nation	25
Region	5

5.2 Distribution of Tables and Logs

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

The following series of tables shows the distribution of tables and logs across all media.

Controller	Drives	Partition*	Size	Use
Internal	1 - 36.4GB	Physical Drive 0	33.9GB	NTFS C:\ Compiler, Operating System
	1 - 36.4GB	Physical Drive 1	33.9GB	NTFS D:\DB2, TPC-H Kit Small Tables
ServeRAID - 1	6 - 36.4GB RAID-0	Physical Drive 2; Logical Node 0	18000MB 3000MB 8000MB 2000MB 35000MB 138.95GB	Lineitem Data Lineitem Indexes Other Tables Data Other Indexes Temp Tables Free Space
	6 - 36.4GB RAID-0	Physical Drive 3; Logical Node 1	18000MB 3000MB 8000MB 2000MB 35000MB 138.95GB	Lineitem Data Lineitem Indexes Other Tables Data Other Indexes Temp Tables Free Space
	2 - 36.4GB RAID-1	Physical Drive 4; Logical Node 0	33.9GB	NTFS E:\logs
	6 - 36.4GB RAID-0	Physical Drive 5; Logical Node 2	18000MB 3000MB 8000MB 2000MB 35000MB 78.13GB	Lineitem Data Lineitem Indexes Other Tables Data Other Indexes Temp Tables O: Stripeset Backups RF Raw Data Free Space
	6 - 36.4GB RAID-0	Physical Drive 6; Logical Node 3	18000MB 3000MB 8000MB 2000MB 35000MB 78.13GB	Lineitem Data Lineitem Indexes Other Tables Data Other Indexes Temp Tables O: Stripeset Backups RF Raw Data Free Space
	6 - 36.4GB RAID-0	Physical Drive 6; Logical Node 3	60.83GB	
	2 - 36.4GB RAID-1	Physical Drive 7; Logical Node 1	33.9GB	NTFS H:\logs

Controller	Drives	Partition*	Size	Use
ServeRAID - 2	6 - 36.4GB RAID-0	Physical Drive 8; Logical Node 4	18000MB 3000MB 8000MB 2000MB 35000MB	Lineitem Data Lineitem Indexes Other Tables Data Other Indexes Temp Tables
			1000MB 400MB 800MB 300MB 2450MB 134.13GB	Lineitem Data (Qual) Lineitem Indexes (Qual) Other Tables Data (Qual) Other Indexes (Qual) Temp Tables (Qual) Free Space
	6 - 36.4GB RAID-0	Physical Drive 9; Logical Node 5	18000MB 3000MB 8000B 2000MB 35000MB	Lineitem Data Lineitem Indexes Other Table Data Other Table Indexes Temp Tables
			1000MB 400MB 800MB 300MB 2450MB 134.13GB	Lineitem Data (Qual) Lineitem Indexes (Qual) Other Tables Data (Qual) Other Indexes (Qual) Temp Tables (Qual) Free Space
	2 - 36.4GB RAID-1	Physical Drive 10; Logical Node 4	33.9GB	NTFS I:\logs
	6 - 36.4GB RAID-0	Physical Drive 11; Logical Node 6	18000MB 3000MB 8000MB 2000MB 35000MB	Lineitem Data Lineitem Indexes Other Tables Data Other Indexes Temp Tables
			1000MB 400MB 800MB 300MB 2450MB 134.13GB	Lineitem Data (Qual) Lineitem Indexes (Qual) Other Table Data (Qual) Other Indexes (Qual) Temp Tables (Qual) Free Space
	6 - 36.4GB RAID-0	Physical Drive 12; Logical Node 7	18000MB 3000MB 8000MB 2000MB 35000MB	Lineitem Data Lineitem Indexes Other Tables Data Other Indexes Temp Tables
			100MB 400MB 800MB 300MB 2450MB 134.13GB	Lineitem Data (Qual) Lineitem Indexes (Qual) Other Tables Data (Qual) Other Indexes (Qual) Temp Tables (Qual) Free Space
	2 - 36.4GB RAID-1	Physical Drive 13; Logical Node 5	33.9GB	NTFS J:\logs

Controller	Drives	Partition*	Size	Use
ServeRAID - 3	6 - 36.4GB RAID-0	Physical Drive 14; Logical Node 0	18000MB 3000MB 8000MB 2000MB 35000MB 78.13GB 60.83GB	Lineitem Data Lineitem Indexes Other Tables Data Other Indexes Temp Tables O: Stripeset Backups RF Raw Data Free Space
	6 - 36.4GB RAID-0	Physical Drive 15; Logical Node 1	18000MB 3000MB 8000MB 2000MB 35000MB 78.13GB	Lineitem Data Lineitem Indexes Other Tables Data Other Indexes Temp Tables O: Stripeset Backups RF Raw Data
	2 - 36.4GB RAID-1	Physical Drive 16; Logical Node 2	33.9GB	NTFS M:\Logs
	6 - 36.4GB RAID-0	Physical Drive 17; Logical Node 2	18000MB 3000MB 8000MB 2000MB 35000MB 78.13GB 60.83GB	Lineitem Data Lineitem Indexes Other Tables Data Other Indexes Temp Tables O: Stripeset Backups RF Raw Data Free Space
	6 - 36.4GB RAID-0	Physical Drive 18; Logical Node 3	18000MB 3000MB 8000MB 2000MB 35000MB 78.13GB 60.83GB	Lineitem Data Lineitem Indexes Other Table Data Other Table Indexes Temp Tables O: Stripeset Backup RF Raw Data Free Space
	2 - 36.4GB RAID-1	Physical Drive 19; Logical Node 3	33.9GB	NTFS N:\Logs

Controller	Drives	Partition*	Size	Use
ServeRAID - 4	6 - 36.4GB RAID-0	Physical Drive 20; Logical Node 4	18000MB 3000MB 8000MB 2000MB 35000MB 78.13GB 60.83GB	Lineitem Data Lineitem Indexes Other Tables Data Other Indexes Temp Tables P: Stripeset Backups Free Space
	6 - 36.4GB RAID-0	Physical Drive 21; Logical Node 5	18000MB 3000MB 8000MB 2000MB 35000MB 78.13GB 60.83GB	Lineitem Data Lineitem Indexes Other Table Data Other Table Indexes Temp Tables P: Stripeset Backups Free Space
	2 - 36.4GB RAID-1	Physical Drive 22	33.9GB	Unused
	6 - 36.4GB RAID-0	Physical Drive 23; Logical Node 6	18000MB 3000MB 8000MB 2000MB 35000MB 78.13GB 60.83GB	Lineitem Data Lineitem Indexes Other Tables Data Other Indexes Temp Tables P: Stripeset Backups Free Space
	6 - 36.4GB RAID-0	Physical Drive 24; Logical Node 7	18000MB 3000MB 8000MB 2000MB 35000MB 78.13GB 60.83GB	Lineitem Data Lineitem Indexes Other Tables Data Other Indexes Temp Tables P: Stripeset Backups Free Space
	2 - 36.4GB RAID-1	Physical Drive 25; Logical Node 6	33.9GB	NTFS G:\Logs
ServeRAID - 5	14 - 36.4GB RAID-5	Physical Drive 26	1000MB 439.74GB	Unused NTFS W: RAW DATA FILES

Controller	Drives	Partition*	Size	Use
ServeRAID - 6	6 - 36.4GB RAID-0	Physical Drive 27; Logical Node 4	18000MB 3000MB 8000MB 2000MB 35000MB 78.13GB 60.83GB	Lineitem Data Lineitem Indexes Other Tables Data Other Indexes Temp Tables P: Stripeset Backups Free Space
	6 - 36.4GB RAID-0	Physical Drive 28; Logical Node 5	18000MB 3000MB 8000MB 2000MB 35000MB 78.13GB 60.83GB	Lineitem Data Lineitem Indexes Other Tables Data Other Indexes Temp Tables P: Stripeset Backups Free Space
	2 - 36.4GB RAID-1	Physical Drive 29; Logical Node 7	33.9GB	NTFS K:\Logs
	6 - 36.4GB RAID-0	Physical Drive 30; Logical Node 6	18000MB 3000MB 8000MB 2000MB 35000MB 78.13GB 60.83GB	Lineitem Data Lineitem Indexes Other Tables Data Other Indexes Temp Tables P: Stripeset Backups Free Space
	6 - 36.4GB RAID-0	Physical Drive 31; Logical Node 7	18000MB 3000MB 8000MB 2000MB 35000MB 78.13GB 60.83GB	Lineitem Data Lineitem Indexes Other Table Data Other Table Indexes Temp Tables P: Stripeset Backups Free Space
	2 - 36.4GB	Physical Drive 32	33.9GB	Unused

* The physical drives that do not have drive letters are assigned Windows junction points

The priced configuration used 136 disks. An additional 14 disks were used to store the 300GB database files and were not priced.

5.3 Database Partition / Replication Mapping

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

The database was not replicated. The database was logically partitioned into eight logical nodes.

5.4 RAID Implementation

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 must be disclosed for each device.

RAID-1 was used for log disks. RAID-0 was used for all other database disks and the temporary tablespace. The Nation and Region tables were placed on the second (D:\) internal SCSI drive .

5.5 DBGEN Modifications

Any modifications to the DBGEN (see Clause 4.2.1) source code must be disclosed. In the event that a program other than DBGEN was used to populate the database, it must be disclosed in its entirety.

The standard distribution DBGEN version 1.3.0 was used for database population. No modifications were made.

5.6 Database Load Time

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

See the Executive Summary at the beginning of this report.

5.7 Data Storage Ratio

The data storage ratio must be disclosed. It is computed as the ratio between the total amount of priced disk space and the chosen test database size as defined in Clause 4.1.3.

The calculation of the data storage ratio is shown in the following table.

Disk Type	Number of Disks	Formatted Space per Disk	Total Disk Space	Scale Factor	Storage Ratio
36.4GB 15K Ultra160 SCSI Drive	136	33.9GB	4610.4GB		
36.4GB 15K Ultra320 SCSI Drive	2	33.9GB	67.8GB		
Total			4678.2GB	300GB	15.594

The data storage ratio is 15.59, derived by dividing 4678.2GB by the database size of 300GB.

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 NATION and REGION tables were created on D:\ and then loaded from dbgen output. The other tables were loaded on the eight logical nodes.

The tables were loaded as depicted in Figure 4-1.

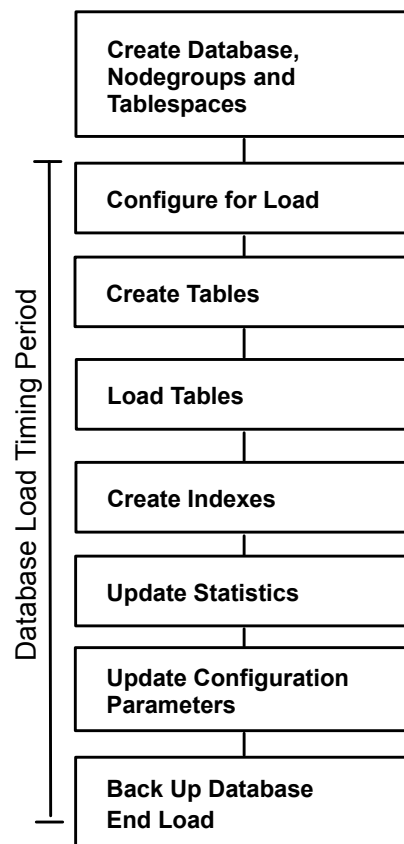


Figure 4-1. Database Load Procedure

5.9 Qualification Database Configuration

Any differences between the configuration of the qualification database and the test database must be disclosed.

The qualification database used identical scripts and disk structure to create and load the data with adjustments for size difference, fewer logical nodes (2), and fewer logical drives were used. Adjustments were also made so that the test database and the qualification database could exist concurrently. The command “SET DB2INSTANCE=QUAL” was used to change from the test database to the qualification database. This setting persisted for the DB2 command session. See Section 5.2 for details.

6 Clause 5: Performance Metrics and Execution Rules Related Items

6.1 System Activity between Load and Performance Tests

Any system activity on the SUT that takes place between the conclusion of the load test and the beginning of the performance test must be fully disclosed.

The auditor requested that queries be run against the database to verify the correctness of the database load.

6.2 Steps in the Power Test

The details of the steps followed to implement the power test (e.g., system reboot, database restart) must be disclosed.

The following steps were used to implement the power test:

1. RF1 Refresh Transaction
2. Stream 00 Execution
3. RF2 Refresh Transaction

6.3 Timing Intervals for Each Query and Refresh Function

The timing intervals for each query of the measured set and for both update functions must be reported for the power test.

See the Numerical Quantities Summary in the Executive Summary at the beginning of this report.

6.4 Number of Streams for the Throughput Test

The number of execution streams used for the throughput test must be disclosed.

Six streams were used for the throughput test.

6.5 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.

See the Numerical Quantities Summary in the Executive Summary at the beginning of this report.

6.6 Total Elapsed Time for the Measurement Interval

The total elapsed time for the measurement interval must be reported for the throughput test.

See the Numerical Quantities Summary in the Executive Summary at the beginning of this report..

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

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

See the Numerical Quantities Summary in the Executive Summary at the beginning of this report.

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

The timing intervals for each query of each stream and for each update function must be reported for the throughput test.

See the Numerical Quantities Summary in the Executive Summary at the beginning of this report.

6.9 Performance Metrics

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

See the Numerical Quantities Summary in the Executive Summary at the beginning of this report.

6.10 Performance Metric and Numerical Quantities from Both Runs

The performance metric and numerical quantities from both runs must be disclosed.

Two consecutive runs of the TPC-H benchmark were performed. The following table contains the results for both runs.

	QppH @ 300GB	QthH @ 300GB	QphH @ 300GB
Run1	8,551.1	5,019.9	6,551.8
Run2	8,629.8	5,007.4	6,573.6

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.

DB2 was restarted between runs.

7 Clause 6: SUT and Driver Implementation Related Items

7.1 Driver

A detailed textual description of how the driver performs its functions, how its various components interact and any product functionality or environmental setting on which it relies must be provided. All related source code, scripts and configurations must be disclosed. The information provided should be sufficient for an independent reconstruction of the driver.

Appendix D, “Driver Source Code,” contains the source code used for the driver and all scripts used in connection with it.

The Power test is invoked by calling tpcdbatch with the stream number 0 specified, an indication that the refresh functions must be run, and the SQL file that contains the power stream queries.

The Throughput test is invoked by initiating a call to tpcdbatch for every query stream that will be run. Tpcdbatch gets the stream number for each of the streams, and the SQL file specific to that stream number as the queries to execute. The refresh function is initiated as a separate call to tpcdbatch with the SQL script for the refresh functions and the total number of query streams specified.

7.2 Implementation-Specific Layer

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.

The implementation specific layer is a single executable SQL application that uses embedded dynamic SQL to process the EQT generated by QGEN. The application is called tpcdbatch to indicate that it processes a batch of TPC-H queries, although it is completely capable of processing any arbitrary SQL statement (both DML and DDL).

A separate instance of tpcdbatch is invoked for each stream. Each instance establishes a distinct connection to the database server through which the EQT is transmitted to the database and the results are returned through the implementation specific layer to the driver. When an instance of tpcdbatch is invoked, it is provided with a context of whether it is running a power test, query stream or refresh stream, as well as an input file containing the 22 queries and/or refresh functions. tpcdbatch then connects to the database, performs any session initialization as well as preparing output files required by the auditor. Then it proceeds to read from the input file and processes each query or refresh function in turn.

For queries, each query is prepared, described, and a cursor is opened and used to fetch the required number of rows. After the last row has been retrieved a commit is issued. For the refresh functions, during the database build all data is first split for each node using the db2split utility. For RF1, the data for each node is further split into n equal portions for both the lineitem and orders tables taking care that the records for the same orderkey remain in the same set. For RF2, the data for each node is further split into m equal portions. During the run, when tpcdbatch encounters a call to execute RF1, it first calls a shell script which loads these n sets of data into n sets of temporary tables (one each for lineitem and orders). Then tpcdbatch forks off n children to do an insert with subselect into the original lineitem and orders tables. When tpcdbatch encounters a call to execute RF2, it calls a shell script that loads these data into a single staging table. Then tpcdbatch forks off p children (where $p * x = m$) to do x sets of deletes from the orders and lineitem tables with a subselect from the staging table.

7.3 Profile-Directed Optimization

Profile-directed optimization was not used.

8 Clause 7: Pricing Related Items

8.1 Hardware and Software Components

A detailed list of the hardware and software used in the priced system must be reported. Each item must have a 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) 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 F.

8.2 Three-Year Cost of System Configuration

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 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 F.

8.3 Availability Dates

The committed delivery date for general availability (availability date) of products used in the price calculations must be reported. When the priced system includes products with different availability dates, 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 (see Clause 7.3.1.3).

The total solution as priced will be available August 31, 2004. The x445 server will be generally available March 19; the server storage will be generally available August 31, 2004. All other hardware and the database software is generally available now.

8.4 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.

Clause 9: Audit Related Items

9.1 Auditor's Report

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

This implementation of the TPC Benchmark H was audited by Francois Raab of InfoSizing, Inc. For a copy of this disclosure, go to www.tpc.org.

Benchmark Sponsor:	Haider Rizvi Manager, DB2 Data Warehouse Performance IBM Canada Ltd; 8200 Warden Avenue Markham, Ontario L6G 1C7	Kamran Amini Manager, xSeries Performance IBM Systems and Technology Group 3039 Cornwallis Road Research Triangle Park, NC 27709
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March 1, 2004

I verified the TPC Benchmark™ H performance of the following configuration:

Platform:	IBM @server eServer xSeries 445
Database Manager:	IBM DB2 UDB 8.1 ESE
Operating System:	Microsoft Windows Server 2003 Enterprise Edition

The results were:

CPU (Speed)	Memory	Disks	QphH@300GB
IBM @server eServer xSeries 445			
8 x Intel Xeon MP (3.0 GHz)	4 MB L3 Cache 16 GB Main	136 x 36.4 GB Ultra160 2 x 36.4 GB Ultra320	6,551.8

In my opinion, this performance result was produced in compliance with the TPC's requirements for the benchmark. The following verification items were given special attention:

- The database records were defined with the proper layout and size
- The database population was generated using DBGEN
- The database was properly scaled to 300GB and populated accordingly
- The compliance of the database auxiliary data structures was verified
- The database load time was correctly measured and reported

- The required ACID properties were verified and met
- The query input variables were generated by QGEN
- The query text was produced using minor modifications and an approved query variant
- The execution of the queries against the SF1 database produced compliant answers
- A compliant implementation specific layer was used to drive the tests
- The throughput tests involved 6 query streams
- The ratio between the longest and the shortest query was such that no query timing was adjusted
- The execution times for queries and refresh functions were correctly measured and reported
- The repeatability of the measured results was verified
- The required amount of database log was configured
- The system pricing was verified for major components and maintenance
- The major pages from the FDR were verified for accuracy

Additional Audit Notes:

None.

Respectfully Yours,

A handwritten signature in black ink, appearing to read "François Raab", with a long horizontal flourish extending to the right.

François Raab
President

Appendix A: Tunable Parameters and System Configuration

DB2 UDB 8.1 Database and Database Manager Configuration

"DB2 Configuration for Node0"
get db cfg for tpcd

Database Configuration for Database tpcd
Database configuration release level = 0x0a00
Database release level = 0x0a00
Database territory = US
Database code page = 1252
Database code set = IBM-1252
Database country/region code = 1
Dynamic SQL Query management (DYN_QUERY_MGMT) = DISABLE
Discovery support for this database (DISCOVER_DB) = ENABLE
Default query optimization class (DFT_QUERYOPT) = 7
Degree of parallelism (DFT_DEGREE) = 1
Continue upon arithmetic exceptions (DFT_SQLMATHWARN) = NO
Default refresh age (DFT_REFRESH_AGE) = 0
Number of frequent values retained (NUM_FREQVALUES) = 0
Number of quantiles retained (NUM_QUANTILES) = 300
Backup pending = NO
Database is consistent = YES
Rollforward pending = NO
Restore pending = NO
Multi-page file allocation enabled = NO
Log retain for recovery status = RECOVERY
User exit for logging status = NO
Data Links Token Expiry Interval (sec) (DL_EXPINT) = 60
Data Links Write Token Init Expiry Intvl(DL_WT_IEXPINT) = 60
Data Links Number of Copies (DL_NUM_COPIES) = 1
Data Links Time after Drop (days) (DL_TIME_DROP) = 1
Data Links Token in Uppercase (DL_UPPER) = NO
Data Links Token Algorithm (DL_TOKEN) = MAC0
Database heap (4KB) (DBHEAP) = 20000
Size of database shared memory (4KB) (DATABASE_MEMORY) = AUTOMATIC
Catalog cache size (4KB) (CATALOGCACHE_SZ) = 386
Log buffer size (4KB) (LOGBUFSZ) = 2048
Utilities heap size (4KB) (UTIL_HEAP_SZ) = 40000
Buffer pool size (pages) (BUFFPAGE) = 60000
Extended storage segments size (4KB) (ESTORE_SEG_SZ) = 16000
Number of extended storage segments (NUM_ESTORE_SEGS) = 0
Max storage for lock list (4KB) (LOCKLIST) = 16384
Max size of appl. group mem set (4KB) (APPGROUP_MEM_SZ) = 40000
Percent of mem for appl. group heap (GROUPHEAP_RATIO) = 70
Max appl. control heap size (4KB) (APP_CTL_HEAP_SZ) = 2048
Sort heap thres for shared sorts (4KB) (SHEAPTHRES_SHR) = (SHEAPTHRES)
Sort list heap (4KB) (SORTHEAP) = 6400
SQL statement heap (4KB) (STMTHEAP) = 10000
Default application heap (4KB) (APPLHEAPSZ) = 16000
Package cache size (4KB) (PCKCACHESZ) = 640
Statistics heap size (4KB) (STAT_HEAP_SZ) = 10000
Interval for checking deadlock (ms) (DLCHKTIME) = 5000
Percent. of lock lists per application (MAXLOCKS) = 5
Lock timeout (sec) (LOCKTIMEOUT) = -1
Changed pages threshold (CHNGPGS_THRESH) = 15
Number of asynchronous page cleaners (NUM_IOCLEANERS) = 4
Number of I/O servers (NUM_IOSERVERS) = 4
Index sort flag (INDEXSORT) = YES
Sequential detect flag (SEQDETECT) = YES
Default prefetch size (pages) (DFT_PREFETCH_SZ) = 16
Track modified pages (TRACKMOD) = OFF
Default number of containers = 1
Default tablespace extentsize (pages) (DFT_EXTENT_SZ) = 32
Max number of active applications (MAXAPPLS) = 40
Average number of active applications (AVG_APPLS) = 1
Max DB files open per application (MAXFILOP) = 1024
Log file size (4KB) (LOGFILSIZ) = 16384

Number of primary log files (LOGPRIMARY) = 20
Number of secondary log files (LOGSECOND) = 2
Changed path to log files (NEWLOGPATH) =
Path to log files = e:\logs\NODE0000\
Overflow log path (OVERFLOWLOGPATH) =
Mirror log path (MIRRORLOGPATH) =
First active log file = S0000036.LOG
Block log on disk full (BLK_LOG_DSK_FUL) = NO
Percent of max active log space by transaction(MAX_LOG) = 0
Num. of active log files for 1 active UOW(NUM_LOG_SPAN) = 0
Group commit count (MINCOMMIT) = 1
Percent log file reclaimed before soft ckcpt (SOFTMAX) = 600
Log retain for recovery enabled (LOGRETAIN) = RECOVERY
User exit for logging enabled (USEREXIT) = OFF
Auto restart enabled (AUTORESTART) = ON
Index re-creation time (INDEXREC) = SYSTEM (ACCESS)
Default number of loadrec sessions (DFT_LOADREC_SES) = 1
Number of database backups to retain (NUM_DB_BACKUPS) = 12
Recovery history retention (days) (REC_HIS_RETENTN) = 366
TSM management class (TSM_MGMTCLASS) =
TSM node name (TSM_NODENAME) =
TSM owner (TSM_OWNER) =
TSM password (TSM_PASSWORD) =

"DB2 Configuration for Node1"
get db cfg for tpcd

Database Configuration for Database tpcd
Database configuration release level = 0x0a00
Database release level = 0x0a00
Database territory = US
Database code page = 1252
Database code set = IBM-1252
Database country/region code = 1
Dynamic SQL Query management (DYN_QUERY_MGMT) = DISABLE
Discovery support for this database (DISCOVER_DB) = ENABLE
Default query optimization class (DFT_QUERYOPT) = 7
Degree of parallelism (DFT_DEGREE) = 1
Continue upon arithmetic exceptions (DFT_SQLMATHWARN) = NO
Default refresh age (DFT_REFRESH_AGE) = 0
Number of frequent values retained (NUM_FREQVALUES) = 0
Number of quantiles retained (NUM_QUANTILES) = 300
Backup pending = NO
Database is consistent = YES
Rollforward pending = NO
Restore pending = NO
Multi-page file allocation enabled = NO
Log retain for recovery status = RECOVERY
User exit for logging status = NO
Data Links Token Expiry Interval (sec) (DL_EXPINT) = 60
Data Links Write Token Init Expiry Intvl(DL_WT_IEXPINT) = 60
Data Links Number of Copies (DL_NUM_COPIES) = 1
Data Links Time after Drop (days) (DL_TIME_DROP) = 1
Data Links Token in Uppercase (DL_UPPER) = NO
Data Links Token Algorithm (DL_TOKEN) = MAC0
Database heap (4KB) (DBHEAP) = 20000
Size of database shared memory (4KB) (DATABASE_MEMORY) = AUTOMATIC
Catalog cache size (4KB) (CATALOGCACHE_SZ) = 386
Log buffer size (4KB) (LOGBUFSZ) = 2048
Utilities heap size (4KB) (UTIL_HEAP_SZ) = 40000
Buffer pool size (pages) (BUFFPAGE) = 60000
Extended storage segments size (4KB) (ESTORE_SEG_SZ) = 16000
Number of extended storage segments (NUM_ESTORE_SEGS) = 0
Max storage for lock list (4KB) (LOCKLIST) = 16384
Max size of appl. group mem set (4KB) (APPGROUP_MEM_SZ) = 40000
Percent of mem for appl. group heap (GROUPHEAP_RATIO) = 70
Max appl. control heap size (4KB) (APP_CTL_HEAP_SZ) = 2048
Sort heap thres for shared sorts (4KB) (SHEAPTHRES_SHR) = (SHEAPTHRES)
Sort list heap (4KB) (SORTHEAP) = 6400
SQL statement heap (4KB) (STMTHEAP) = 10000
Default application heap (4KB) (APPLHEAPSZ) = 16000
Package cache size (4KB) (PCKCACHESZ) = 640
Statistics heap size (4KB) (STAT_HEAP_SZ) = 10000
Interval for checking deadlock (ms) (DLCHKTIME) = 5000

Percent. of lock lists per application (MAXLOCKS) = 5
 Lock timeout (sec) (LOCKTIMEOUT) = -1
 Changed pages threshold (CHNGPGS_THRESH) = 15
 Number of asynchronous page cleaners (NUM_IOCLEANERS) = 4
 Number of I/O servers (NUM_IOSERVERS) = 4
 Index sort flag (INDEXSORT) = YES
 Sequential detect flag (SEQDETECT) = YES
 Default prefetch size (pages) (DFT_PREFETCH_SZ) = 16
 Track modified pages (TRACKMOD) = OFF
 Default number of containers = 1
 Default tablespace extentsize (pages) (DFT_EXTENT_SZ) = 32
 Max number of active applications (MAXAPPLS) = 40
 Average number of active applications (AVG_APPLS) = 1
 Max DB files open per application (MAXFILOP) = 1024
 Log file size (4KB) (LOGFILSIZ) = 16384
 Number of primary log files (LOGPRIMARY) = 20
 Number of secondary log files (LOGSECOND) = 2
 Changed path to log files (NEWLOGPATH) =
 Path to log files = h:\logs\NODE0001\
 Overflow log path (OVERFLOWLOGPATH) =
 Mirror log path (MIRRORLOGPATH) =
 First active log file = S0000032.LOG
 Block log on disk full (BLK_LOG_DSK_FUL) = NO
 Percent of max active log space by transaction (MAX_LOG) = 0
 Num. of active log files for 1 active UOW (NUM_LOG_SPAN) = 0
 Group commit count (MINCOMMIT) = 1
 Percent log file reclaimed before soft chkpt (SOFTMAX) = 600
 Log retain for recovery enabled (LOGRETAIN) = RECOVERY
 User exit for logging enabled (USEREXIT) = OFF
 Auto restart enabled (AUTORESTART) = ON
 Index re-creation time (INDEXREC) = SYSTEM (ACCESS)
 Default number of loadrec sessions (DFT_LOADREC_SES) = 1
 Number of database backups to retain (NUM_DB_BACKUPS) = 12
 Recovery history retention (days) (REC_HIS_RETENTN) = 366
 TSM management class (TSM_MGMTCLASS) =
 TSM node name (TSM_NODENAME) =
 TSM owner (TSM_OWNER) =
 TSM password (TSM_PASSWORD) =

"DB2 Configuration for Node2"

get db cfg for tpcd

Database Configuration for Database tpcd
 Database configuration release level = 0x0a00
 Database release level = 0x0a00
 Database territory = US
 Database code page = 1252
 Database code set = IBM-1252
 Database country/region code = 1
 Dynamic SQL Query management (DYN_QUERY_MGMT) = DISABLE
 Discovery support for this database (DISCOVER_DB) = ENABLE
 Default query optimization class (DFT_QUERYOPT) = 7
 Degree of parallelism (DFT_DEGREE) = 1
 Continue upon arithmetic exceptions (DFT_SQLMATHWARN) = NO
 Default refresh age (DFT_REFRESH_AGE) = 0
 Number of frequent values retained (NUM_FREQVALUES) = 0
 Number of quantiles retained (NUM_QUANTILES) = 300
 Backup pending = NO
 Database is consistent = YES
 Rollforward pending = NO
 Restore pending = NO
 Multi-page file allocation enabled = NO
 Log retain for recovery status = RECOVERY
 User exit for logging status = NO
 Data Links Token Expiry Interval (sec) (DL_EXPINT) = 60
 Data Links Write Token Init Expiry Intvl (DL_WT_IEXPINT) = 60
 Data Links Number of Copies (DL_NUM_COPIES) = 1
 Data Links Time after Drop (days) (DL_TIME_DROP) = 1
 Data Links Token in Uppercase (DL_UPPER) = NO
 Data Links Token Algorithm (DL_TOKEN) = MAC0
 Database heap (4KB) (DBHEAP) = 20000
 Size of database shared memory (4KB) (DATABASE_MEMORY) = AUTOMATIC
 Catalog cache size (4KB) (CATALOGCACHE_SZ) = 386
 Log buffer size (4KB) (LOGBUFSZ) = 2048

Utilities heap size (4KB) (UTIL_HEAP_SZ) = 40000
 Buffer pool size (pages) (BUFFPAGE) = 60000
 Extended storage segments size (4KB) (ESTORE_SEG_SZ) = 16000
 Number of extended storage segments (NUM_ESTORE_SEGS) = 0
 Max storage for lock list (4KB) (LOCKLIST) = 16384
 Max size of appl. group mem set (4KB) (APPGROUP_MEM_SZ) = 40000
 Percent of mem for appl. group heap (GROUPHEAP_RATIO) = 70
 Max appl. control heap size (4KB) (APP_CTL_HEAP_SZ) = 2048
 Sort heap thres for shared sorts (4KB) (SHEAPTHRES_SHR) = (SHEAPTHRES)
 Sort list heap (4KB) (SORTHEAP) = 6400
 SQL statement heap (4KB) (STMTHEAP) = 10000
 Default application heap (4KB) (APPLHEAPSZ) = 16000
 Package cache size (4KB) (PCKCACHESZ) = 640
 Statistics heap size (4KB) (STAT_HEAP_SZ) = 10000
 Interval for checking deadlock (ms) (DLCHKTIME) = 5000
 Percent. of lock lists per application (MAXLOCKS) = 5
 Lock timeout (sec) (LOCKTIMEOUT) = -1
 Changed pages threshold (CHNGPGS_THRESH) = 15
 Number of asynchronous page cleaners (NUM_IOCLEANERS) = 4
 Number of I/O servers (NUM_IOSERVERS) = 4
 Index sort flag (INDEXSORT) = YES
 Sequential detect flag (SEQDETECT) = YES
 Default prefetch size (pages) (DFT_PREFETCH_SZ) = 16
 Track modified pages (TRACKMOD) = OFF
 Default number of containers = 1
 Default tablespace extentsize (pages) (DFT_EXTENT_SZ) = 32
 Max number of active applications (MAXAPPLS) = 40
 Average number of active applications (AVG_APPLS) = 1
 Max DB files open per application (MAXFILOP) = 1024
 Log file size (4KB) (LOGFILSIZ) = 16384
 Number of primary log files (LOGPRIMARY) = 20
 Number of secondary log files (LOGSECOND) = 2
 Changed path to log files (NEWLOGPATH) =
 Path to log files = m:\logs\NODE0002\
 Overflow log path (OVERFLOWLOGPATH) =
 Mirror log path (MIRRORLOGPATH) =
 First active log file = S0000032.LOG
 Block log on disk full (BLK_LOG_DSK_FUL) = NO
 Percent of max active log space by transaction (MAX_LOG) = 0
 Num. of active log files for 1 active UOW (NUM_LOG_SPAN) = 0
 Group commit count (MINCOMMIT) = 1
 Percent log file reclaimed before soft chkpt (SOFTMAX) = 600
 Log retain for recovery enabled (LOGRETAIN) = RECOVERY
 User exit for logging enabled (USEREXIT) = OFF
 Auto restart enabled (AUTORESTART) = ON
 Index re-creation time (INDEXREC) = SYSTEM (ACCESS)
 Default number of loadrec sessions (DFT_LOADREC_SES) = 1
 Number of database backups to retain (NUM_DB_BACKUPS) = 12
 Recovery history retention (days) (REC_HIS_RETENTN) = 366
 TSM management class (TSM_MGMTCLASS) =
 TSM node name (TSM_NODENAME) =
 TSM owner (TSM_OWNER) =
 TSM password (TSM_PASSWORD) =

"DB2 Configuration for Node3"

get db cfg for tpcd

Database Configuration for Database tpcd
 Database configuration release level = 0x0a00
 Database release level = 0x0a00
 Database territory = US
 Database code page = 1252
 Database code set = IBM-1252
 Database country/region code = 1
 Dynamic SQL Query management (DYN_QUERY_MGMT) = DISABLE
 Discovery support for this database (DISCOVER_DB) = ENABLE
 Default query optimization class (DFT_QUERYOPT) = 7
 Degree of parallelism (DFT_DEGREE) = 1
 Continue upon arithmetic exceptions (DFT_SQLMATHWARN) = NO
 Default refresh age (DFT_REFRESH_AGE) = 0
 Number of frequent values retained (NUM_FREQVALUES) = 0
 Number of quantiles retained (NUM_QUANTILES) = 300
 Backup pending = NO
 Database is consistent = YES

Rollforward pending = NO
 Restore pending = NO
 Multi-page file allocation enabled = NO
 Log retain for recovery status = RECOVERY
 User exit for logging status = NO
 Data Links Token Expiry Interval (sec) (DL_EXPINT) = 60
 Data Links Write Token Init Expiry Intvl(DL_WT_IEXPINT) = 60
 Data Links Number of Copies (DL_NUM_COPIES) = 1
 Data Links Time after Drop (days) (DL_TIME_DROP) = 1
 Data Links Token in Uppercase (DL_UPPER) = NO
 Data Links Token Algorithm (DL_TOKEN) = MAC0
 Database heap (4KB) (DBHEAP) = 20000
 Size of database shared memory (4KB) (DATABASE_MEMORY) = AUTOMATIC
 Catalog cache size (4KB) (CATALOGCACHE_SZ) = 386
 Log buffer size (4KB) (LOGBUFSZ) = 2048
 Utilities heap size (4KB) (UTIL_HEAP_SZ) = 40000
 Buffer pool size (pages) (BUFFPAGE) = 60000
 Extended storage segments size (4KB) (ESTORE_SEG_SZ) = 16000
 Number of extended storage segments (NUM_ESTORE_SEGS) = 0
 Max storage for lock list (4KB) (LOCKLIST) = 16384
 Max size of appl. group mem set (4KB) (APPGROUP_MEM_SZ) = 40000
 Percent of mem for appl. group heap (GROUPHEAP_RATIO) = 70
 Max appl. control heap size (4KB) (APP_CTL_HEAP_SZ) = 2048
 Sort heap thres for shared sorts (4KB) (SHEAPTHRES_SHR) = (SHEAPTHRES)
 Sort list heap (4KB) (SORTHEAP) = 6400
 SQL statement heap (4KB) (STMTHEAP) = 10000
 Default application heap (4KB) (APPLHEAPSZ) = 16000
 Package cache size (4KB) (PCKCACHESZ) = 640
 Statistics heap size (4KB) (STAT_HEAP_SZ) = 10000
 Interval for checking deadlock (ms) (DLCHKTIME) = 5000
 Percent. of lock lists per application (MAXLOCKS) = 5
 Lock timeout (sec) (LOCKTIMEOUT) = -1
 Changed pages threshold (CHNGPGS_THRESH) = 15
 Number of asynchronous page cleaners (NUM_IOCLEANERS) = 4
 Number of I/O servers (NUM_IOSERVERS) = 4
 Index sort flag (INDEXSORT) = YES
 Sequential detect flag (SEQDETECT) = YES
 Default prefetch size (pages) (DFT_PREFETCH_SZ) = 16
 Track modified pages (TRACKMOD) = OFF
 Default number of containers = 1
 Default tablespace extentsize (pages) (DFT_EXTENT_SZ) = 32
 Max number of active applications (MAXAPPLS) = 40
 Average number of active applications (AVG_APPLS) = 1
 Max DB files open per application (MAXFILOP) = 1024
 Log file size (4KB) (LOGFILSZ) = 16384
 Number of primary log files (LOGPRIMARY) = 20
 Number of secondary log files (LOGSECOND) = 2
 Changed path to log files (NEWLOGPATH) =
 Path to log files = n:\logs\NODE0003\
 Overflow log path (OVERFLOWLOGPATH) =
 Mirror log path (MIRRORLOGPATH) =
 First active log file = S0000032.LOG
 Block log on disk full (BLK_LOG_DSK_FUL) = NO
 Percent of max active log space by transaction(MAX_LOG) = 0
 Num. of active log files for 1 active UOW(NUM_LOG_SPAN) = 0
 Group commit count (MINCOMMIT) = 1
 Percent log file reclaimed before soft ckcpt (SOFTMAX) = 600
 Log retain for recovery enabled (LOGRETAIN) = RECOVERY
 User exit for logging enabled (USEREXIT) = OFF
 Auto restart enabled (AUTORESTART) = ON
 Index re-creation time (INDEXREC) = SYSTEM (ACCESS)
 Default number of loadrec sessions (DFT_LOADREC_SES) = 1
 Number of database backups to retain (NUM_DB_BACKUPS) = 12
 Recovery history retention (days) (REC_HIS_RETENTN) = 366
 TSM management class (TSM_MGMTCLASS) =
 TSM node name (TSM_NODENAME) =
 TSM owner (TSM_OWNER) =
 TSM password (TSM_PASSWORD) =

"DB2 Configuration for Node4"
 get db cfg for tpcd

Database Configuration for Database tpcd
 Database configuration release level = 0x0a00

Database release level = 0x0a00
 Database territory = US
 Database code page = 1252
 Database code set = IBM-1252
 Database country/region code = 1
 Dynamic SQL Query management (DYN_QUERY_MGMT) = DISABLE
 Discovery support for this database (DISCOVER_DB) = ENABLE
 Default query optimization class (DFT_QUERYOPT) = 7
 Degree of parallelism (DFT_DEGREE) = 1
 Continue upon arithmetic exceptions (DFT_SQLMATHWARN) = NO
 Default refresh age (DFT_REFRESH_AGE) = 0
 Number of frequent values retained (NUM_FREQVALUES) = 0
 Number of quantiles retained (NUM_QUANTILES) = 300
 Backup pending = NO
 Database is consistent = YES
 Rollforward pending = NO
 Restore pending = NO
 Multi-page file allocation enabled = NO
 Log retain for recovery status = RECOVERY
 User exit for logging status = NO
 Data Links Token Expiry Interval (sec) (DL_EXPINT) = 60
 Data Links Write Token Init Expiry Intvl(DL_WT_IEXPINT) = 60
 Data Links Number of Copies (DL_NUM_COPIES) = 1
 Data Links Time after Drop (days) (DL_TIME_DROP) = 1
 Data Links Token in Uppercase (DL_UPPER) = NO
 Data Links Token Algorithm (DL_TOKEN) = MAC0
 Database heap (4KB) (DBHEAP) = 20000
 Size of database shared memory (4KB) (DATABASE_MEMORY) = AUTOMATIC
 Catalog cache size (4KB) (CATALOGCACHE_SZ) = 386
 Log buffer size (4KB) (LOGBUFSZ) = 2048
 Utilities heap size (4KB) (UTIL_HEAP_SZ) = 40000
 Buffer pool size (pages) (BUFFPAGE) = 60000
 Extended storage segments size (4KB) (ESTORE_SEG_SZ) = 16000
 Number of extended storage segments (NUM_ESTORE_SEGS) = 0
 Max storage for lock list (4KB) (LOCKLIST) = 16384
 Max size of appl. group mem set (4KB) (APPGROUP_MEM_SZ) = 40000
 Percent of mem for appl. group heap (GROUPHEAP_RATIO) = 70
 Max appl. control heap size (4KB) (APP_CTL_HEAP_SZ) = 2048
 Sort heap thres for shared sorts (4KB) (SHEAPTHRES_SHR) = (SHEAPTHRES)
 Sort list heap (4KB) (SORTHEAP) = 6400
 SQL statement heap (4KB) (STMTHEAP) = 10000
 Default application heap (4KB) (APPLHEAPSZ) = 16000
 Package cache size (4KB) (PCKCACHESZ) = 640
 Statistics heap size (4KB) (STAT_HEAP_SZ) = 10000
 Interval for checking deadlock (ms) (DLCHKTIME) = 5000
 Percent. of lock lists per application (MAXLOCKS) = 5
 Lock timeout (sec) (LOCKTIMEOUT) = -1
 Changed pages threshold (CHNGPGS_THRESH) = 15
 Number of asynchronous page cleaners (NUM_IOCLEANERS) = 4
 Number of I/O servers (NUM_IOSERVERS) = 4
 Index sort flag (INDEXSORT) = YES
 Sequential detect flag (SEQDETECT) = YES
 Default prefetch size (pages) (DFT_PREFETCH_SZ) = 16
 Track modified pages (TRACKMOD) = OFF
 Default number of containers = 1
 Default tablespace extentsize (pages) (DFT_EXTENT_SZ) = 32
 Max number of active applications (MAXAPPLS) = 40
 Average number of active applications (AVG_APPLS) = 1
 Max DB files open per application (MAXFILOP) = 1024
 Log file size (4KB) (LOGFILSZ) = 16384
 Number of primary log files (LOGPRIMARY) = 20
 Number of secondary log files (LOGSECOND) = 2
 Changed path to log files (NEWLOGPATH) =
 Path to log files = i:\logs\NODE0004\
 Overflow log path (OVERFLOWLOGPATH) =
 Mirror log path (MIRRORLOGPATH) =
 First active log file = S0000032.LOG
 Block log on disk full (BLK_LOG_DSK_FUL) = NO
 Percent of max active log space by transaction(MAX_LOG) = 0
 Num. of active log files for 1 active UOW(NUM_LOG_SPAN) = 0
 Group commit count (MINCOMMIT) = 1
 Percent log file reclaimed before soft ckcpt (SOFTMAX) = 600
 Log retain for recovery enabled (LOGRETAIN) = RECOVERY
 User exit for logging enabled (USEREXIT) = OFF

Auto restart enabled (AUTORESTART) = ON
 Index re-creation time (INDEXREC) = SYSTEM (ACCESS)
 Default number of loadrec sessions (DFT_LOADREC_SES) = 1
 Number of database backups to retain (NUM_DB_BACKUPS) = 12
 Recovery history retention (days) (REC_HIS_RETENTN) = 366
 TSM management class (TSM_MGMTCLASS) =
 TSM node name (TSM_NODENAME) =
 TSM owner (TSM_OWNER) =
 TSM password (TSM_PASSWORD) =

"DB2 Configuration for Node5"

get db cfg for tpcd

Database Configuration for Database tpcd

Database configuration release level = 0x0a00
 Database release level = 0x0a00
 Database territory = US
 Database code page = 1252
 Database code set = IBM-1252
 Database country/region code = 1
 Dynamic SQL Query management (DYN_QUERY_MGMT) = DISABLE
 Discovery support for this database (DISCOVER_DB) = ENABLE
 Default query optimization class (DFT_QUERYOPT) = 7
 Degree of parallelism (DFT_DEGREE) = 1
 Continue upon arithmetic exceptions (DFT_SQLMATHWARN) = NO
 Default refresh age (DFT_REFRESH_AGE) = 0
 Number of frequent values retained (NUM_FREQVALUES) = 0
 Number of quantiles retained (NUM_QUANTILES) = 300
 Backup pending = NO
 Database is consistent = YES
 Rollforward pending = NO
 Restore pending = NO
 Multi-page file allocation enabled = NO
 Log retain for recovery status = RECOVERY
 User exit for logging status = NO
 Data Links Token Expiry Interval (sec) (DL_EXPINT) = 60
 Data Links Write Token Init Expiry Intvl(DL_WT_IEXPINT) = 60
 Data Links Number of Copies (DL_NUM_COPIES) = 1
 Data Links Time after Drop (days) (DL_TIME_DROP) = 1
 Data Links Token in Uppercase (DL_UPPER) = NO
 Data Links Token Algorithm (DL_TOKEN) = MAC0
 Database heap (4KB) (DBHEAP) = 20000
 Size of database shared memory (4KB) (DATABASE_MEMORY) = AUTOMATIC
 Catalog cache size (4KB) (CATALOGCACHE_SZ) = 386
 Log buffer size (4KB) (LOGBUFSZ) = 2048
 Utilities heap size (4KB) (UTIL_HEAP_SZ) = 40000
 Buffer pool size (pages) (BUFFPAGE) = 60000
 Extended storage segments size (4KB) (ESTORE_SEG_SZ) = 16000
 Number of extended storage segments (NUM_ESTORE_SEGS) = 0
 Max storage for lock list (4KB) (LOCKLIST) = 16384
 Max size of appl. group mem set (4KB) (APPGROUP_MEM_SZ) = 40000
 Percent of mem for appl. group heap (GROUPHEAP_RATIO) = 70
 Max appl. control heap size (4KB) (APP_CTL_HEAP_SZ) = 2048
 Sort heap thres for shared sorts (4KB) (SHEAPTHRES_SHR) = (SHEAPTHRES)
 Sort list heap (4KB) (SORTHEAP) = 6400
 SQL statement heap (4KB) (STMTHEAP) = 10000
 Default application heap (4KB) (APPLHEAPSZ) = 16000
 Package cache size (4KB) (PCKCACHESZ) = 640
 Statistics heap size (4KB) (STAT_HEAP_SZ) = 10000
 Interval for checking deadlock (ms) (DLCHKTIME) = 5000
 Percent. of lock lists per application (MAXLOCKS) = 5
 Lock timeout (sec) (LOCKTIMEOUT) = -1
 Changed pages threshold (CHNGPGS_THRESH) = 15
 Number of asynchronous page cleaners (NUM_IOCLEANERS) = 4
 Number of I/O servers (NUM_IOSERVERS) = 4
 Index sort flag (INDEXSORT) = YES
 Sequential detect flag (SEQDETECT) = YES
 Default prefetch size (pages) (DFT_PREFETCH_SZ) = 16
 Track modified pages (TRACKMOD) = OFF
 Default number of containers = 1
 Default tablespace extentsize (pages) (DFT_EXTENT_SZ) = 32
 Max number of active applications (MAXAPPLS) = 40
 Average number of active applications (AVG_APPLS) = 1
 Max DB files open per application (MAXFILOP) = 1024

Log file size (4KB) (LOGFILSIZ) = 16384
 Number of primary log files (LOGPRIMARY) = 20
 Number of secondary log files (LOGSECOND) = 2
 Changed path to log files (NEWLOGPATH) =
 Path to log files = j:\logs\NODE0005\
 Overflow log path (OVERFLOWLOGPATH) =
 Mirror log path (MIRRORLOGPATH) =
 First active log file = S0000032.LOG
 Block log on disk full (BLK_LOG_DSK_FUL) = NO
 Percent of max active log space by transaction(MAX_LOG) = 0
 Num. of active log files for 1 active UOW(NUM_LOG_SPAN) = 0
 Group commit count (MINCOMMIT) = 1
 Percent log file reclaimed before soft ckpt(SOFTMAX) = 600
 Log retain for recovery enabled (LOGRETAIN) = RECOVERY
 User exit for logging enabled (USEREXIT) = OFF
 Auto restart enabled (AUTORESTART) = ON
 Index re-creation time (INDEXREC) = SYSTEM (ACCESS)
 Default number of loadrec sessions (DFT_LOADREC_SES) = 1
 Number of database backups to retain (NUM_DB_BACKUPS) = 12
 Recovery history retention (days) (REC_HIS_RETENTN) = 366
 TSM management class (TSM_MGMTCLASS) =
 TSM node name (TSM_NODENAME) =
 TSM owner (TSM_OWNER) =
 TSM password (TSM_PASSWORD) =

"DB2 Configuration for Node6"

get db cfg for tpcd

Database Configuration for Database tpcd

Database configuration release level = 0x0a00
 Database release level = 0x0a00
 Database territory = US
 Database code page = 1252
 Database code set = IBM-1252
 Database country/region code = 1
 Dynamic SQL Query management (DYN_QUERY_MGMT) = DISABLE
 Discovery support for this database (DISCOVER_DB) = ENABLE
 Default query optimization class (DFT_QUERYOPT) = 7
 Degree of parallelism (DFT_DEGREE) = 1
 Continue upon arithmetic exceptions (DFT_SQLMATHWARN) = NO
 Default refresh age (DFT_REFRESH_AGE) = 0
 Number of frequent values retained (NUM_FREQVALUES) = 0
 Number of quantiles retained (NUM_QUANTILES) = 300
 Backup pending = NO
 Database is consistent = YES
 Rollforward pending = NO
 Restore pending = NO
 Multi-page file allocation enabled = NO
 Log retain for recovery status = RECOVERY
 User exit for logging status = NO
 Data Links Token Expiry Interval (sec) (DL_EXPINT) = 60
 Data Links Write Token Init Expiry Intvl(DL_WT_IEXPINT) = 60
 Data Links Number of Copies (DL_NUM_COPIES) = 1
 Data Links Time after Drop (days) (DL_TIME_DROP) = 1
 Data Links Token in Uppercase (DL_UPPER) = NO
 Data Links Token Algorithm (DL_TOKEN) = MAC0
 Database heap (4KB) (DBHEAP) = 20000
 Size of database shared memory (4KB) (DATABASE_MEMORY) = AUTOMATIC
 Catalog cache size (4KB) (CATALOGCACHE_SZ) = 386
 Log buffer size (4KB) (LOGBUFSZ) = 2048
 Utilities heap size (4KB) (UTIL_HEAP_SZ) = 40000
 Buffer pool size (pages) (BUFFPAGE) = 60000
 Extended storage segments size (4KB) (ESTORE_SEG_SZ) = 16000
 Number of extended storage segments (NUM_ESTORE_SEGS) = 0
 Max storage for lock list (4KB) (LOCKLIST) = 16384
 Max size of appl. group mem set (4KB) (APPGROUP_MEM_SZ) = 40000
 Percent of mem for appl. group heap (GROUPHEAP_RATIO) = 70
 Max appl. control heap size (4KB) (APP_CTL_HEAP_SZ) = 2048
 Sort heap thres for shared sorts (4KB) (SHEAPTHRES_SHR) = (SHEAPTHRES)
 Sort list heap (4KB) (SORTHEAP) = 6400
 SQL statement heap (4KB) (STMTHEAP) = 10000
 Default application heap (4KB) (APPLHEAPSZ) = 16000
 Package cache size (4KB) (PCKCACHESZ) = 640
 Statistics heap size (4KB) (STAT_HEAP_SZ) = 10000

Interval for checking deadlock (ms) (DLCHKTIME) = 5000
 Percent. of lock lists per application (MAXLOCKS) = 5
 Lock timeout (sec) (LOCKTIMEOUT) = -1
 Changed pages threshold (CHNGPGS_THRESH) = 15
 Number of asynchronous page cleaners (NUM_IOCLEANERS) = 4
 Number of I/O servers (NUM_IOSERVERS) = 4
 Index sort flag (INDEXSORT) = YES
 Sequential detect flag (SEQDETECT) = YES
 Default prefetch size (pages) (DFT_PREFETCH_SZ) = 16
 Track modified pages (TRACKMOD) = OFF
 Default number of containers = 1
 Default tablespace extentsize (pages) (DFT_EXTENT_SZ) = 32
 Max number of active applications (MAXAPPLS) = 40
 Average number of active applications (AVG_APPLS) = 1
 Max DB files open per application (MAXFILOP) = 1024
 Log file size (4KB) (LOGFILSIZ) = 16384
 Number of primary log files (LOGPRIMARY) = 20
 Number of secondary log files (LOGSECOND) = 2
 Changed path to log files (NEWLOGPATH) =
 Path to log files = g:\logs\NODE0006\
 Overflow log path (OVERFLOWLOGPATH) =
 Mirror log path (MIRRORLOGPATH) =
 First active log file = S0000033.LOG
 Block log on disk full (BLK_LOG_DSK_FUL) = NO
 Percent of max active log space by transaction (MAX_LOG) = 0
 Num. of active log files for 1 active UOW (NUM_LOG_SPAN) = 0
 Group commit count (MINCOMMIT) = 1
 Percent log file reclaimed before soft ckcpt (SOFTMAX) = 600
 Log retain for recovery enabled (LOGRETAIN) = RECOVERY
 User exit for logging enabled (USEREXIT) = OFF
 Auto restart enabled (AUTORESTART) = ON
 Index re-creation time (INDEXREC) = SYSTEM (ACCESS)
 Default number of loadrec sessions (DFT_LOADREC_SES) = 1
 Number of database backups to retain (NUM_DB_BACKUPS) = 12
 Recovery history retention (days) (REC_HIS_RETENTN) = 366
 TSM management class (TSM_MGMTCLASS) =
 TSM node name (TSM_NODENAME) =
 TSM owner (TSM_OWNER) =
 TSM password (TSM_PASSWORD) =

"DB2 Configuration for Node7"

get db cfg for tpcd

Database Configuration for Database tpcd

Database configuration release level = 0x0a00
 Database release level = 0x0a00
 Database territory = US
 Database code page = 1252
 Database code set = IBM-1252
 Database country/region code = 1
 Dynamic SQL Query management (DYN_QUERY_MGMT) = DISABLE
 Discovery support for this database (DISCOVER_DB) = ENABLE
 Default query optimization class (DFT_QUERYOPT) = 7
 Degree of parallelism (DFT_DEGREE) = 1
 Continue upon arithmetic exceptions (DFT_SQLMATHWARN) = NO
 Default refresh age (DFT_REFRESH_AGE) = 0
 Number of frequent values retained (NUM_FREQVALUES) = 0
 Number of quantiles retained (NUM_QUANTILES) = 300
 Backup pending = NO

Database is consistent = YES
 Rollforward pending = NO
 Restore pending = NO
 Multi-page file allocation enabled = NO
 Log retain for recovery status = RECOVERY
 User exit for logging status = NO
 Data Links Token Expiry Interval (sec) (DL_EXPINT) = 60
 Data Links Write Token Init Expiry Intvl (DL_WT_IEXPINT) = 60
 Data Links Number of Copies (DL_NUM_COPIES) = 1
 Data Links Time after Drop (days) (DL_TIME_DROP) = 1
 Data Links Token in Uppercase (DL_UPPER) = NO
 Data Links Token Algorithm (DL_TOKEN) = MAC0
 Database heap (4KB) (DBHEAP) = 20000
 Size of database shared memory (4KB) (DATABASE_MEMORY) = AUTOMATIC

Catalog cache size (4KB) (CATALOGCACHE_SZ) = 386
 Log buffer size (4KB) (LOGBUFSZ) = 2048
 Utilities heap size (4KB) (UTIL_HEAP_SZ) = 40000
 Buffer pool size (pages) (BUFFPAGE) = 60000
 Extended storage segments size (4KB) (ESTORE_SEG_SZ) = 16000
 Number of extended storage segments (NUM_ESTORE_SEGS) = 0
 Max storage for lock list (4KB) (LOCKLIST) = 16384
 Max size of appl. group mem set (4KB) (APPGROUP_MEM_SZ) = 40000
 Percent of mem for appl. group heap (GROUPHEAP_RATIO) = 70
 Max appl. control heap size (4KB) (APP_CTL_HEAP_SZ) = 2048
 Sort heap thres for shared sorts (4KB) (SHEAPTHRES_SHR) = (SHEAPTHRES)
 Sort list heap (4KB) (SORTHEAP) = 6400
 SQL statement heap (4KB) (STMTHPEAP) = 10000
 Default application heap (4KB) (APPLHEAPSZ) = 16000
 Package cache size (4KB) (PCKCACHESZ) = 640
 Statistics heap size (4KB) (STAT_HEAP_SZ) = 10000
 Interval for checking deadlock (ms) (DLCHKTIME) = 5000
 Percent. of lock lists per application (MAXLOCKS) = 5
 Lock timeout (sec) (LOCKTIMEOUT) = -1
 Changed pages threshold (CHNGPGS_THRESH) = 15
 Number of asynchronous page cleaners (NUM_IOCLEANERS) = 4
 Number of I/O servers (NUM_IOSERVERS) = 4
 Index sort flag (INDEXSORT) = YES
 Sequential detect flag (SEQDETECT) = YES
 Default prefetch size (pages) (DFT_PREFETCH_SZ) = 16
 Track modified pages (TRACKMOD) = OFF
 Default number of containers = 1
 Default tablespace extentsize (pages) (DFT_EXTENT_SZ) = 32
 Max number of active applications (MAXAPPLS) = 40
 Average number of active applications (AVG_APPLS) = 1
 Max DB files open per application (MAXFILOP) = 1024
 Log file size (4KB) (LOGFILSIZ) = 16384
 Number of primary log files (LOGPRIMARY) = 20
 Number of secondary log files (LOGSECOND) = 2
 Changed path to log files (NEWLOGPATH) =
 Path to log files = k:\logs\NODE0007\
 Overflow log path (OVERFLOWLOGPATH) =
 Mirror log path (MIRRORLOGPATH) =
 First active log file = S0000032.LOG
 Block log on disk full (BLK_LOG_DSK_FUL) = NO
 Percent of max active log space by transaction (MAX_LOG) = 0
 Num. of active log files for 1 active UOW (NUM_LOG_SPAN) = 0
 Group commit count (MINCOMMIT) = 1
 Percent log file reclaimed before soft ckcpt (SOFTMAX) = 600
 Log retain for recovery enabled (LOGRETAIN) = RECOVERY
 User exit for logging enabled (USEREXIT) = OFF
 Auto restart enabled (AUTORESTART) = ON
 Index re-creation time (INDEXREC) = SYSTEM (ACCESS)
 Default number of loadrec sessions (DFT_LOADREC_SES) = 1
 Number of database backups to retain (NUM_DB_BACKUPS) = 12
 Recovery history retention (days) (REC_HIS_RETENTN) = 366
 TSM management class (TSM_MGMTCLASS) =
 TSM node name (TSM_NODENAME) =
 TSM owner (TSM_OWNER) =
 TSM password (TSM_PASSWORD) =

"DB2 DBM Configuration for System"

get dbm cfg

Database Manager Configuration

Node type = Enterprise Server Edition with local and remote clients
 Database manager configuration release level = 0x0a00
 Maximum total of files open (MAXTOTFILOP) = 16000
 CPU speed (millisec/instruction) (CPUSPEED) = 7.951129e-007
 Communications bandwidth (MB/sec) (COMM_BANDWIDTH) = 7.000000e+000
 Max number of concurrently active databases (NUMDB) = 1
 Data Links support (DATALINKS) = NO
 Federated Database System Support (FEDERATED) = NO
 Transaction processor monitor name (TP_MON_NAME) =
 Default charge-back account (DFT_ACCOUNT_STR) =
 Java Development Kit installation path (JDK_PATH) =
 Diagnostic error capture level (DIAGLEVEL) = 0
 Notify Level (NOTIFYLEVEL) = 3
 Diagnostic data directory path (DIAGPATH) =

Default database monitor switches

Buffer pool (DFT_MON_BUFPOOL) = OFF

Lock (DFT_MON_LOCK) = OFF

Sort (DFT_MON_SORT) = OFF

Statement (DFT_MON_STMT) = OFF

Table (DFT_MON_TABLE) = OFF

Timestamp (DFT_MON_TIMESTAMP) = ON

Unit of work (DFT_MON_UOW) = OFF

Monitor health of instance and databases (HEALTH_MON) = OFF

SYSADM group name (SYSADM_GROUP) =

SYSCTRL group name (SYSCTRL_GROUP) =

SYSMAINT group name (SYSMAINT_GROUP) =

SYSMON group name (SYSMON_GROUP) =

Database manager authentication (AUTHENTICATION) = SERVER

Cataloging allowed without authority (CATALOG_NOAUTH) = NO

Trust all clients (TRUST_ALLCLNTS) = YES

Trusted client authentication (TRUST_CLNTAUTH) = CLIENT

Bypass federated authentication (FED_NOAUTH) = NO

Default database path (DFTDBPATH) = D:

Database monitor heap size (4KB) (MON_HEAP_SZ) = 46

Java Virtual Machine heap size (4KB) (JAVA_HEAP_SZ) = 512

Audit buffer size (4KB) (AUDIT_BUF_SZ) = 0

Size of instance shared memory (4KB) (INSTANCE_MEMORY) = AUTOMATIC

Backup buffer default size (4KB) (BACKBUFSZ) = 1024

Restore buffer default size (4KB) (RESTBUFSZ) = 1024

Agent stack size (AGENT_STACK_SZ) = 16

Minimum committed private memory (4KB) (MIN_PRIV_MEM) = 32

Private memory threshold (4KB) (PRIV_MEM_THRESH) = 20000

Sort heap threshold (4KB) (SHEAPTHRES) = 250000

Directory cache support (DIR_CACHE) = YES

Application support layer heap size (4KB) (ASLHEAPSZ) = 15

Max requester I/O block size (bytes) (RQRIOLBK) = 32767

DOS requester I/O block size (bytes) (DOS_RQRIOLBK) = 4096

Query heap size (4KB) (QUERY_HEAP_SZ) = 1000

DRDA services heap size (4KB) (DRDA_HEAP_SZ) = 128

Workload impact by throttled utilities (UTIL_IMPACT_LIM) = 100

Priority of agents (AGENTPRI) = SYSTEM

Max number of existing agents (MAXAGENTS) = 3600

Agent pool size (NUM_POOLAGENTS) = 64

Initial number of agents in pool (NUM_INITAGENTS) = 4

Max number of coordinating agents (MAX_COORDAGENTS) = (MAXAGENTS - NUM_INITAGENTS)

Max no. of concurrent coordinating agents (MAXCAGENTS) = MAX_COORDAGENTS

Max number of client connections (MAX_CONNECTIONS) = MAX_COORDAGENTS

Keep fenced process (KEEPFENCED) = YES

Number of pooled fenced processes (FENCED_POOL) = MAX_COORDAGENTS

Initial number of fenced processes (NUM_INITFENCED) = 0

Index re-creation time (INDEXREC) = ACCESS

Transaction manager database name (TM_DATABASE) = 1ST_CONN

Transaction resync interval (sec) (RESYNC_INTERVAL) = 180

SPM name (SPM_NAME) =

SPM log size (SPM_LOG_FILE_SZ) = 256

SPM resync agent limit (SPM_MAX_RESYNC) = 20

SPM log path (SPM_LOG_PATH) =

NetBIOS Workstation name (NNAME) =

TCP/IP Service name (SVCENAME) = DB2_TPCHE_END

Discovery mode (DISCOVER) = SEARCH

Discover server instance (DISCOVER_INST) = ENABLE

Maximum query degree of parallelism (MAX_QUERYDEGREE) = ANY

Enable intra-partition parallelism (INTRA_PARALLEL) = NO

No. of int. communication buffers(4KB)(FCM_NUM_BUFFERS) = 30000

Node connection elapse time (sec) (CONN_ELAPSE) = 10

Max number of node connection retries (MAX_CONNRETRIES) = 5

Max time difference between nodes (min) (MAX_TIME_DIFF) = 60

db2start/db2stop timeout (min) (START_STOP_TIME) = 10

"DB2 Version Information"

DB21085I Instance "TPCH" uses "32" bits and DB2 code release "SQL08014" with level identifier "02050106".

Informational tokens are "DB2 v8.1.4.341", "s031027", "WR21326", and FixPak "4".

Product is installed at "D:\SQLLIB".

DB2 Registry Variables

DB2_EXTENDED_OPTIMIZATION=YES

DB2_ANTIJOIN=Y

DB2BPVARS=d:\tpch\ddl\scattered_read

DB2ACCOUNTNAME=RUTHLESS1\tpch

DB2INSTOWNER=RUTHLESS1

DB2PORTRANGE=80000:80008

DB2MEMMAXFREE=100000000

DB2OPTIONS=-t -v +c

DB2NTNOCACHE=ON

DB2INSTPROF=D:\INST

DB2_PARALLEL_IO=*

Microsoft Windows Server 2003 Enterprise Edition

Configuration Parameters

The following startup parmeters were selected via Boot.ini:

[boot loader]

timeout=15

default=multi(0)disk(0)rdisk(0)partition(1)\WINDOWS

[operating systems]

multi(0)disk(0)rdisk(0)partition(1)\WINDOWS="Windows Server 2003, Enterprise /PAE" /fastdetect /PAE

multi(0)disk(0)rdisk(0)partition(1)\WINDOWS="Windows Server 2003, Enterprise" /fastdetect

The following updates were made to the registry:

HKLP\System\CurrentControlSet\Control\Session Manager\I/O

System\CountOperations(DWORD=0)

HKLM\System\CurrentControlSet\Control\Session Manager\Memory Management\

DontVerifyRandomDrivers(DWORD=1)

LargeSystemCache (DWORD=0)

Disable PagingExecutive(DWORD=1)

SUT Hardware Information Report

System Information report written at: 02/25/04 17:08:19

System Name: RUTHLESS1

[System Summary]

Item	Value
OS Name	Microsoft(R) Windows(R) Server 2003, Enterprise Edition
Version	5.2.3790 Build 3790
OS Manufacturer	Microsoft Corporation
System Name	RUTHLESS1
System Manufacturer	IBM
System Model	eserver xSeries 445 -[88704RX]-
System Type	X86-based PC
Processor	x86 Family 15 Model 2 Stepping 6 GenuineIntel ~2999 Mhz
Processor	x86 Family 15 Model 2 Stepping 6 GenuineIntel ~2999 Mhz
Processor	x86 Family 15 Model 2 Stepping 6 GenuineIntel ~2999 Mhz
Processor	x86 Family 15 Model 2 Stepping 6 GenuineIntel ~2999 Mhz
Processor	x86 Family 15 Model 2 Stepping 6 GenuineIntel ~2999 Mhz
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Processor	x86 Family 15 Model 2 Stepping 6 GenuineIntel ~2999 Mhz
Processor	x86 Family 15 Model 2 Stepping 6 GenuineIntel ~2999 Mhz
Processor	x86 Family 15 Model 2 Stepping 6 GenuineIntel ~2999 Mhz

BIOS Version/Date IBM-[REE136PF1-1.0;]-, 2/9/2004
 SMBIOS Version 2.3
 Windows Directory C:\WINDOWS
 System Directory C:\WINDOWS\system32
 Boot Device \Device\HarddiskVolume1
 Locale United States
 Hardware Abstraction Layer Version = "1.40.0000 built by: (chrisk)"
 User Name RUTHLESS1\tpch
 Time Zone Eastern Standard Time
 Total Physical Memory 16,384.00 MB
 Available Physical Memory 15.11 GB
 Total Virtual Memory 33.75 GB
 Available Virtual Memory 32.09 GB
 Page File Space 17.76 GB
 Page File C:\pagefile.sys

[Hardware Resources]

[Conflicts/Sharing]

Resource	Device	Status
I/O Port 0x00000000-0x00001FFF	PCI bus	
I/O Port 0x00000000-0x00001FFF	Direct memory access controller	
Memory Address 0xF8B00000-0xF8BFFFFF	PCI bus	
Memory Address 0xF8B00000-0xF8BFFFFF	PCI standard PCI-to-PCI bridge	
I/O Port 0x00002000-0x000027FF	PCI bus	
I/O Port 0x00002000-0x000027FF	LSI Logic PCI-X Ultra320 SCSI Host Adapter	
Memory Address 0xE8000000-0xE9FFFFFFF	PCI bus	
Memory Address 0xE8000000-0xE9FFFFFFF	RAGE XL PCI Family (Microsoft Corporation)	
Memory Address 0xF8A00000-0xF8AFFFFF	PCI bus	
Memory Address 0xF8A00000-0xF8AFFFFF	PCI standard PCI-to-PCI bridge	
IRQ 18	VIA Rev 5 or later USB Universal Host Controller	
IRQ 18	VIA Rev 5 or later USB Universal Host Controller	
Memory Address 0xEDA00000-0xEDAFFFFF	PCI bus	
Memory Address 0xEDA00000-0xEDAFFFFF	LSI Logic PCI-X Ultra320 SCSI Host Adapter	
Memory Address 0xA0000-0xA7FFF	PCI bus	
Memory Address 0xA0000-0xA7FFF	RAGE XL PCI Family (Microsoft Corporation)	
[DMA]		
Resource	Device	Status
Channel 2	Standard floppy disk controller	OK
Channel 4	Direct memory access controller	OK
[Forced Hardware]		
Device	PNP Device ID	
[I/O]		
Resource	Device	Status
0x00000000-0x00001FFF	PCI bus	OK
0x00000000-0x00001FFF	Direct memory access controller	OK
0x00001800-0x000018FF	RAGE XL PCI Family (Microsoft Corporation)	OK
0x000003B0-0x000003BB	RAGE XL PCI Family (Microsoft Corporation)	OK
0x000003C0-0x000003DF	RAGE XL PCI Family (Microsoft Corporation)	OK
0x00001900-0x0000197F	Other PCI Bridge Device	OK
0x00000A79-0x00000A79	ISAPNP Read Data Port	OK
0x00000279-0x00000279	ISAPNP Read Data Port	OK
0x00000274-0x00000277	ISAPNP Read Data Port	OK
0x00000430-0x00000437	Motherboard resources	OK
0x00000438-0x00000439	Motherboard resources	OK
0x0000002E-0x0000002F	Motherboard resources	OK
0x00000064-0x00000064	Standard 101/102-Key or Microsoft Natural PS/2 Keyboard	OK
0x00000060-0x00000060	Standard 101/102-Key or Microsoft Natural PS/2 Keyboard	OK
0x000003F0-0x000003F5	Standard floppy disk controller	OK
0x000003F7-0x000003F7	Standard floppy disk controller	OK
0x00000020-0x00000021	Advanced programmable interrupt controller	OK
0x000000A0-0x000000A1	Advanced programmable interrupt controller	OK
0x00000080-0x0000008F	Direct memory access controller	OK

0x000000C0-0x000000DF	Direct memory access controller	OK
0x00000040-0x00000043	System timer	OK
0x00000070-0x00000073	System CMOS/real time clock	OK
0x00000061-0x00000061	System speaker	OK
0x000000F0-0x000000FF	Numeric data processor	OK
0x00000092-0x00000092	Motherboard resources	OK
0x000000A8-0x000000A9	Motherboard resources	OK
0x00000440-0x0000044F	Motherboard resources	OK
0x000004C0-0x000004C3	Motherboard resources	OK
0x000004D0-0x000004D1	Motherboard resources	OK
0x000004E0-0x000004FF	Motherboard resources	OK
0x00000500-0x0000057F	Motherboard resources	OK
0x00000700-0x0000070F	VIA Bus Master IDE Controller	OK
0x000001F0-0x000001F7	Primary IDE Channel	OK
0x000003F6-0x000003F6	Primary IDE Channel	OK
0x00000170-0x00000177	Secondary IDE Channel	OK
0x00000376-0x00000376	Secondary IDE Channel	OK
0x00001980-0x0000199F	VIA Rev 5 or later USB Universal Host Controller	OK
0x000019A0-0x000019BF	VIA Rev 5 or later USB Universal Host Controller	OK
0x00002000-0x000027FF	PCI bus	OK
0x00002000-0x000027FF	LSI Logic PCI-X Ultra320 SCSI Host Adapter	OK
0x00002100-0x000021FF	LSI Logic PCI-X Ultra320 SCSI Host Adapter	OK
0x00004000-0x00005FFF	PCI bus	OK
0x0000E000-0x0000EFFF	PCI bus	OK
0x00003000-0x00003FFF	PCI bus	OK
0x00006000-0x00006FFF	PCI bus	OK
0x00007000-0x00007FFF	PCI bus	OK
0x00008000-0x00009FFF	PCI bus	OK
0x0000A000-0x0000BFFF	PCI bus	OK
0x0000C000-0x0000DFFF	PCI bus	OK

[IRQs]

Resource	Device	Status
IRQ 9	Microsoft ACPI-Compliant System	OK
IRQ 39	RAGE XL PCI Family (Microsoft Corporation)	OK
IRQ 4	Other PCI Bridge Device	OK
IRQ 1	Standard 101/102-Key or Microsoft Natural PS/2 Keyboard	OK
IRQ 12	PS/2 Compatible Mouse	OK
IRQ 6	Standard floppy disk controller	OK
IRQ 0	System timer	OK
IRQ 8	System CMOS/real time clock	OK
IRQ 13	Numeric data processor	OK
IRQ 14	Primary IDE Channel	OK
IRQ 15	Secondary IDE Channel	OK
IRQ 18	VIA Rev 5 or later USB Universal Host Controller	OK
IRQ 18	VIA Rev 5 or later USB Universal Host Controller	OK
IRQ 40	LSI Logic PCI-X Ultra320 SCSI Host Adapter	OK
IRQ 41	LSI Logic PCI-X Ultra320 SCSI Host Adapter	OK
IRQ 42	Broadcom NetXtreme Gigabit Ethernet	OK
IRQ 11	Broadcom NetXtreme Gigabit Ethernet #2	OK
IRQ 64	IBM ServeRAID 6M Controller	OK
IRQ 60	IBM ServeRAID 6M Controller	OK
IRQ 56	IBM ServeRAID 6M Controller	OK
IRQ 102	IBM ServeRAID 6M Controller	OK
IRQ 95	IBM ServeRAID 6M Controller	OK
IRQ 88	IBM ServeRAID 6M Controller	OK

[Memory]

Resource	Device	Status
0xA0000-0xA7FFF	PCI bus	OK
0xA0000-0xA7FFF	RAGE XL PCI Family (Microsoft Corporation)	OK
0xA8000-0xAFFFF	PCI bus	OK
0xB0000-0xB7FFF	PCI bus	OK
0xB8000-0xBFFFF	PCI bus	OK
0xE8000000-0xE9FFFFFFF	PCI bus	OK
0xE8000000-0xE9FFFFFFF	RAGE XL PCI Family (Microsoft Corporation)	OK
0xE9200000-0xE9200FFF	RAGE XL PCI Family (Microsoft Corporation)	OK
0xE9000000-0xE91FFFFFFF	Other PCI Bridge Device	OK
0x0400-0x04FF	System board	OK
0x10000-0xDFF9C33F	Memory Module	OK

0xEDA00000-0xEDAFFFFFFF	PCI bus	OK			
0xEDA00000-0xEDAFFFFFFF	LSI Logic PCI-X Ultra320 SCSI Host Adapter	OK			
0xEDA10000-0xEDA1FFFFF	LSI Logic PCI-X Ultra320 SCSI Host Adapter	OK			
0xEDA20000-0xEDA2FFFFF	LSI Logic PCI-X Ultra320 SCSI Host Adapter	OK			
0xEDA30000-0xEDA3FFFFF	LSI Logic PCI-X Ultra320 SCSI Host Adapter	OK			
0xEDA40000-0xEDA4FFFFF	Broadcom NetXtreme Gigabit Ethernet	OK			
0xEDA50000-0xEDA5FFFFF	Broadcom NetXtreme Gigabit Ethernet	OK			
0xEDA60000-0xEDA6FFFFF	Broadcom NetXtreme Gigabit Ethernet #2	OK			
0xEDA70000-0xEDA7FFFFF	Broadcom NetXtreme Gigabit Ethernet #2	OK			
0xEA000000-0xEA7FFFFFFF	PCI bus	OK			
0xF0000000-0xF07FFFFFFF	PCI bus	OK			
0xF8A00000-0xF8AFFFFFFF	PCI bus	OK			
0xF8A80000-0xF8A80FFFFF	PCI standard PCI-to-PCI bridge	OK			
0xF8B00000-0xF8B0FFFFF	IBM ServeRAID 6M Controller	OK			
0xF8B80000-0xF8B80FFFFF	PCI bus	OK			
0xF8000000-0xF87FFFFFFF	PCI standard PCI-to-PCI bridge	OK			
0xF9000000-0xF93FFFFFFF	IBM ServeRAID 6M Controller	OK			
0xF8400000-0xF844FFFFF	PCI bus	OK			
0xF8480000-0xF8480FFFFF	PCI bus	OK			
0xEA800000-0xEA8FFFFFFF	PCI standard PCI-to-PCI bridge	OK			
0xF2000000-0xF23FFFFFFF	IBM ServeRAID 6M Controller	OK			
0xEAC00000-0xEACFFFFFFF	PCI bus	OK			
0xEAC80000-0xEAC80FFFFF	PCI bus	OK			
0xEB000000-0xEB7FFFFFFF	PCI standard PCI-to-PCI bridge	OK			
0xF2400000-0xF27FFFFFFF	IBM ServeRAID 6M Controller	OK			
0xEB400000-0xEB44FFFFF	PCI bus	OK			
0xEB480000-0xEB480FFFFF	PCI bus	OK			
0xEB800000-0xEB8FFFFFFF	PCI standard PCI-to-PCI bridge	OK			
0xF2800000-0xF2BFFFFFFF	IBM ServeRAID 6M Controller	OK			
0xEBC00000-0xEBC0FFFFFFF	PCI bus	OK			
0xEBC80000-0xEBC80FFFFF	PCI bus	OK			
0xEC000000-0xEC7FFFFFFF	PCI standard PCI-to-PCI bridge	OK			
0xF0800000-0xF0FFFFFFF	IBM ServeRAID 6M Controller	OK			
0xEC800000-0xEC8FFFFFFF	PCI bus	OK			
0xF1000000-0xF17FFFFFFF	PCI bus	OK			
0xED000000-0xED7FFFFFFF	PCI bus	OK			
0xF1800000-0xF1FFFFFFF	PCI bus	OK			

[Components]

[Multimedia]

[Audio Codecs]

CODEC	Manufacturer	Description	Status	File	Version
c:\windows\system32\msgsm32.acm	Microsoft Corporation				
OK	C:\WINDOWS\system32\MSGSM32.ACM	5.2.3790.0			
(srv03_rtm.030324-2048)	20.50 KB (20,992 bytes)	3/25/2003 7:00 AM			
c:\windows\system32\tssoft32.acm	DSP GROUP, INC.		OK		
C:\WINDOWS\system32\TSSOFT32.ACM	1.01	9.50 KB (9,728 bytes)			
3/25/2003 7:00 AM					
c:\windows\system32\imaadp32.acm	Microsoft Corporation				
OK	C:\WINDOWS\system32\IMAADP32.ACM	5.2.3790.0			
(srv03_rtm.030324-2048)	15.50 KB (15,872 bytes)	3/25/2003 7:00 AM			
c:\windows\system32\msaud32.acm	Microsoft Corporation				
Windows Media Audio Codec	OK				
C:\WINDOWS\system32\MSAUD32.ACM	8.00.00.4487	288.00 KB			
(294,912 bytes)	3/25/2003 7:00 AM				
c:\windows\system32\msg711.acm	Microsoft Corporation				
OK	C:\WINDOWS\system32\MSG711.ACM	5.2.3790.0			
(srv03_rtm.030324-2048)	10.00 KB (10,240 bytes)	3/25/2003 7:00 AM			
c:\windows\system32\msadp32.acm	Microsoft Corporation				
OK	C:\WINDOWS\system32\MSADP32.ACM	5.2.3790.0			
(srv03_rtm.030324-2048)	14.50 KB (14,848 bytes)	3/25/2003 7:00 AM			
c:\windows\system32\msg723.acm	Microsoft Corporation				
OK	C:\WINDOWS\system32\MSG723.ACM	4.4.4000		116.00 KB	
(118,784 bytes)	2/16/2004 11:35 AM				

c:\windows\system32\sl_anet.acm	Sipro Lab Telecom Inc.	Sipro
Lab Telecom Audio Codec	OK	
C:\WINDOWS\system32\SL_ANET.ACM	3.02	84.00 KB (86,016 bytes)
3/25/2003 7:00 AM		
c:\windows\system32\l3codeca.acm	Fraunhofer Institut Integrierte	
Schaltungen IIS	Fraunhofer IIS MPEG Layer-3 Codec	OK
C:\WINDOWS\system32\L3CODECA.ACM	1, 9, 0, 0305	284.00
KB (290,816 bytes)	3/25/2003 7:00 AM	

[Video Codecs]

CODEC	Manufacturer	Description	Status	File	Version
c:\windows\system32\msh261.drv	Microsoft Corporation				
OK	C:\WINDOWS\system32\MSH261.DRV	4.4.4000		180.00 KB	
(184,320 bytes)	2/16/2004 11:35 AM				
c:\windows\system32\msrle32.dll	Microsoft Corporation		OK		
C:\WINDOWS\system32\MSRLE32.DLL	5.2.3790.0 (srv03_rtm.030324-2048)				
10.50 KB (10,752 bytes)	3/25/2003 7:00 AM				
c:\windows\system32\tsbyuv.dll	Microsoft Corporation		OK		
C:\WINDOWS\system32\TSBYUV.DLL	5.2.3790.0 (srv03_rtm.030324-2048)				
8.00 KB (8,192 bytes)	3/24/2003 8:50 PM				
c:\windows\system32\msyuv.dll	Microsoft Corporation		OK		
C:\WINDOWS\system32\MSYUV.DLL	5.2.3790.0 (srv03_rtm.030324-2048)				
16.50 KB (16,896 bytes)	3/24/2003 8:49 PM				
c:\windows\system32\msvidc32.dll	Microsoft Corporation				
OK	C:\WINDOWS\system32\MSVIDC32.DLL	5.2.3790.0			
(srv03_rtm.030324-2048)	26.50 KB (27,136 bytes)	3/25/2003 7:00 AM			
c:\windows\system32\msh263.drv	Microsoft Corporation				
OK	C:\WINDOWS\system32\MSH263.DRV	4.4.4000		284.00 KB	
(290,816 bytes)	3/24/2003 8:46 PM				
c:\windows\system32\iyuv_32.dll	Microsoft Corporation				
OK	C:\WINDOWS\system32\IYUV_32.DLL	5.2.3790.0			
(srv03_rtm.030324-2048)	45.00 KB (46,080 bytes)	3/24/2003 8:49 PM			

[CD-ROM]

Item	Value
Drive	Z:
Description	CD-ROM Drive
Media Loaded	No
Media Type	CD-ROM
Name	HL-DT-ST DVD-ROM GDR8081N
Manufacturer	(Standard CD-ROM drives)
Status	OK
Transfer Rate	Not Available
SCSI Target ID	0
PNP Device ID	
IDE\CDROMHL-DT-ST_DVD-ROM_GDR8081N	0012_5&C
BC355F&0&0.0.0	
Driver	c:\windows\system32\drivers\cdrom.sys (5.2.3790.0
(srv03_rtm.030324-2048), 49.50 KB (50,688 bytes), 3/25/2003 7:00 AM)	

[Sound Device]

Item	Value
[Display]	
Item	Value
Name	RAGE XL PCI Family (Microsoft Corporation)
PNP Device ID	
PCI\VEN_1002&DEV_4752&SUBSYS_02401014&REV_27\3&267A616A&0&18	
Adapter Type	ATI RAGE XL PCI (B41), ATI Technologies Inc. compatible
Adapter Description	RAGE XL PCI Family (Microsoft Corporation)
Adapter RAM	8.00 MB (8,388,608 bytes)
Installed Drivers	ati2drad.dll
Driver Version	5.10.3663.6013
INF File	atiixpad.inf (ati2mpad section)
Color Planes	1
Color Table Entries	4294967296
Resolution	1024 x 768 x 60 hertz
Bits/Pixel	32
Memory Address	0xE8000000-0xE9FFFFFFF
I/O Port	0x00001800-0x000018FF
Memory Address	0xE9200000-0xE9200FFF
IRQ Channel	IRQ 39
I/O Port	0x000003B0-0x000003BB
I/O Port	0x000003C0-0x000003DF
Memory Address	0xA0000-0xA7FFF

Driver c:\windows\system32\drivers\ati2mpad.sys (5.10.3663.6013, 335.38 KB (343,424 bytes), 2/16/2004 6:24 AM)

[Infrared]

Item	Value
[Input]	
[Keyboard]	
Item	Value
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&7FD7688&0
Number of Function Keys	12
IRQ Channel	IRQ 1
I/O Port	0x00000064-0x00000064
I/O Port	0x00000060-0x00000060

Driver c:\windows\system32\drivers\i8042prt.sys (5.2.3790.0 (srv03_rtm.030324-2048), 68.50 KB (70,144 bytes), 3/25/2003 7:00 AM)

[Pointing Device]

Item	Value
Hardware Type	PS/2 Compatible Mouse
Number of Buttons	5
Status	OK
PNP Device ID	ACPI\PNP0F13\4&7FD7688&0
Power Management Supported	No
Double Click Threshold	6
Handedness	Right Handed Operation
IRQ Channel	IRQ 12

Driver c:\windows\system32\drivers\i8042prt.sys (5.2.3790.0 (srv03_rtm.030324-2048), 68.50 KB (70,144 bytes), 3/25/2003 7:00 AM)

[Modem]

Item	Value
[Network]	
[Adapter]	
Item	Value
Name	[00000001] RAS Async Adapter
Adapter Type	Not Available
Product Type	RAS Async Adapter
Installed	Yes
PNP Device ID	Not Available
Last Reset	2/24/2004 12:37 PM

Index 1

Service Name AsyncMac

IP Address Not Available

IP Subnet Not Available

Default IP Gateway Not Available

DHCP Enabled No

DHCP Server Not Available

DHCP Lease Expires Not Available

DHCP Lease Obtained Not Available

MAC Address Not Available

Name [00000002] WAN Miniport (L2TP)

Adapter Type Not Available

Product Type WAN Miniport (L2TP)

Installed Yes

PNP Device ID ROOT\MS_L2TPMINIPOINT\0000

Last Reset 2/24/2004 12:37 PM

Index 2

Service Name Rasl2tp

IP Address Not Available

IP Subnet Not Available

Default IP Gateway Not Available

DHCP Enabled No

DHCP Server Not Available

DHCP Lease Expires Not Available

DHCP Lease Obtained Not Available

MAC Address Not Available

Driver c:\windows\system32\drivers\rasl2tp.sys (5.2.3790.0 (srv03_rtm.030324-2048), 77.00 KB (78,848 bytes), 3/25/2003 7:00 AM)

Name [00000003] WAN Miniport (PPTP)

Adapter Type Wide Area Network (WAN)

Product Type WAN Miniport (PPTP)

Installed Yes

PNP Device ID ROOT\MS_PPTPMINIPOINT\0000

Last Reset 2/24/2004 12:37 PM

Index 3

Service Name PptpMiniport

IP Address Not Available

IP Subnet Not Available

Default IP Gateway Not Available

DHCP Enabled No

DHCP Server Not Available

DHCP Lease Expires Not Available

DHCP Lease Obtained Not Available

MAC Address 50:50:54:50:30:30

Driver c:\windows\system32\drivers\rasptp.sys (5.2.3790.0 (srv03_rtm.030324-2048), 70.50 KB (72,192 bytes), 3/25/2003 7:00 AM)

Name [00000004] WAN Miniport (PPPOE)

Adapter Type Wide Area Network (WAN)

Product Type WAN Miniport (PPPOE)

Installed Yes

PNP Device ID ROOT\MS_PPPOEMINIPOINT\0000

Last Reset 2/24/2004 12:37 PM

Index 4

Service Name RasPppoe

IP Address Not Available

IP Subnet Not Available

Default IP Gateway Not Available

DHCP Enabled No

DHCP Server Not Available

DHCP Lease Expires Not Available

DHCP Lease Obtained Not Available

MAC Address 33:50:6F:45:30:30

Driver c:\windows\system32\drivers\rasppoe.sys (5.2.3790.0 (srv03_rtm.030324-2048), 38.00 KB (38,912 bytes), 3/25/2003 7:00 AM)

Name [00000005] Direct Parallel

Adapter Type Not Available

Product Type Direct Parallel

Installed Yes

PNP Device ID ROOT\MS_PTMINIPOINT\0000

Last Reset 2/24/2004 12:37 PM

Index 5

Service Name Raspti

IP Address Not Available

IP Subnet Not Available

Default IP Gateway Not Available

DHCP Enabled No

DHCP Server Not Available

DHCP Lease Expires Not Available

DHCP Lease Obtained Not Available

MAC Address Not Available

Driver c:\windows\system32\drivers\raspti.sys (5.2.3790.0 (srv03_rtm.030324-2048), 18.50 KB (18,944 bytes), 3/25/2003 7:00 AM)

Name [00000006] WAN Miniport (IP)

Adapter Type Not Available

Product Type WAN Miniport (IP)

Installed Yes

PNP Device ID ROOT\MS_NDISWANIP\0000

Last Reset 2/24/2004 12:37 PM

Index 6

Service Name NdisWan

IP Address Not Available

IP Subnet Not Available

Default IP Gateway Not Available

DHCP Enabled No

DHCP Server Not Available

DHCP Lease Expires Not Available

DHCP Lease Obtained Not Available

MAC Address Not Available

Driver c:\windows\system32\drivers\ndiswan.sys (5.2.3790.0 (srv03_rtm.030324-2048), 96.50 KB (98,816 bytes), 3/25/2003 7:00 AM)

Name [00000007] Broadcom NetXtreme Gigabit Ethernet

Adapter Type Ethernet 802.3

Product Type Broadcom NetXtreme Gigabit Ethernet

Installed Yes

PNP Device ID PCI\VEN_14E4&DEV_1648&SUBSYS_02A61014&REV_02\3&13C0B0C5&0&20

Last Reset 2/24/2004 12:37 PM

Index 7

Service Name b57w2k
IP Address 192.168.200.100
IP Subnet 255.255.255.0
Default IP Gateway Not Available
DHCP Enabled No
DHCP Server Not Available
DHCP Lease Expires Not Available
DHCP Lease Obtained Not Available
MAC Address 00:09:6B:E6:02:AD
Memory Address 0xEDA40000-0xEDA4FFFF
Memory Address 0xEDA50000-0xEDA5FFFF
IRQ Channel IRQ 42
Driver c:\windows\system32\drivers\b57xp32.sys (6.34.0.0 built by: WinDDK, 166.88 KB (170,880 bytes), 2/16/2004 12:09 PM)
Name [00000008] Broadcom NetXtreme Gigabit Ethernet
Adapter Type Ethernet 802.3
Product Type Broadcom NetXtreme Gigabit Ethernet
Installed Yes
PNP Device ID
PCI\VEN_14E4&DEV_1648&SUBSYS_02A61014&REV_02\3&13C0B0C5&0&21
Last Reset 2/24/2004 12:37 PM
Index 8
Service Name b57w2k
IP Address 192.168.30.200
IP Subnet 255.255.255.0
Default IP Gateway 192.168.30.100
DHCP Enabled No
DHCP Server Not Available
DHCP Lease Expires Not Available
DHCP Lease Obtained Not Available
MAC Address 00:09:6B:16:02:AD
Memory Address 0xEDA60000-0xEDA6FFFF
Memory Address 0xEDA70000-0xEDA7FFFF
IRQ Channel IRQ 11
Driver c:\windows\system32\drivers\b57xp32.sys (6.34.0.0 built by: WinDDK, 166.88 KB (170,880 bytes), 2/16/2004 12:09 PM)
[Protocol]
Item Value
Name MSAFD Tcpiip [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 Tcpiip [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
Name MSAFD NetBIOS
[\Device\NetBT_Tcpip_{048A5157-65DE-4ACD-BA6C-CA5ACB4A67F2}]
SEQPACKET 3
Connectionless Service No
Guarantees Delivery Yes
Guarantees Sequencing Yes
Maximum Address Size 20 bytes
Maximum Message Size 62.50 KB (64,000 bytes)
Message Oriented Yes
Minimum Address Size 20 bytes
Pseudo Stream Oriented No
Supports Broadcasting No
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 No
Name MSAFD NetBIOS
[\Device\NetBT_Tcpip_{048A5157-65DE-4ACD-BA6C-CA5ACB4A67F2}]
DATAGRAM 3
Connectionless Service Yes
Guarantees Delivery No
Guarantees Sequencing No
Maximum Address Size 20 bytes
Maximum Message Size 62.50 KB (64,000 bytes)
Message Oriented Yes
Minimum Address Size 20 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 No
Name MSAFD NetBIOS
[\Device\NetBT_Tcpip_{14769FC9-0CD9-4B9E-8A4B-0CFD49A97293}]
SEQPACKET 0
Connectionless Service No

Guarantees Delivery	Yes
Guarantees Sequencing	Yes
Maximum Address Size	20 bytes
Maximum Message Size	62.50 KB (64,000 bytes)
Message Oriented	Yes
Minimum Address Size	20 bytes
Pseudo Stream Oriented	No
Supports Broadcasting	No
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	No

Name MSAFD NetBIOS
[\Device\NetBT_Tcpip_{14769FC9-0CD9-4B9E-8A4B-0CFD49A97293}]
DATAGRAM 0

Connectionless Service	Yes
Guarantees Delivery	No
Guarantees Sequencing	No
Maximum Address Size	20 bytes
Maximum Message Size	62.50 KB (64,000 bytes)
Message Oriented	Yes
Minimum Address Size	20 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	No

Name MSAFD NetBIOS
[\Device\NetBT_Tcpip_{36CBCEFC-3058-4CF3-B3AA-BF135E40F724}]
SEQPACKET 1

Connectionless Service	No
Guarantees Delivery	Yes
Guarantees Sequencing	Yes
Maximum Address Size	20 bytes
Maximum Message Size	62.50 KB (64,000 bytes)
Message Oriented	Yes
Minimum Address Size	20 bytes
Pseudo Stream Oriented	No
Supports Broadcasting	No
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	No

Name MSAFD NetBIOS
[\Device\NetBT_Tcpip_{36CBCEFC-3058-4CF3-B3AA-BF135E40F724}]
DATAGRAM 1

Connectionless Service	Yes
Guarantees Delivery	No
Guarantees Sequencing	No
Maximum Address Size	20 bytes
Maximum Message Size	62.50 KB (64,000 bytes)
Message Oriented	Yes
Minimum Address Size	20 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	No

Name MSAFD NetBIOS
[\Device\NetBT_Tcpip_{5D6EE261-C498-4B49-B455-46E3B2B22DFF}]
SEQPACKET 2

Connectionless Service	No
Guarantees Delivery	Yes
Guarantees Sequencing	Yes
Maximum Address Size	20 bytes
Maximum Message Size	62.50 KB (64,000 bytes)
Message Oriented	Yes
Minimum Address Size	20 bytes
Pseudo Stream Oriented	No
Supports Broadcasting	No
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	No

Name MSAFD NetBIOS
[\Device\NetBT_Tcpip_{5D6EE261-C498-4B49-B455-46E3B2B22DFF}]
DATAGRAM 2

Connectionless Service	Yes
Guarantees Delivery	No
Guarantees Sequencing	No
Maximum Address Size	20 bytes
Maximum Message Size	62.50 KB (64,000 bytes)
Message Oriented	Yes
Minimum Address Size	20 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	No

[WinSock]

Item	Value
File	c:\windows\system32\winsock.dll
Size	2.80 KB (2,864 bytes)
Version	3.10
File	c:\windows\system32\wsock32.dll
Size	22.00 KB (22,528 bytes)
Version	5.2.3790.0 (srv03_rtm.030324-2048)

[Ports]

[Serial]

Item	Value
[Parallel]	
Item	Value

[Storage]

[Drives]

Item	Value
Drive A:	
Description	3 1/2 Inch Floppy Drive
Drive C:	
Description	Local Fixed Disk
Compressed	No
File System	NTFS
Size	33.89 GB (36,388,605,952 bytes)
Free Space	29.90 GB (32,102,387,712 bytes)
Volume Name	
Volume Serial Number	049D8073
Drive D:	
Description	Local Fixed Disk
Compressed	No
File System	NTFS
Size	33.90 GB (36,396,830,720 bytes)
Free Space	26.32 GB (28,265,177,088 bytes)
Volume Name	New Volume
Volume Serial Number	CC55D1B2
Drive E:	
Description	Local Fixed Disk

Compressed No
File System NTFS
Size 33.90 GB (36,396,068,864 bytes)
Free Space 30.36 GB (32,602,218,496 bytes)
Volume Name Node 0 Log
Volume Serial Number 30E9C787
Drive G:
Description Local Fixed Disk
Compressed No
File System NTFS
Size 33.90 GB (36,396,068,864 bytes)
Free Space 30.65 GB (32,912,269,312 bytes)
Volume Name Node 6 log
Volume Serial Number AC83E79E
Drive H:
Description Local Fixed Disk
Compressed No
File System NTFS
Size 33.90 GB (36,396,068,864 bytes)
Free Space 30.59 GB (32,844,484,608 bytes)
Volume Name Node 1 log
Volume Serial Number D4AE8517
Drive I:
Description Local Fixed Disk
Compressed No
File System NTFS
Size 33.90 GB (36,396,068,864 bytes)
Free Space 30.00 GB (32,208,904,192 bytes)
Volume Name Node 4
Volume Serial Number 6C013B17
Drive J:
Description Local Fixed Disk
Compressed No
File System NTFS
Size 33.90 GB (36,396,068,864 bytes)
Free Space 30.00 GB (32,207,974,400 bytes)
Volume Name Node 5
Volume Serial Number 801CB44D
Drive K:
Description Local Fixed Disk
Compressed No
File System NTFS
Size 33.90 GB (36,396,068,864 bytes)
Free Space 30.59 GB (32,847,011,840 bytes)
Volume Name Node 7 log
Volume Serial Number 58EA1E7F
Drive M:
Description Local Fixed Disk
Compressed No
File System NTFS
Size 33.90 GB (36,396,068,864 bytes)
Free Space 30.59 GB (32,846,393,344 bytes)
Volume Name node 2
Volume Serial Number 0C3C2EE8
Drive N:
Description Local Fixed Disk
Compressed No
File System NTFS
Size 33.90 GB (36,396,068,864 bytes)
Free Space 30.59 GB (32,844,447,744 bytes)
Volume Name Node 3 log
Volume Serial Number A4AE377B
Drive O:
Description Local Fixed Disk
Compressed No
File System NTFS
Size 468.75 GB (503,316,475,904 bytes)
Free Space 234.68 GB (251,990,691,840 bytes)
Volume Name New Volume
Volume Serial Number E0A5B852
Drive P:
Description Local Fixed Disk
Compressed No
File System NTFS

Size 625.00 GB (671,088,635,904 bytes)
Free Space 428.80 GB (460,416,270,336 bytes)
Volume Name New Volume
Volume Serial Number 6004DAC9
Drive V:
Description Network Connection
Provider Name \\fsserv.raleigh.ibm.com\edrive
Drive W:
Description Local Fixed Disk
Compressed No
File System NTFS
Size 439.74 GB (472,166,428,672 bytes)
Free Space 61.44 GB (65,974,018,048 bytes)
Volume Name FlatFiles
Volume Serial Number D0F14DA9
Drive X:
Description Network Connection
Provider Name \\fsserv.raleigh.ibm.com\edrive
Drive Y:
Description Network Connection
Provider Name \\fsserv.raleigh.ibm.com\edrive
Drive Z:
Description CD-ROM Disc
[Disks]

Item	Value
Description	Disk drive
Manufacturer	(Standard disk drives)
Model	IBM ServeRAID 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	0
Sectors/Track	32
Size	203.41 GB (218,405,797,888 bytes)
Total Cylinders	104,144
Total Sectors	426,573,824
Total Tracks	13,330,432
Tracks/Cylinder	128
Partition	Disk #14, Partition #0
Partition Size	203.41 GB (218,407,878,656 bytes)
Partition Starting Offset	16,384 bytes
Description	Disk drive
Manufacturer	(Standard disk drives)
Model	IBM ServeRAID 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	1
Sectors/Track	32
Size	203.41 GB (218,405,797,888 bytes)
Total Cylinders	104,144
Total Sectors	426,573,824
Total Tracks	13,330,432
Tracks/Cylinder	128
Partition	Disk #15, Partition #0
Partition Size	203.41 GB (218,407,878,656 bytes)
Partition Starting Offset	16,384 bytes
Description	Disk drive
Manufacturer	(Standard disk drives)
Model	IBM ServeRAID 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 2
 Sectors/Track 32
 Size 33.90 GB (36,396,072,960 bytes)
 Total Cylinders 17,355
 Total Sectors 71,086,080
 Total Tracks 2,221,440
 Tracks/Cylinder 128
 Partition Disk #16, Partition #0
 Partition Size 33.90 GB (36,400,250,880 bytes)
 Partition Starting Offset 16,384 bytes
 Description Disk drive
 Manufacturer (Standard disk drives)
 Model IBM ServeRAID 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 3
 Sectors/Track 32
 Size 203.41 GB (218,405,797,888 bytes)
 Total Cylinders 104,144
 Total Sectors 426,573,824
 Total Tracks 13,330,432
 Tracks/Cylinder 128
 Partition Disk #17, Partition #0
 Partition Size 203.41 GB (218,407,878,656 bytes)
 Partition Starting Offset 16,384 bytes
 Description Disk drive
 Manufacturer (Standard disk drives)
 Model IBM ServeRAID 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 203.41 GB (218,405,797,888 bytes)
 Total Cylinders 104,144
 Total Sectors 426,573,824
 Total Tracks 13,330,432
 Tracks/Cylinder 128
 Partition Disk #18, Partition #0
 Partition Size 203.41 GB (218,407,878,656 bytes)
 Partition Starting Offset 16,384 bytes
 Description Disk drive
 Manufacturer (Standard disk drives)
 Model IBM ServeRAID 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 33.90 GB (36,396,072,960 bytes)
 Total Cylinders 17,355
 Total Sectors 71,086,080
 Total Tracks 2,221,440
 Tracks/Cylinder 128
 Partition Disk #19, Partition #0
 Partition Size 33.90 GB (36,400,250,880 bytes)
 Partition Starting Offset 16,384 bytes
 Description Disk drive
 Manufacturer (Standard disk drives)
 Model IBM ServeRAID 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 0
 Sectors/Track 32
 Size 203.41 GB (218,405,797,888 bytes)
 Total Cylinders 104,144
 Total Sectors 426,573,824
 Total Tracks 13,330,432
 Tracks/Cylinder 128
 Partition Disk #8, Partition #0
 Partition Size 203.41 GB (218,407,878,656 bytes)
 Partition Starting Offset 16,384 bytes
 Description Disk drive
 Manufacturer (Standard disk drives)
 Model IBM ServeRAID 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 1
 Sectors/Track 32
 Size 203.41 GB (218,405,797,888 bytes)
 Total Cylinders 104,144
 Total Sectors 426,573,824
 Total Tracks 13,330,432
 Tracks/Cylinder 128
 Partition Disk #9, Partition #0
 Partition Size 203.41 GB (218,407,878,656 bytes)
 Partition Starting Offset 16,384 bytes
 Description Disk drive
 Manufacturer (Standard disk drives)
 Model IBM ServeRAID 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 2
 Sectors/Track 32
 Size 33.90 GB (36,396,072,960 bytes)
 Total Cylinders 17,355
 Total Sectors 71,086,080
 Total Tracks 2,221,440
 Tracks/Cylinder 128
 Partition Disk #10, Partition #0
 Partition Size 33.90 GB (36,400,250,880 bytes)
 Partition Starting Offset 16,384 bytes
 Description Disk drive
 Manufacturer (Standard disk drives)
 Model IBM ServeRAID 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 3
 Sectors/Track 32
 Size 203.41 GB (218,405,797,888 bytes)
 Total Cylinders 104,144
 Total Sectors 426,573,824
 Total Tracks 13,330,432
 Tracks/Cylinder 128

Partition Disk #11, Partition #0
 Partition Size 203.41 GB (218,407,878,656 bytes)
 Partition Starting Offset 16,384 bytes
 Description Disk drive
 Manufacturer (Standard disk drives)
 Model IBM ServeRAID 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 32
 Size 203.41 GB (218,405,797,888 bytes)
 Total Cylinders 104,144
 Total Sectors 426,573,824
 Total Tracks 13,330,432
 Tracks/Cylinder 128
 Partition Disk #12, Partition #0
 Partition Size 203.41 GB (218,407,878,656 bytes)
 Partition Starting Offset 16,384 bytes
 Description Disk drive
 Manufacturer (Standard disk drives)
 Model IBM ServeRAID 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 32
 Size 33.90 GB (36,396,072,960 bytes)
 Total Cylinders 17,355
 Total Sectors 71,086,080
 Total Tracks 2,221,440
 Tracks/Cylinder 128
 Partition Disk #13, Partition #0
 Partition Size 33.90 GB (36,400,250,880 bytes)
 Partition Starting Offset 16,384 bytes
 Description Disk drive
 Manufacturer (Standard disk drives)
 Model IBM ServeRAID 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 0
 Sectors/Track 32
 Size 203.41 GB (218,405,797,888 bytes)
 Total Cylinders 104,144
 Total Sectors 426,573,824
 Total Tracks 13,330,432
 Tracks/Cylinder 128
 Partition Disk #20, Partition #0
 Partition Size 203.41 GB (218,407,878,656 bytes)
 Partition Starting Offset 16,384 bytes
 Description Disk drive
 Manufacturer (Standard disk drives)
 Model IBM ServeRAID 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 1

Sectors/Track 32
 Size 203.41 GB (218,405,797,888 bytes)
 Total Cylinders 104,144
 Total Sectors 426,573,824
 Total Tracks 13,330,432
 Tracks/Cylinder 128
 Partition Disk #21, Partition #0
 Partition Size 203.41 GB (218,407,878,656 bytes)
 Partition Starting Offset 16,384 bytes
 Description Disk drive
 Manufacturer (Standard disk drives)
 Model IBM ServeRAID 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 2
 Sectors/Track 32
 Size 33.90 GB (36,396,072,960 bytes)
 Total Cylinders 17,355
 Total Sectors 71,086,080
 Total Tracks 2,221,440
 Tracks/Cylinder 128
 Partition Disk #22, Partition #0
 Partition Size 33.90 GB (36,400,250,880 bytes)
 Partition Starting Offset 16,384 bytes
 Description Disk drive
 Manufacturer (Standard disk drives)
 Model IBM ServeRAID 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 3
 Sectors/Track 32
 Size 203.41 GB (218,405,797,888 bytes)
 Total Cylinders 104,144
 Total Sectors 426,573,824
 Total Tracks 13,330,432
 Tracks/Cylinder 128
 Partition Disk #23, Partition #0
 Partition Size 203.41 GB (218,407,878,656 bytes)
 Partition Starting Offset 16,384 bytes
 Description Disk drive
 Manufacturer (Standard disk drives)
 Model IBM ServeRAID 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 32
 Size 203.41 GB (218,405,797,888 bytes)
 Total Cylinders 104,144
 Total Sectors 426,573,824
 Total Tracks 13,330,432
 Tracks/Cylinder 128
 Partition Disk #24, Partition #0
 Partition Size 203.41 GB (218,407,878,656 bytes)
 Partition Starting Offset 16,384 bytes
 Description Disk drive
 Manufacturer (Standard disk drives)
 Model IBM ServeRAID 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 32

Size 33.90 GB (36,396,072,960 bytes)

Total Cylinders 17,355

Total Sectors 71,086,080

Total Tracks 2,221,440

Tracks/Cylinder 128

Partition Disk #25, Partition #0

Partition Size 33.90 GB (36,400,250,880 bytes)

Partition Starting Offset 16,384 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model IBM ServeRAID 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 0

Sectors/Track 32

Size 203.41 GB (218,407,895,040 bytes)

Total Cylinders 104,145

Total Sectors 426,577,920

Total Tracks 13,330,560

Tracks/Cylinder 128

Partition Disk #2, Partition #0

Partition Size 203.41 GB (218,407,878,656 bytes)

Partition Starting Offset 16,384 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model IBM ServeRAID 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 1

Sectors/Track 32

Size 203.41 GB (218,407,895,040 bytes)

Total Cylinders 104,145

Total Sectors 426,577,920

Total Tracks 13,330,560

Tracks/Cylinder 128

Partition Disk #3, Partition #0

Partition Size 203.41 GB (218,407,878,656 bytes)

Partition Starting Offset 16,384 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model IBM ServeRAID 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 2

Sectors/Track 32

Size 33.90 GB (36,396,072,960 bytes)

Total Cylinders 17,355

Total Sectors 71,086,080

Total Tracks 2,221,440

Tracks/Cylinder 128

Partition Disk #4, Partition #0

Partition Size 33.90 GB (36,396,831,744 bytes)

Partition Starting Offset 32,256 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model IBM ServeRAID 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 3

Sectors/Track 32

Size 203.41 GB (218,407,895,040 bytes)

Total Cylinders 104,145

Total Sectors 426,577,920

Total Tracks 13,330,560

Tracks/Cylinder 128

Partition Disk #5, Partition #0

Partition Size 203.41 GB (218,407,878,656 bytes)

Partition Starting Offset 16,384 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model IBM ServeRAID 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 203.41 GB (218,407,895,040 bytes)

Total Cylinders 104,145

Total Sectors 426,577,920

Total Tracks 13,330,560

Tracks/Cylinder 128

Partition Disk #6, Partition #0

Partition Size 203.41 GB (218,407,878,656 bytes)

Partition Starting Offset 16,384 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model IBM ServeRAID 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 33.90 GB (36,400,267,264 bytes)

Total Cylinders 17,357

Total Sectors 71,094,272

Total Tracks 2,221,696

Tracks/Cylinder 128

Partition Disk #7, Partition #0

Partition Size 33.90 GB (36,400,250,880 bytes)

Partition Starting Offset 16,384 bytes

Description Disk drive

Manufacturer (Standard disk drives)

Model IBM ServeRAID 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 9

SCSI Target ID 0

Sectors/Track 32

Size 203.41 GB (218,405,797,888 bytes)

Total Cylinders 104,144
 Total Sectors 426,573,824
 Total Tracks 13,330,432
 Tracks/Cylinder 128
 Partition Disk #27, Partition #0
 Partition Size 203.41 GB (218,407,878,656 bytes)
 Partition Starting Offset 16,384 bytes
 Description Disk drive
 Manufacturer (Standard disk drives)
 Model IBM ServeRAID 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 9
 SCSI Target ID 1
 Sectors/Track 32
 Size 203.41 GB (218,405,797,888 bytes)
 Total Cylinders 104,144
 Total Sectors 426,573,824
 Total Tracks 13,330,432
 Tracks/Cylinder 128
 Partition Disk #28, Partition #0
 Partition Size 203.41 GB (218,407,878,656 bytes)
 Partition Starting Offset 16,384 bytes
 Description Disk drive
 Manufacturer (Standard disk drives)
 Model IBM ServeRAID 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 9
 SCSI Target ID 2
 Sectors/Track 32
 Size 33.90 GB (36,396,072,960 bytes)
 Total Cylinders 17,355
 Total Sectors 71,086,080
 Total Tracks 2,221,440
 Tracks/Cylinder 128
 Partition Disk #29, Partition #0
 Partition Size 33.90 GB (36,400,250,880 bytes)
 Partition Starting Offset 16,384 bytes
 Description Disk drive
 Manufacturer (Standard disk drives)
 Model IBM ServeRAID 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 9
 SCSI Target ID 3
 Sectors/Track 32
 Size 203.41 GB (218,405,797,888 bytes)
 Total Cylinders 104,144
 Total Sectors 426,573,824
 Total Tracks 13,330,432
 Tracks/Cylinder 128
 Partition Disk #30, Partition #0
 Partition Size 203.41 GB (218,407,878,656 bytes)
 Partition Starting Offset 16,384 bytes
 Description Disk drive
 Manufacturer (Standard disk drives)
 Model IBM ServeRAID 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 9
 SCSI Target ID 4
 Sectors/Track 32
 Size 203.41 GB (218,405,797,888 bytes)
 Total Cylinders 104,144
 Total Sectors 426,573,824
 Total Tracks 13,330,432
 Tracks/Cylinder 128
 Partition Disk #31, Partition #0
 Partition Size 203.41 GB (218,407,878,656 bytes)
 Partition Starting Offset 16,384 bytes
 Description Disk drive
 Manufacturer (Standard disk drives)
 Model IBM ServeRAID 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 9
 SCSI Target ID 5
 Sectors/Track 32
 Size 33.90 GB (36,396,072,960 bytes)
 Total Cylinders 17,355
 Total Sectors 71,086,080
 Total Tracks 2,221,440
 Tracks/Cylinder 128
 Partition Disk #32, Partition #0
 Partition Size 33.90 GB (36,400,250,880 bytes)
 Partition Starting Offset 16,384 bytes
 Description Disk drive
 Manufacturer (Standard disk drives)
 Model IBM ServeRAID 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 0
 Sectors/Track 32
 Size 440.72 GB (473,216,057,344 bytes)
 Total Cylinders 225,647
 Total Sectors 924,250,112
 Total Tracks 28,882,816
 Tracks/Cylinder 128
 Partition Disk #26, Partition #0
 Partition Size 440.72 GB (473,216,776,704 bytes)
 Partition Starting Offset 32,256 bytes
 Description Disk drive
 Manufacturer (Standard disk drives)
 Model IBM-ESXS ST336753LC FN 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 0
 Sectors/Track 63
 Size 33.90 GB (36,396,864,000 bytes)
 Total Cylinders 4,425
 Total Sectors 71,087,625
 Total Tracks 1,128,375
 Tracks/Cylinder 255
 Partition Disk #0, Partition #0
 Partition Size 33.89 GB (36,388,606,464 bytes)
 Partition Starting Offset 32,256 bytes
 Description Disk drive

Manufacturer (Standard disk drives)
Model IBM-ESXS ST336753LC FN 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 1
Sectors/Track 63
Size 33.90 GB (36,396,864,000 bytes)
Total Cylinders 4,425
Total Sectors 71,087,625
Total Tracks 1,128,375
Tracks/Cylinder 255

Partition Disk #1, Partition #0
Partition Size 33.90 GB (36,396,831,744 bytes)
Partition Starting Offset 32,256 bytes

[SCSI]

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

Name	LSI Logic PCI-X Ultra320 SCSI Host Adapter
------	--

Manufacturer	LSI Logic Inc.
--------------	----------------

Status	OK
--------	----

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

PCI\VEN_1000&DEV_0030&SUBSYS_02921014&REV_073&13C0B0C5&0&18	
---	--

I/O Port	0x00002000-0x000027FF
----------	-----------------------

Memory Address	0xEDA00000-0xEDAFFFFF
----------------	-----------------------

Memory Address	0xEDA10000-0xEDA1FFFF
----------------	-----------------------

IRQ Channel	IRQ 40
-------------	--------

Driver	c:\windows\system32\drivers\symmpi.sys (1.08.18.00 (NT.021001-2000), 25.88 KB (26,496 bytes), 3/25/2003 7:00 AM)
--------	--

Name	LSI Logic PCI-X Ultra320 SCSI Host Adapter
------	--

Manufacturer	LSI Logic Inc.
--------------	----------------

Status	OK
--------	----

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

PCI\VEN_1000&DEV_0030&SUBSYS_02921014&REV_073&13C0B0C5&0&19	
---	--

I/O Port	0x00002100-0x000021FF
----------	-----------------------

Memory Address	0xEDA20000-0xEDA2FFFF
----------------	-----------------------

Memory Address	0xEDA30000-0xEDA3FFFF
----------------	-----------------------

IRQ Channel	IRQ 41
-------------	--------

Driver	c:\windows\system32\drivers\symmpi.sys (1.08.18.00 (NT.021001-2000), 25.88 KB (26,496 bytes), 3/25/2003 7:00 AM)
--------	--

Name	IBM ServeRAID 6M Controller
------	-----------------------------

Manufacturer	IBM Corporation
--------------	-----------------

Status	OK
--------	----

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

PCI\VEN_9005&DEV_0250&SUBSYS_02791014&REV_024&180CD7A4&0&4020	
---	--

Memory Address	0xF8A80000-0xF8A80FFF
----------------	-----------------------

IRQ Channel	IRQ 64
-------------	--------

Driver	c:\windows\system32\drivers\nfrd6m.sys (6.06.07 built by: WinDDK, 29.50 KB (30,208 bytes), 11/21/2003 3:02 PM)
--------	--

Name	IBM ServeRAID 6M Controller
------	-----------------------------

Manufacturer	IBM Corporation
--------------	-----------------

Status	OK
--------	----

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

PCI\VEN_9005&DEV_0250&SUBSYS_02791014&REV_024&14F365D1&0&4018	
---	--

Memory Address	0xF8B80000-0xF8B80FFF
----------------	-----------------------

IRQ Channel	IRQ 60
-------------	--------

Driver	c:\windows\system32\drivers\nfrd6m.sys (6.06.07 built by: WinDDK, 29.50 KB (30,208 bytes), 11/21/2003 3:02 PM)
--------	--

Name	IBM ServeRAID 6M Controller
------	-----------------------------

Manufacturer	IBM Corporation
--------------	-----------------

Status	OK
--------	----

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

PCI\VEN_9005&DEV_0250&SUBSYS_02791014&REV_024&8C37DC5&0&4010	
--	--

Memory Address	0xF8480000-0xF8480FFF
----------------	-----------------------

IRQ Channel	IRQ 56
-------------	--------

Driver	c:\windows\system32\drivers\nfrd6m.sys (6.06.07 built by: WinDDK, 29.50 KB (30,208 bytes), 11/21/2003 3:02 PM)
--------	--

Name	IBM ServeRAID 6M Controller
------	-----------------------------

Manufacturer	IBM Corporation
--------------	-----------------

Status	OK
--------	----

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

PCI\VEN_9005&DEV_0250&SUBSYS_02791014&REV_024&1CCD9D43&0&4008	
---	--

Memory Address	0xEAC80000-0xEAC80FFF
----------------	-----------------------

IRQ Channel	IRQ 102
-------------	---------

Driver	c:\windows\system32\drivers\nfrd6m.sys (6.06.07 built by: WinDDK, 29.50 KB (30,208 bytes), 11/21/2003 3:02 PM)
--------	--

Name	IBM ServeRAID 6M Controller
------	-----------------------------

Manufacturer	IBM Corporation
--------------	-----------------

Status	OK
--------	----

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

PCI\VEN_9005&DEV_0250&SUBSYS_02791014&REV_024&219E2F76&0&4008	
---	--

Memory Address	0xEB480000-0xEB480FFF
----------------	-----------------------

IRQ Channel	IRQ 95
-------------	--------

Driver	c:\windows\system32\drivers\nfrd6m.sys (6.06.07 built by: WinDDK, 29.50 KB (30,208 bytes), 11/21/2003 3:02 PM)
--------	--

Name	IBM ServeRAID 6M Controller
------	-----------------------------

Manufacturer	IBM Corporation
--------------	-----------------

Status	OK
--------	----

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

PCI\VEN_9005&DEV_0250&SUBSYS_02791014&REV_024&C31448A&0&4008	
--	--

Memory Address	0xEBC80000-0xEBC80FFF
----------------	-----------------------

IRQ Channel	IRQ 88
-------------	--------

Driver	c:\windows\system32\drivers\nfrd6m.sys (6.06.07 built by: WinDDK, 29.50 KB (30,208 bytes), 11/21/2003 3:02 PM)
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[IDE]

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

Name	VIA Bus Master IDE Controller
------	-------------------------------

Manufacturer	VIA Technologies, Inc.
--------------	------------------------

Status	OK
--------	----

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

PCI\VEN_1106&DEV_0571&SUBSYS_02A61014&REV_063&267A616A&0&29	
---	--

I/O Port	0x00000700-0x0000070F
----------	-----------------------

Driver	c:\windows\system32\drivers\viaide.sys (1.00.01.00, 7.00 KB (7,168 bytes), 3/25/2003 7:00 AM)
--------	---

Name	Primary IDE Channel
------	---------------------

Manufacturer	(Standard IDE ATA/ATAPI controllers)
--------------	--------------------------------------

Status	OK
--------	----

PNP Device ID	PCIIDE\IDECHANNEL\4&29582549&0&0
---------------	----------------------------------

I/O Port	0x000001F0-0x000001F7
----------	-----------------------

I/O Port	0x000003F6-0x000003F6
----------	-----------------------

IRQ Channel	IRQ 14
-------------	--------

Driver	c:\windows\system32\drivers\atapi.sys (5.2.3790.0 (srv03_rtm.030324-2048), 89.00 KB (91,136 bytes), 3/25/2003 7:00 AM)
--------	--

Name	Secondary IDE Channel
------	-----------------------

Manufacturer	(Standard IDE ATA/ATAPI controllers)
--------------	--------------------------------------

Status	OK
--------	----

PNP Device ID	PCIIDE\IDECHANNEL\4&29582549&0&1
---------------	----------------------------------

I/O Port	0x00000170-0x00000177
----------	-----------------------

I/O Port	0x00000376-0x00000376
----------	-----------------------

IRQ Channel	IRQ 15
-------------	--------

Driver	c:\windows\system32\drivers\atapi.sys (5.2.3790.0 (srv03_rtm.030324-2048), 89.00 KB (91,136 bytes), 3/25/2003 7:00 AM)
--------	--

[Printing]

Name	Driver	Port Name	Server Name
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[Problem Devices]

Device	PNP Device ID	Error Code
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Not Available	ACPI\IBM37D4\2&DABA3FF&0	The drivers for this device are not installed.
---------------	--------------------------	--

Other PCI Bridge Device

PCI\VEN_1014&DEV_010F&SUBSYS_01131014&REV_003&267A616A&0&20	
---	--

The drivers for this device are not installed.

[USB]

Device	PNP Device ID
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VIA Rev 5 or later USB Universal Host Controller	
--	--

PCI\VEN_1106&DEV_3038&SUBSYS_02A61014&REV_163&267A616A&0&2A	
---	--

USB Root Hub	USB\ROOT_HUB\4&226DFD17&0
--------------	---------------------------

VIA Rev 5 or later USB Universal Host Controller	
--	--

PCI\VEN_1106&DEV_3038&SUBSYS_02A61014&REV_163&267A616A&0&2B	
---	--

USB Root Hub	USB\ROOT_HUB\4&3527ADBC&0
--------------	---------------------------

[Software Environment]

The following updates were made to the registry:

HKLP\System\CurrentControlSet\Control\Session Manager\I/O

System\CountOperations(DWORD=0)

HKLM\System\CurrentControlSet\Control\Session Manager\Memory Management\

DontVerifyRandomDrivers(DWORD=1)

LargeSystemCache (DWORD=0)

Disable PagingExecutive(DWORD=1)

[System Drivers]

Name	Description	File	Type	Started	Start Mode	State
Status	Error Control	Accept Pause	Accept Stop			
abiosdsk	Abiosdsk	Not Available	Kernel Driver	No		
Disabled	Stopped	OK	Ignore	No	No	
acpi	Microsoft ACPI Driver	c:\windows\system32\drivers\acpi.sys				
Kernel Driver	Yes	Boot	Running	OK	Normal	No
Yes						
acpiec	ACPIEC	c:\windows\system32\drivers\acpiec.sys				Kernel Driver
No	Disabled	Stopped	OK	Normal	No	
adpu160m	adpu160m	Not Available	Kernel Driver			No
Disabled	Stopped	OK	Normal	No	No	
adpu320	adpu320	Not Available	Kernel Driver			No
Disabled	Stopped	OK	Normal	No	No	
afent	afent	Not Available	Kernel Driver			No
Disabled	Stopped	OK	Normal	No	No	
afd	AFD Networking Support Environment					
c:\windows\system32\drivers\afd.sys			Kernel Driver	Yes	Auto	
Running	OK	Normal	No	Yes		
aha154x	Aha154x	Not Available	Kernel Driver			No
Disabled	Stopped	OK	Normal	No	No	
aic78u2	aic78u2	Not Available	Kernel Driver			No
Disabled	Stopped	OK	Normal	No	No	
aic78xx	aic78xx	Not Available	Kernel Driver			No
Disabled	Stopped	OK	Normal	No	No	
aliide	Aliide	Not Available	Kernel Driver			No
Disabled	Stopped	OK	Normal	No	No	
asynmac	RAS Asynchronous Media Driver					
c:\windows\system32\drivers\asynmac.sys			Kernel Driver	No	Manual	
Stopped	OK	Normal	No			
atapi	Standard IDE/ESDI Hard Disk Controller					
c:\windows\system32\drivers\atapi.sys			Kernel Driver	Yes	Boot	
Running	OK	Normal	No	Yes		
atdisk	Atdisk	Not Available	Kernel Driver			No
Disabled	Stopped	OK	Ignore	No	No	
ati2mpad	ati2mpad	c:\windows\system32\drivers\ati2mpad.sys				Kernel Driver
Yes	Manual	Running	OK	Ignore	No	Yes
atmarpc	ATM ARP Client Protocol	c:\windows\system32\drivers\atmarpc.sys				
Kernel Driver	No	Manual	Stopped	OK	Normal	No
No						
audstub	Audio Stub Driver	c:\windows\system32\drivers\audstub.sys				Kernel
Driver	Yes	Manual	Running	OK	Normal	No
Yes						Yes
b57w2k	Broadcom NetXtreme Gigabit Ethernet					
c:\windows\system32\drivers\b57xp32.sys			Kernel Driver	Yes	Manual	
Running	OK	Normal	No	Yes		
beep	Beep	c:\windows\system32\drivers\beep.sys				Kernel Driver
Yes	System	Running	OK	Normal	No	Yes
cbidf2k	cbidf2k	c:\windows\system32\drivers\cbidf2k.sys				Kernel Driver
No	Disabled	Stopped	OK	Normal	No	No
cd20xrnt	cd20xrnt	Not Available	Kernel Driver			No
Disabled	Stopped	OK	Normal	No	No	
cdfs	Cdfs	c:\windows\system32\drivers\cdfs.sys				File System Driver
Yes	Disabled	Running	OK	Normal	No	Yes
cdrom	CD-ROM Driver	c:\windows\system32\drivers\cdrom.sys				Kernel
Driver	Yes	System	Running	OK	Normal	No
Yes						Yes
changer	Changer	Not Available	Kernel Driver			No
Stopped	OK	Ignore	No	No		System
clusdisk	Cluster Disk Driver	c:\windows\system32\drivers\clusdisk.sys				Kernel
Driver	No	Disabled	Stopped	OK	Normal	No
No						
cmdide	CmdIde	Not Available	Kernel Driver			No
Disabled	Stopped	OK	Normal	No	No	
cpqarray	Cpqarray	Not Available	Kernel Driver			No
Disabled	Stopped	OK	Normal	No	No	
cpqarry2	cpqarry2	Not Available	Kernel Driver			No
Disabled	Stopped	OK	Normal	No	No	
cpqcissm	cpqcissm	Not Available	Kernel Driver			No
Disabled	Stopped	OK	Normal	No	No	

cpqfcalm	cpqfcalm	Not Available	Kernel Driver	No		
Disabled	Stopped	OK	Normal	No	No	
credisk	CRC Disk Filter Driver			c:\windows\system32\drivers\credisk.sys		
Kernel Driver	Yes	Boot	Running	OK	Normal	No
Yes						
dac960nt	dac960nt	Not Available	Kernel Driver			No
Disabled	Stopped	OK	Normal	No	No	
dellcerc	dellcerc	Not Available	Kernel Driver			No
Disabled	Stopped	OK	Normal	No	No	
dfsdriver	DfsDriver	c:\windows\system32\drivers\dfs.sys				File System Driver
Yes	Boot	Running	OK	Normal	No	Yes
disk	Disk Driver	c:\windows\system32\drivers\disk.sys				Kernel
Driver	Yes	Boot	Running	OK	Normal	No
Yes						Yes
dmboot	dmboot	c:\windows\system32\drivers\dmboot.sys				Kernel Driver
Yes	Disabled	Running	OK	Normal	No	Yes
dmio	Logical Disk Manager Driver	c:\windows\system32\drivers\dmio.sys				
Kernel Driver	Yes	Boot	Running	OK	Normal	No
Yes						
dmload	dmload	c:\windows\system32\drivers\dmload.sys				Kernel Driver
Yes	Boot	Running	OK	Normal	No	Yes
dpti2o	dpti2o	Not Available	Kernel Driver			No
Disabled	Stopped	OK	Normal	No	No	
fastfat	Fastfat	c:\windows\system32\drivers\fastfat.sys				File System Driver
No	Disabled	Stopped	OK	Normal	No	No
fdc	Floppy Disk Controller Driver	c:\windows\system32\drivers\fdc.sys				
Kernel Driver	Yes	Manual	Running	OK	Normal	No
Yes						
fips	Fips	c:\windows\system32\drivers\fips.sys				Kernel Driver
Yes	System	Running	OK	Normal	No	Yes
flpydisk	Floppy Disk Driver	c:\windows\system32\drivers\flpydisk.sys				Kernel
Driver	Yes	Manual	Running	OK	Normal	No
Yes						Yes
ftdisk	Volume Manager Driver	c:\windows\system32\drivers\ftdisk.sys				
Kernel Driver	Yes	Boot	Running	OK	Normal	No
Yes						
gpc	Generic Packet Classifier	c:\windows\system32\drivers\msgpc.sys				
Kernel Driver	Yes	Manual	Running	OK	Normal	No
Yes						
hpn	hpn	Not Available	Kernel Driver			No
Disabled	Stopped	OK	Normal	No	No	
hpt3xx	hpt3xx	Not Available	Kernel Driver			No
Disabled	Stopped	OK	Normal	No	No	
http	HTTP	c:\windows\system32\drivers\http.sys				Kernel Driver
No	Manual	Stopped	OK	Normal	No	No
i2omgmt	i2omgmt	Not Available	Kernel Driver			No
Stopped	OK	Normal	No	No		System
i2omp	i2omp	Not Available	Kernel Driver			No
Disabled	Stopped	OK	Normal	No	No	
i8042prt	i8042 Keyboard and PS/2 Mouse Port Driver					
c:\windows\system32\drivers\i8042prt.sys			Kernel Driver	Yes		System
Running	OK	Normal	No	Yes		
iirsp	iirsp	Not Available	Kernel Driver			No
Disabled	Stopped	OK	Normal	No	No	
imapi	CD-Burning Filter Driver	c:\windows\system32\drivers\imapi.sys				
Kernel Driver	No	System	Stopped	OK	Normal	No
No						
intelide	IntelIde	Not Available	Kernel Driver			No
Disabled	Stopped	OK	Normal	No	No	
ipfilterdriver	IP Traffic Filter Driver					
c:\windows\system32\drivers\ipfltdrv.sys			Kernel Driver			No
Stopped	OK	Normal	No	No		Manual
ipinip	IP in IP Tunnel Driver	c:\windows\system32\drivers\ipinip.sys				Kernel
Driver	No	Manual	Stopped	OK	Normal	No
ipnat	IP Network Address Translator	c:\windows\system32\drivers\ipnat.sys				
Kernel Driver	No	Manual	Stopped	OK	Normal	No
No						
ipsec	IPSEC driver	c:\windows\system32\drivers\ipsec.sys				Kernel
Driver	Yes	System	Running	OK	Normal	No
Yes						Yes
ipsraidn	ipsraidn	Not Available	Kernel Driver			No
Disabled	Stopped	OK	Normal	No	No	
isapnp	PnP ISA/EISA Bus Driver	c:\windows\system32\drivers\isapnp.sys				
Kernel Driver	Yes	Boot	Running	OK	Critical	No
Yes						

kbdclass	Keyboard Class Driver						pdrframe	PDRFRAME					
c:\windows\system32\drivers\kbdclass.sys	Kernel Driver	Yes	System	Manual	Stopped	OK	Ignore	No	No	Kernel Driver	No		
Running	OK	Normal	No	Yes									
ksecdd	KSecDD c:\windows\system32\drivers\ksecdd.sys						perc2	perc2 Not Available					
Yes	Boot	Running	OK	Normal	No	Yes	Disabled	Stopped	OK	Normal	No	No	No
lp6nds35	lp6nds35 Not Available						perc2hib	perc2hib Not Available					
Disabled	Stopped	OK	Normal	No	No		Disabled	Stopped	OK	Normal	No	No	No
mmdd	mmdd c:\windows\system32\drivers\mmdd.sys						pnpmem	Microsoft Memory Module Driver					
Yes	System	Running	OK	Ignore	No	Yes	c:\windows\system32\drivers\pnpmem.sys	Kernel Driver	Yes	Manual			
modem	Modem c:\windows\system32\drivers\modem.sys						Running	OK	Normal	No	Yes		
No	Manual	Stopped	OK	Ignore	No	No	pptpminiport	WAN Miniport (PPTP)					
mouclass	Mouse Class Driver c:\windows\system32\drivers\mouclass.sys						c:\windows\system32\drivers\raspppt.sys	Kernel Driver	Yes	Manual			
Driver	Yes	System	Running	OK	Normal	No	Running	OK	Normal	No	Yes		
mountmgr	Mount Point Manager c:\windows\system32\drivers\mountmgr.sys						processor	Processor Driver c:\windows\system32\drivers\processsr.sys					
Driver	Yes	Boot	Running	OK	Normal	No	Driver	Yes	Manual	Running	OK	Normal	No
mraid35x	mraid35x Not Available						ptilink	Direct Parallel Link Driver c:\windows\system32\drivers\ptilink.sys					
Disabled	Stopped	OK	Normal	No	No		Kernel Driver	Yes	Manual	Running	OK	Normal	No
mrxdav	WebDav Client Redirector c:\windows\system32\drivers\mrxdav.sys						Yes						
File System Driver	No	Manual	Stopped	OK	Normal	No	ql1080	ql1080 Not Available					
No							Disabled	Stopped	OK	Normal	No	No	No
mrxsmmb	MRXSMB c:\windows\system32\drivers\mrxsmmb.sys						ql10wnt	ql10wnt Not Available					
Yes	System	Running	OK	Normal	No	Yes	Disabled	Stopped	OK	Normal	No	No	No
msfs	Msfs c:\windows\system32\drivers\msfs.sys						ql12160	ql12160 Not Available					
Yes	System	Running	OK	Normal	No	Yes	Disabled	Stopped	OK	Normal	No	No	No
mup	Mup c:\windows\system32\drivers\mup.sys						ql1240	ql1240 Not Available					
Yes	Boot	Running	OK	Normal	No	Yes	Disabled	Stopped	OK	Normal	No	No	No
ndis	NDIS System Driver c:\windows\system32\drivers\ndis.sys						ql1280	ql1280 Not Available					
Driver	Yes	Boot	Running	OK	Normal	No	Disabled	Stopped	OK	Normal	No	No	No
ndistapi	Remote Access NDIS TAPI Driver						ql2100	ql2100 Not Available					
c:\windows\system32\drivers\ndistapi.sys	Kernel Driver	Yes	Manual				Disabled	Stopped	OK	Normal	No	No	No
Running	OK	Normal	No	Yes			ql2200	ql2200 Not Available					
ndisuiop	NDIS Usermode I/O Protocol c:\windows\system32\drivers\ndisuiop.sys						Disabled	Stopped	OK	Normal	No	No	No
Kernel Driver	No	Manual	Stopped	OK	Normal	No	ql2300	ql2300 Not Available					
No							Disabled	Stopped	OK	Normal	No	No	No
ndiswan	Remote Access NDIS WAN Driver						rasacd	Remote Access Auto Connection Driver					
c:\windows\system32\drivers\ndiswan.sys	Kernel Driver	Yes	Manual				c:\windows\system32\drivers\rasacd.sys	Kernel Driver	Yes	System			
Running	OK	Normal	No	Yes			Running	OK	Normal	No	Yes		
ndproxy	NDIS Proxy c:\windows\system32\drivers\ndproxy.sys						rasl2tp	WAN Miniport (L2TP) c:\windows\system32\drivers\rasl2tp.sys					
Driver	Yes	Manual	Running	OK	Normal	No	Kernel Driver	Yes	Manual	Running	OK	Normal	No
netbios	NetBIOS Interface c:\windows\system32\drivers\netbios.sys						Yes						
System Driver	Yes	System	Running	OK	Normal	No	raspppoe	Remote Access PPPOE Driver					
Yes							c:\windows\system32\drivers\raspppoe.sys	Kernel Driver	Yes	Manual			
netbt	NetBios over Tcpip c:\windows\system32\drivers\netbt.sys						Running	OK	Normal	No	Yes		
Driver	Yes	System	Running	OK	Normal	No	raspti	Direct Parallel c:\windows\system32\drivers\raspti.sys					
nfrd6m	IBM ServeRAID 6M Device Driver						Driver	Yes	Manual	Running	OK	Normal	No
c:\windows\system32\drivers\nfrd6m.sys	Kernel Driver	Yes	Boot				rdbss	c:\windows\system32\drivers\rdbss.sys					
Running	OK	Normal	No	Yes			Yes	System	Running	OK	Normal	No	Yes
nfrd6mpf	IBM ServeRAID 6M Performance Driver						rdpcedd	RDPCCDD c:\windows\system32\drivers\rdpcedd.sys					
c:\windows\system32\drivers\nfrd6mpf.sys	Kernel Driver	Yes	Boot				Yes	System	Running	OK	Ignore	No	Yes
Running	OK	Normal	No	Yes			rdpdr	Terminal Server Device Redirector Driver					
nfrd960	nfrd960 Not Available						c:\windows\system32\drivers\rdpdr.sys	Kernel Driver	Yes	Manual			
Disabled	Stopped	OK	Normal	No	No		Running	OK	Normal	No	Yes		
npfs	Npfs c:\windows\system32\drivers\npfs.sys						rdpwd	RDPWD c:\windows\system32\drivers\rdpwd.sys					
Yes	System	Running	OK	Normal	No	Yes	Yes	Manual	Running	OK	Ignore	No	Yes
ntfs	Ntfs c:\windows\system32\drivers\ntfs.sys						redbook	Digital CD Audio Playback Filter Driver					
Yes	Disabled	Running	OK	Normal	No	Yes	c:\windows\system32\drivers\redbook.sys	Kernel Driver	Yes	System			
null	Null c:\windows\system32\drivers\null.sys						Running	OK	Normal	No	Yes		
Yes	System	Running	OK	Normal	No	Yes	secdrv	Secdrv c:\windows\system32\drivers\secdrv.sys					
parport	Parport c:\windows\system32\drivers\parport.sys						No	Manual	Stopped	OK	Normal	No	No
No	Manual	Stopped	OK	Ignore	No	No	serial	Serial c:\windows\system32\drivers\serial.sys					
partmgr	Partition Manager c:\windows\system32\drivers\partmgr.sys						No	Auto	Stopped	OK	Ignore	No	No
Driver	Yes	Boot	Running	OK	Normal	No	sfloppy	Sfloppy c:\windows\system32\drivers\sfloppy.sys					
pci	PCI Bus Driver c:\windows\system32\drivers\pci.sys						No	System	Stopped	OK	Ignore	No	No
Driver	Yes	Boot	Running	OK	Critical	No	simbad	Simbad Not Available					
pciide	PCIIde Not Available						Disabled	Stopped	OK	Normal	No	No	No
Disabled	Stopped	OK	Normal	No	No		sparrow	Sparrow Not Available					
pcmcia	Pcmcia c:\windows\system32\drivers\pcmcia.sys						Disabled	Stopped	OK	Normal	No	No	No
No	Disabled	Stopped	OK	Normal	No	No	srv	Srv c:\windows\system32\drivers\srv.sys					
pdcomp	PDCOMP Not Available						Yes	Manual	Running	OK	Normal	No	Yes
Stopped	OK	Ignore	No	No			swenum	Software Bus Driver c:\windows\system32\drivers\swenum.sys					
pdframe	PDFRAME Not Available						Driver	Yes	Manual	Running	OK	Normal	No
Manual	Stopped	OK	Ignore	No	No		symc810	symc810 Not Available					
pdreli	PDRELI Not Available						Disabled	Stopped	OK	Normal	No	No	No
Stopped	OK	Ignore	No	No			symc8xx	symc8xx Not Available					
							Disabled	Stopped	OK	Normal	No	No	No

symmpi	symmpi	c:\windows\system32\drivers\symmpi.sys	Kernel Driver			
Yes	Boot	Running	OK	Normal	No	Yes
sym_hi	sym_hi	Not Available		Kernel Driver		No
Disabled	Stopped	OK	Normal	No	No	
sym_u3	sym_u3	Not Available		Kernel Driver		No
Disabled	Stopped	OK	Normal	No	No	
tcpip	TCP/IP Protocol Driver			c:\windows\system32\drivers\tcpip.sys		
Kernel Driver	Yes	System	Running	OK	Normal	No
Yes						
tdpipe	TDPIPE	c:\windows\system32\drivers\tdpipe.sys	Kernel Driver			
No	Manual	Stopped	OK	Ignore	No	No
tdtcp	TDTCP	c:\windows\system32\drivers\tdtcp.sys	Kernel Driver			
Yes	Manual	Running	OK	Ignore	No	Yes
termdd	Terminal Device Driver			c:\windows\system32\drivers\termdd.sys		
Kernel Driver	Yes	System	Running	OK	Normal	No
Yes						
toside	TosIde	Not Available		Kernel Driver		No
Disabled	Stopped	OK	Normal	No	No	
udfs	Udfs	c:\windows\system32\drivers\udfs.sys	File System Driver			
No	Disabled	Stopped	OK	Normal	No	No
ultra	ultra	Not Available		Kernel Driver		No
Disabled	Stopped	OK	Normal	No	No	
update	Microcode Update Driver			c:\windows\system32\drivers\update.sys		
Kernel Driver	Yes	Manual	Running	OK	Normal	No
Yes						
usbhub	USB2 Enabled Hub			c:\windows\system32\drivers\usbhub.sys	Kernel	
Driver	Yes	Manual	Running	OK	Normal	No
usbuhci	Microsoft USB Universal Host Controller Miniport Driver					Yes
c:\windows\system32\drivers\usbuhci.sys				Kernel Driver	Yes	Manual
Running	OK	Normal	No	Yes		
vgasave	VGA Display Controller			c:\windows\system32\drivers\vga.sys		
Kernel Driver	Yes	System	Running	OK	Ignore	No
Yes						
viaide	ViaIde	c:\windows\system32\drivers\viaide.sys	Kernel Driver			
Yes	Boot	Running	OK	Normal	No	Yes
volsnap	Storage volumes			c:\windows\system32\drivers\volsnap.sys	Kernel	
Driver	Yes	Boot	Running	OK	Normal	No
wanarp	Remote Access IP ARP Driver			c:\windows\system32\drivers\wanarp.sys		Yes
Kernel Driver	Yes	Manual	Running	OK	Normal	No
Yes						
wdica	WDICA	Not Available		Kernel Driver		No
Stopped	OK	Ignore	No	No		Manual
wlbs	Network Load Balancing			c:\windows\system32\drivers\wlbs.sys		
Kernel Driver	No	Manual	Stopped	OK	Normal	No
No						
[Signed Drivers]						
Device Name	Signed	Device Class	Driver Version	Driver		
Date	Manufacturer	INF Name	Driver Name	Device ID		
Not Available	Not Available	Not Available	Not Available	Not Available		
Not Available	Not Available	Not Available	Not Available	Not Available		
HTREE\ROOT\0						
ACPI Multiprocessor Node	No	COMPUTER	1.32.0.0			
4/14/2002 (Node-based Computers)		oem0.inf	Not Available			
ROOT\ACPI_HAL\0000						
Microsoft ACPI-Compliant System	Yes	SYSTEM	5.2.3790.0			
10/1/2002 Microsoft	acpi.inf	Not Available	ACPI_HAL\PNP0C08\0			
Not Available	Not Available	Not Available	Not Available			
Not Available	Not Available	Not Available	Not Available			
ACPI\IBM37D4\2&DABA3FF&0						
PCI bus	Yes	SYSTEM	5.2.3790.0 10/1/2002 (Standard system devices)			
machine.inf	Not Available	ACPI\PNP0A03\0				
PCI standard host CPU bridge	Yes	SYSTEM	5.2.3790.0 10/1/2002			
(Standard system devices)	machine.inf	Not Available				
PCI\VEN_1014&DEV_0302&SUBSYS_00000000&REV_05\3&267A616A&0&00						
RAGE XL PCI Family (Microsoft Corporation)	Yes	DISPLAY				
5.10.2600.6014	8/8/2001	ATI Technologies Inc.	atiixpad.inf			
Not Available						
PCI\VEN_1002&DEV_4752&SUBSYS_02401014&REV_27\3&267A616A&0&18						
Plug and Play Monitor	Yes	MONITOR	5.1.2001.0			
6/6/2001 (Standard monitor types)		monitor.inf	Not Available			
DISPLAY\AVO0402\4&F17EA7B&0&80000001&00&03						
Other PCI Bridge Device	Not Available	UNKNOWN	Not			
Available	Not Available	Not Available	Not Available	Not		

Available						
PCI\VEN_1014&DEV_010F&SUBSYS_01131014&REV_00\3&267A616A&0&20						
VIA Tech PCI to ISA bridge	Yes	SYSTEM	5.2.3790.0 10/1/2002	VIA		
machine.inf	Not Available					
PCI\VEN_1106&DEV_0686&SUBSYS_00000000&REV_40\3&267A616A&0&28						
ISAPNP Read Data Port	Yes	SYSTEM	5.2.3790.0 10/1/2002			
(Standard system devices)	machine.inf	Not Available				
ISAPNP\READDATAPORT\0						
Motherboard resources	Yes	SYSTEM	5.2.3790.0 10/1/2002			
(Standard system devices)	machine.inf	Not Available				
ACPI\PNP0C02\2						
Standard 101/102-Key or Microsoft Natural PS/2 Keyboard	Yes					
KEYBOARD	5.2.3790.0 10/1/2002 (Standard keyboards)	keyboard.inf				
Not Available	ACPI\PNP0303\4&7FD7688&0					
PS/2 Compatible Mouse	Yes	MOUSE	5.2.3790.0 10/1/2002			
Microsoft	msmouse.inf	Not Available				
ACPI\PNP0F13\4&7FD7688&0						
Standard floppy disk controller	Yes	FDC	5.2.3790.0 10/1/2002			
(Standard floppy disk controllers)	fdc.inf	Not Available				
ACPI\PNP0700\4&7FD7688&0						
Floppy disk drive	Yes	FLOPPYDISK	5.2.3790.0 10/1/2002			
(Standard floppy disk drives)	flydisk.inf	Not Available				
FDC\GENERIC_FLOPPY_DRIVE\5&17D92A40&0&0						
Advanced programmable interrupt controller	Yes	SYSTEM	5.2.3790.0			
10/1/2002 (Standard system devices)	machine.inf	Not Available				
ACPI\PNP0003\4&7FD7688&0						
Direct memory access controller	Yes	SYSTEM	5.2.3790.0 10/1/2002			
(Standard system devices)	machine.inf	Not Available				
ACPI\PNP0200\4&7FD7688&0						
System timer	Yes	SYSTEM	5.2.3790.0 10/1/2002 (Standard system			
devices)	machine.inf	Not Available				
ACPI\PNP0100\4&7FD7688&0						
System CMOS/real time clock	Yes	SYSTEM	5.2.3790.0 10/1/2002			
(Standard system devices)	machine.inf	Not Available				
ACPI\PNP0B00\4&7FD7688&0						
System speaker	Yes	SYSTEM	5.2.3790.0 10/1/2002 (Standard system			
devices)	machine.inf	Not Available				
ACPI\PNP0800\4&7FD7688&0						
Numeric data processor	Yes	SYSTEM	5.2.3790.0 10/1/2002			
(Standard system devices)	machine.inf	Not Available				
ACPI\PNP0C04\4&7FD7688&0						
Motherboard resources	Yes	SYSTEM	5.2.3790.0 10/1/2002			
(Standard system devices)	machine.inf	Not Available				
ACPI\PNP0C02\3						
VIA Bus Master IDE Controller	Yes	HDC	5.2.3790.0 10/1/2002	VIA		
Technologies, Inc.	mshdc.inf	Not Available				
PCI\VEN_1106&DEV_0571&SUBSYS_02A61014&REV_06\3&267A616A&0&29						
Primary IDE Channel	Yes	HDC	5.2.3790.0 10/1/2002 (Standard IDE			
ATA\ATAPI controllers)	mshdc.inf	Not Available				
PCI\IDE\IDECHANNEL\4&29582549&0&0						
CD-ROM Drive	Yes	CDROM	5.2.3790.0 10/1/2002 (Standard			
CD-ROM drives)	cdrom.inf	Not Available				
IDE\CDROMHL-DT-ST_DVD-ROM_GDR8081N_____0012____\5&C						
BC355F&0&0.0.0						
Secondary IDE Channel	Yes	HDC	5.2.3790.0 10/1/2002			
(Standard IDE ATA\ATAPI controllers)	mshdc.inf	Not Available				
PCI\IDE\IDECHANNEL\4&29582549&0&1						
VIA Rev 5 or later USB Universal Host Controller	Yes	USB				
5.2.3790.0 10/1/2002	VIA Technologies	usbport.inf	Not Available			
PCI\VEN_1106&DEV_3038&SUBSYS_02A61014&REV_16\3&267A616A&0&2A						
USB Root Hub	Yes	USB	5.2.3790.0 10/1/2002 (Standard USB			
Host Controller)	usbport.inf	Not Available				
USB\ROOT_HUB\4&226DFD17&0						
VIA Rev 5 or later USB Universal Host Controller	Yes	USB				
5.2.3790.0 10/1/2002	VIA Technologies	usbport.inf	Not Available			
PCI\VEN_1106&DEV_3038&SUBSYS_02A61014&REV_16\3&267A616A&0&2B						
USB Root Hub	Yes	USB	5.2.3790.0 10/1/2002 (Standard USB			
Host Controller)	usbport.inf	Not Available				
USB\ROOT_HUB\4&3527ADBC&0						
VIA Tech Power Management controller	Yes	SYSTEM	5.2.3790.0			
10/1/2002	VIA	machine.inf	Not Available			
PCI\VEN_1106&DEV_3057&SUBSYS_02A61014&REV_40\3&267A616A&0&2C						
System board	Yes	SYSTEM	5.2.3790.0 10/1/2002 (Standard system			
devices)	machine.inf	Not Available				
ACPI\PNP0C01\1						

ACPI Fixed Feature Button	Yes	SYSTEM	5.2.3790.0 10/1/2002
(Standard system devices)	machine.inf		Not Available
ACPI\FIXEDBUTTON\2&DABA3FF&0			
Processor Yes	PROCESSOR	5.2.3790.0 10/1/2002	(Standard processor types)
	cpu.inf		Not Available
ACPI\GENUINEINTEL_-_X86_FAMILY_15_MODEL_2_0			
Processor Yes	PROCESSOR	5.2.3790.0 10/1/2002	(Standard processor types)
	cpu.inf		Not Available
ACPI\GENUINEINTEL_-_X86_FAMILY_15_MODEL_2_1			
Processor Yes	PROCESSOR	5.2.3790.0 10/1/2002	(Standard processor types)
	cpu.inf		Not Available
ACPI\GENUINEINTEL_-_X86_FAMILY_15_MODEL_2_2			
Processor Yes	PROCESSOR	5.2.3790.0 10/1/2002	(Standard processor types)
	cpu.inf		Not Available
ACPI\GENUINEINTEL_-_X86_FAMILY_15_MODEL_2_3			
Processor Yes	PROCESSOR	5.2.3790.0 10/1/2002	(Standard processor types)
	cpu.inf		Not Available
ACPI\GENUINEINTEL_-_X86_FAMILY_15_MODEL_2_4			
Processor Yes	PROCESSOR	5.2.3790.0 10/1/2002	(Standard processor types)
	cpu.inf		Not Available
ACPI\GENUINEINTEL_-_X86_FAMILY_15_MODEL_2_5			
Processor Yes	PROCESSOR	5.2.3790.0 10/1/2002	(Standard processor types)
	cpu.inf		Not Available
ACPI\GENUINEINTEL_-_X86_FAMILY_15_MODEL_2_6			
Processor Yes	PROCESSOR	5.2.3790.0 10/1/2002	(Standard processor types)
	cpu.inf		Not Available
ACPI\GENUINEINTEL_-_X86_FAMILY_15_MODEL_2_7			
Processor Yes	PROCESSOR	5.2.3790.0 10/1/2002	(Standard processor types)
	cpu.inf		Not Available
ACPI\GENUINEINTEL_-_X86_FAMILY_15_MODEL_2_8			
Processor Yes	PROCESSOR	5.2.3790.0 10/1/2002	(Standard processor types)
	cpu.inf		Not Available
ACPI\GENUINEINTEL_-_X86_FAMILY_15_MODEL_2_9			
Processor Yes	PROCESSOR	5.2.3790.0 10/1/2002	(Standard processor types)
	cpu.inf		Not Available
ACPI\GENUINEINTEL_-_X86_FAMILY_15_MODEL_2\10			
Processor Yes	PROCESSOR	5.2.3790.0 10/1/2002	(Standard processor types)
	cpu.inf		Not Available
ACPI\GENUINEINTEL_-_X86_FAMILY_15_MODEL_2\11			
Processor Yes	PROCESSOR	5.2.3790.0 10/1/2002	(Standard processor types)
	cpu.inf		Not Available
ACPI\GENUINEINTEL_-_X86_FAMILY_15_MODEL_2\12			
Processor Yes	PROCESSOR	5.2.3790.0 10/1/2002	(Standard processor types)
	cpu.inf		Not Available
ACPI\GENUINEINTEL_-_X86_FAMILY_15_MODEL_2\13			
Processor Yes	PROCESSOR	5.2.3790.0 10/1/2002	(Standard processor types)
	cpu.inf		Not Available
ACPI\GENUINEINTEL_-_X86_FAMILY_15_MODEL_2\14			
Processor Yes	PROCESSOR	5.2.3790.0 10/1/2002	(Standard processor types)
	cpu.inf		Not Available
ACPI\GENUINEINTEL_-_X86_FAMILY_15_MODEL_2\15			
Memory Module	Yes	MEMORY	5.2.3790.0 10/1/2002
memory.inf			Not Available
		ACPI\PNP0C80\0	
Memory Module	Yes	MEMORY	5.2.3790.0 10/1/2002
memory.inf			Not Available
		ACPI\PNP0C80\2	
PCI bus	Yes	SYSTEM	5.2.3790.0 10/1/2002
machine.inf			Not Available
		ACPI\PNP0A03\1	
PCI standard host CPU bridge	Yes	SYSTEM	5.2.3790.0 10/1/2002
(Standard system devices)	machine.inf		Not Available
PCI\VEN_1014&DEV_0302&SUBSYS_00000000&REV_05\3&13C0B0C5&0&00			
LSI Logic PCI-X Ultra320 SCSI Host Adapter	Yes	SCSIADAPTER	
5.2.3790.0 10/1/2002	LSI Logic Inc.	pnpscsi.inf	Not Available
PCI\VEN_1000&DEV_0030&SUBSYS_02921014&REV_07\3&13C0B0C5&0&18			
Disk drive	Yes	DISKDRIVE	5.2.3790.0 10/1/2002
(Standard disk drives)	disk.inf		Not Available
SCSI\DISK&VEN_IBM-ESXS&PROD_ST336753LC____FN&REV_B85B\4&3CF91A&0&000			
Disk drive	Yes	DISKDRIVE	5.2.3790.0 10/1/2002
(Standard disk drives)	disk.inf		Not Available
SCSI\DISK&VEN_IBM-ESXS&PROD_ST336753LC____FN&REV_B85B\4&3CF91A&0&010			
SCSI Processor Device	Yes	SYSTEM	5.2.3790.0 10/1/2002
scsdev.inf			Not Available

SCSI\PROCESSOR&VEN_IBM&PROD_25P3495A_S320__1&REV_1\4&3CF91A&0&080			
IBM Dummy Device	Yes	SYSTEM	5.2.3790.0 10/1/2002
scsdev.inf			Not Available
SCSI\BRIDGE&VEN_IBM&PROD_DUMMY_DEVICE&REV_4.80\4&3CF91A&0&100			
LSI Logic PCI-X Ultra320 SCSI Host Adapter	Yes	SCSIADAPTER	
5.2.3790.0 10/1/2002	LSI Logic Inc.	pnpscsi.inf	Not Available
PCI\VEN_1000&DEV_0030&SUBSYS_02921014&REV_07\3&13C0B0C5&0&19			
IBM Dummy Device	Yes	SYSTEM	5.2.3790.0 10/1/2002
scsdev.inf			Not Available
SCSI\BRIDGE&VEN_IBM&PROD_DUMMY_DEVICE&REV_4.80\4&12F6A9BF&0&100			
Broadcom NetXtreme Gigabit Ethernet	Yes	NET	6.34.0.0
2/17/2003	Broadcom oem1.inf		Not Available
PCI\VEN_14E4&DEV_1648&SUBSYS_02A61014&REV_02\3&13C0B0C5&0&20			
Broadcom NetXtreme Gigabit Ethernet	Yes	NET	6.34.0.0
2/17/2003	Broadcom oem1.inf		Not Available
PCI\VEN_14E4&DEV_1648&SUBSYS_02A61014&REV_02\3&13C0B0C5&0&21			
PCI bus	Yes	SYSTEM	5.2.3790.0 10/1/2002
(Standard system devices)	machine.inf		Not Available
		ACPI\PNP0A03\2	
PCI standard host CPU bridge	Yes	SYSTEM	5.2.3790.0 10/1/2002
(Standard system devices)	machine.inf		Not Available
PCI\VEN_1014&DEV_0302&SUBSYS_00000000&REV_05\3&1070020&0&00			
PCI bus	Yes	SYSTEM	5.2.3790.0 10/1/2002
(Standard system devices)	machine.inf		Not Available
		ACPI\PNP0A03\3	
PCI standard host CPU bridge	Yes	SYSTEM	5.2.3790.0 10/1/2002
(Standard system devices)	machine.inf		Not Available
PCI\VEN_1014&DEV_0302&SUBSYS_00000000&REV_05\3&29E81982&0&00			
PCI standard PCI-to-PCI bridge	Yes	SYSTEM	5.2.3790.0 10/1/2002
(Standard system devices)	machine.inf		Not Available
PCI\VEN_1014&DEV_01A7&SUBSYS_00000000&REV_02\3&29E81982&0&20			
IBM ServeRAID 6M Controller	No	SCSIADAPTER	6.6.7.0
10/22/2003	IBM Corporation	oem2.inf	Not Available
PCI\VEN_9005&DEV_0250&SUBSYS_02791014&REV_02\4&180CD7A4&0&4020			
Disk drive	Yes	DISKDRIVE	5.2.3790.0 10/1/2002
(Standard disk drives)	disk.inf		Not Available
SCSI\DISK&VEN_IBM&PROD_SERVERAID&REV_6.06\5&35EFC5FC&0&000			
Disk drive	Yes	DISKDRIVE	5.2.3790.0 10/1/2002
(Standard disk drives)	disk.inf		Not Available
SCSI\DISK&VEN_IBM&PROD_SERVERAID&REV_6.06\5&35EFC5FC&0&010			
Disk drive	Yes	DISKDRIVE	5.2.3790.0 10/1/2002
(Standard disk drives)	disk.inf		Not Available
SCSI\DISK&VEN_IBM&PROD_SERVERAID&REV_6.06\5&35EFC5FC&0&020			
Disk drive	Yes	DISKDRIVE	5.2.3790.0 10/1/2002
(Standard disk drives)	disk.inf		Not Available
SCSI\DISK&VEN_IBM&PROD_SERVERAID&REV_6.06\5&35EFC5FC&0&030			
Disk drive	Yes	DISKDRIVE	5.2.3790.0 10/1/2002
(Standard disk drives)	disk.inf		Not Available
SCSI\DISK&VEN_IBM&PROD_SERVERAID&REV_6.06\5&35EFC5FC&0&040			
Disk drive	Yes	DISKDRIVE	5.2.3790.0 10/1/2002
(Standard disk drives)	disk.inf		Not Available
SCSI\DISK&VEN_IBM&PROD_SERVERAID&REV_6.06\5&35EFC5FC&0&050			
SCSI Processor Device	Yes	SYSTEM	5.2.3790.0 10/1/2002
scsdev.inf			Not Available
SCSI\PROCESSOR&VEN_IBM&PROD_EXP400__S320&REV_D110\5&35EFC5FC&0&1F0			
SCSI Processor Device	Yes	SYSTEM	5.2.3790.0 10/1/2002
scsdev.inf			Not Available
SCSI\PROCESSOR&VEN_IBM&PROD_EXP400__S320&REV_D110\5&35EFC5FC&0&2F0			
IBM Dummy Device	Yes	SYSTEM	5.2.3790.0 10/1/2002
scsdev.inf			Not Available
SCSI\BRIDGE&VEN_IBM&PROD_DUMMY_DEVICE&REV_6.06\5&35EFC5FC&0&300			
PCI bus	Yes	SYSTEM	5.2.3790.0 10/1/2002
(Standard system devices)	machine.inf		Not Available
		ACPI\PNP0A03\4	
PCI standard host CPU bridge	Yes	SYSTEM	5.2.3790.0 10/1/2002
(Standard system devices)	machine.inf		Not Available
PCI\VEN_1014&DEV_0302&SUBSYS_00000000&REV_05\3&172E68DD&0&00			
PCI standard PCI-to-PCI bridge	Yes	SYSTEM	5.2.3790.0 10/1/2002
(Standard system devices)	machine.inf		Not Available
PCI\VEN_1014&DEV_01A7&SUBSYS_00000000&REV_02\3&172E68DD&0&18			

IBM ServeRAID 6M Controller	No	SCSIADAPTER	6.6.7.0
10/22/2003	IBM Corporation	oem2.inf	Not Available
PCI\VEN_9005&DEV_0250&SUBSYS_02791014&REV_02\4&14F365D1&0&4018			
Disk drive	Yes	DISKDRIVE	5.2.3790.0 10/1/2002 (Standard disk drives)
disk.inf	Not Available		
SCSI\DISK&VEN_IBM&PROD_SERVERAID&REV_6.06\5&1D86B3A9&0&000			
Disk drive	Yes	DISKDRIVE	5.2.3790.0 10/1/2002 (Standard disk drives)
disk.inf	Not Available		
SCSI\DISK&VEN_IBM&PROD_SERVERAID&REV_6.06\5&1D86B3A9&0&010			
Disk drive	Yes	DISKDRIVE	5.2.3790.0 10/1/2002 (Standard disk drives)
disk.inf	Not Available		
SCSI\DISK&VEN_IBM&PROD_SERVERAID&REV_6.06\5&1D86B3A9&0&020			
Disk drive	Yes	DISKDRIVE	5.2.3790.0 10/1/2002 (Standard disk drives)
disk.inf	Not Available		
SCSI\DISK&VEN_IBM&PROD_SERVERAID&REV_6.06\5&1D86B3A9&0&030			
Disk drive	Yes	DISKDRIVE	5.2.3790.0 10/1/2002 (Standard disk drives)
disk.inf	Not Available		
SCSI\DISK&VEN_IBM&PROD_SERVERAID&REV_6.06\5&1D86B3A9&0&040			
Disk drive	Yes	DISKDRIVE	5.2.3790.0 10/1/2002 (Standard disk drives)
disk.inf	Not Available		
SCSI\DISK&VEN_IBM&PROD_SERVERAID&REV_6.06\5&1D86B3A9&0&050			
SCSI Processor Device	Yes	SYSTEM	5.2.3790.0 10/1/2002 IBM scsdev.inf Not Available
SCSI\PROCESSOR&VEN_IBM&PROD_EXP400___S320&REV_D110\5&1D86B3A9&0&1F0			
SCSI Processor Device	Yes	SYSTEM	5.2.3790.0 10/1/2002 IBM scsdev.inf Not Available
SCSI\PROCESSOR&VEN_IBM&PROD_EXP400___S320&REV_D110\5&1D86B3A9&0&2F0			
IBM Dummy Device	Yes	SYSTEM	5.2.3790.0 10/1/2002 IBM scsdev.inf Not Available
SCSI\BRIDGE&VEN_IBM&PROD_DUMMY_DEVICE&REV_6.06\5&1D86B3A9&0&300			
PCI bus	Yes	SYSTEM	5.2.3790.0 10/1/2002 (Standard system devices)
machine.inf	Not Available	ACPI\PNP0A03\5	
PCI standard host CPU bridge	Yes	SYSTEM	5.2.3790.0 10/1/2002 (Standard system devices)
machine.inf	Not Available		
PCI\VEN_1014&DEV_0302&SUBSYS_00000000&REV_05\3&474B838&0&00			
PCI standard PCI-to-PCI bridge	Yes	SYSTEM	5.2.3790.0 10/1/2002 (Standard system devices)
machine.inf	Not Available		
PCI\VEN_1014&DEV_01A7&SUBSYS_00000000&REV_02\3&474B838&0&10			
IBM ServeRAID 6M Controller	No	SCSIADAPTER	6.6.7.0
10/22/2003	IBM Corporation	oem2.inf	Not Available
PCI\VEN_9005&DEV_0250&SUBSYS_02791014&REV_02\4&8C37DC5&0&4010			
Disk drive	Yes	DISKDRIVE	5.2.3790.0 10/1/2002 (Standard disk drives)
disk.inf	Not Available		
SCSI\DISK&VEN_IBM&PROD_SERVERAID&REV_6.06\5&F3D1498&0&000			
SCSI Processor Device	Yes	SYSTEM	5.2.3790.0 10/1/2002 IBM scsdev.inf Not Available
SCSI\PROCESSOR&VEN_IBM&PROD_EXP300___S160&REV_D014\5&F3D1498&0&1F0			
SCSI Processor Device	Yes	SYSTEM	5.2.3790.0 10/1/2002 IBM scsdev.inf Not Available
SCSI\PROCESSOR&VEN_IBM&PROD_EXP300___S160&REV_D014\5&F3D1498&0&2F0			
IBM Dummy Device	Yes	SYSTEM	5.2.3790.0 10/1/2002 IBM scsdev.inf Not Available
SCSI\BRIDGE&VEN_IBM&PROD_DUMMY_DEVICE&REV_6.06\5&F3D1498&0&300			
Motherboard resources	Yes	SYSTEM	5.2.3790.0 10/1/2002 (Standard system devices)
machine.inf	Not Available		
ACPI\PNP0C02\10			
PCI bus	Yes	SYSTEM	5.2.3790.0 10/1/2002 (Standard system devices)
machine.inf	Not Available	ACPI\PNP0A03\80	
PCI standard host CPU bridge	Yes	SYSTEM	5.2.3790.0 10/1/2002 (Standard system devices)
machine.inf	Not Available		
PCI\VEN_1014&DEV_0302&SUBSYS_00000000&REV_05\3&389E99D&0&00			
PCI standard PCI-to-PCI bridge	Yes	SYSTEM	5.2.3790.0 10/1/2002 (Standard system devices)
machine.inf	Not Available		
PCI\VEN_1014&DEV_01A7&SUBSYS_00000000&REV_02\3&389E99D&0&08			
IBM ServeRAID 6M Controller	No	SCSIADAPTER	6.6.7.0
10/22/2003	IBM Corporation	oem2.inf	Not Available

PCI\VEN_9005&DEV_0250&SUBSYS_02791014&REV_02\4&1CCD9D43&0&4008			
Disk drive	Yes	DISKDRIVE	5.2.3790.0 10/1/2002 (Standard disk drives)
disk.inf	Not Available		
SCSI\DISK&VEN_IBM&PROD_SERVERAID&REV_6.06\5&95FC660&0&000			
Disk drive	Yes	DISKDRIVE	5.2.3790.0 10/1/2002 (Standard disk drives)
disk.inf	Not Available		
SCSI\DISK&VEN_IBM&PROD_SERVERAID&REV_6.06\5&95FC660&0&010			
Disk drive	Yes	DISKDRIVE	5.2.3790.0 10/1/2002 (Standard disk drives)
disk.inf	Not Available		
SCSI\DISK&VEN_IBM&PROD_SERVERAID&REV_6.06\5&95FC660&0&020			
Disk drive	Yes	DISKDRIVE	5.2.3790.0 10/1/2002 (Standard disk drives)
disk.inf	Not Available		
SCSI\DISK&VEN_IBM&PROD_SERVERAID&REV_6.06\5&95FC660&0&030			
Disk drive	Yes	DISKDRIVE	5.2.3790.0 10/1/2002 (Standard disk drives)
disk.inf	Not Available		
SCSI\DISK&VEN_IBM&PROD_SERVERAID&REV_6.06\5&95FC660&0&040			
Disk drive	Yes	DISKDRIVE	5.2.3790.0 10/1/2002 (Standard disk drives)
disk.inf	Not Available		
SCSI\DISK&VEN_IBM&PROD_SERVERAID&REV_6.06\5&95FC660&0&050			
SCSI Processor Device	Yes	SYSTEM	5.2.3790.0 10/1/2002 IBM scsdev.inf Not Available
SCSI\PROCESSOR&VEN_IBM&PROD_EXP400___S320&REV_D110\5&95FC660&0&1F0			
SCSI Processor Device	Yes	SYSTEM	5.2.3790.0 10/1/2002 IBM scsdev.inf Not Available
SCSI\PROCESSOR&VEN_IBM&PROD_EXP400___S320&REV_D110\5&95FC660&0&2F0			
IBM Dummy Device	Yes	SYSTEM	5.2.3790.0 10/1/2002 IBM scsdev.inf Not Available
SCSI\BRIDGE&VEN_IBM&PROD_DUMMY_DEVICE&REV_6.06\5&95FC660&0&300			
PCI bus	Yes	SYSTEM	5.2.3790.0 10/1/2002 (Standard system devices)
machine.inf	Not Available	ACPI\PNP0A03\81	
PCI standard host CPU bridge	Yes	SYSTEM	5.2.3790.0 10/1/2002 (Standard system devices)
machine.inf	Not Available		
PCI\VEN_1014&DEV_0302&SUBSYS_00000000&REV_05\3&F2FC708&0&00			
PCI standard PCI-to-PCI bridge	Yes	SYSTEM	5.2.3790.0 10/1/2002 (Standard system devices)
machine.inf	Not Available		
PCI\VEN_1014&DEV_01A7&SUBSYS_00000000&REV_02\3&F2FC708&0&08			
IBM ServeRAID 6M Controller	No	SCSIADAPTER	6.6.7.0
10/22/2003	IBM Corporation	oem2.inf	Not Available
PCI\VEN_9005&DEV_0250&SUBSYS_02791014&REV_02\4&219E2F76&0&4008			
Disk drive	Yes	DISKDRIVE	5.2.3790.0 10/1/2002 (Standard disk drives)
disk.inf	Not Available		
SCSI\DISK&VEN_IBM&PROD_SERVERAID&REV_6.06\5&2F37A55C&0&000			
Disk drive	Yes	DISKDRIVE	5.2.3790.0 10/1/2002 (Standard disk drives)
disk.inf	Not Available		
SCSI\DISK&VEN_IBM&PROD_SERVERAID&REV_6.06\5&2F37A55C&0&010			
Disk drive	Yes	DISKDRIVE	5.2.3790.0 10/1/2002 (Standard disk drives)
disk.inf	Not Available		
SCSI\DISK&VEN_IBM&PROD_SERVERAID&REV_6.06\5&2F37A55C&0&020			
Disk drive	Yes	DISKDRIVE	5.2.3790.0 10/1/2002 (Standard disk drives)
disk.inf	Not Available		
SCSI\DISK&VEN_IBM&PROD_SERVERAID&REV_6.06\5&2F37A55C&0&030			
Disk drive	Yes	DISKDRIVE	5.2.3790.0 10/1/2002 (Standard disk drives)
disk.inf	Not Available		
SCSI\DISK&VEN_IBM&PROD_SERVERAID&REV_6.06\5&2F37A55C&0&040			
Disk drive	Yes	DISKDRIVE	5.2.3790.0 10/1/2002 (Standard disk drives)
disk.inf	Not Available		
SCSI\DISK&VEN_IBM&PROD_SERVERAID&REV_6.06\5&2F37A55C&0&050			
SCSI Processor Device	Yes	SYSTEM	5.2.3790.0 10/1/2002 IBM scsdev.inf Not Available
SCSI\PROCESSOR&VEN_IBM&PROD_EXP400___S320&REV_D110\5&2F37A55C&0&1F0			
SCSI Processor Device	Yes	SYSTEM	5.2.3790.0 10/1/2002 IBM scsdev.inf Not Available
SCSI\PROCESSOR&VEN_IBM&PROD_EXP400___S320&REV_D110\5&2F37A55C&0&2F0			
IBM Dummy Device	Yes	SYSTEM	5.2.3790.0 10/1/2002 IBM scsdev.inf Not Available
SCSI\BRIDGE&VEN_IBM&PROD_DUMMY_DEVICE&REV_6.06\5&2F37A55C&0&300			

PCI bus	Yes	SYSTEM	5.2.3790.0	10/1/2002	(Standard system devices)
machine.inf	Not Available	ACPI\PNP0A03\82			
PCI standard host CPU bridge	Yes	SYSTEM	5.2.3790.0	10/1/2002	
(Standard system devices)	machine.inf	Not Available			
PCI\VEN_1014&DEV_0302&SUBSYS_00000000&REV_05\3&21E977AD&0&00					
PCI standard PCI-to-PCI bridge	Yes	SYSTEM	5.2.3790.0	10/1/2002	
(Standard system devices)	machine.inf	Not Available			
PCI\VEN_1014&DEV_01A7&SUBSYS_00000000&REV_02\3&21E977AD&0&08					
IBM ServeRAID 6M Controller	No	SCSIADAPTER	6.6.7.0		
10/22/2003	IBM Corporation	oem2.inf	Not Available		
PCI\VEN_9005&DEV_0250&SUBSYS_02791014&REV_02\4&C31448A&0&4008					
Disk drive	Yes	DISKDRIVE	5.2.3790.0	10/1/2002	(Standard disk drives)
disk.inf	Not Available				
SCSI\DISK&VEN_IBM&PROD_SERVERAID&REV_6.06\5&29697B4D&0&000					
Disk drive	Yes	DISKDRIVE	5.2.3790.0	10/1/2002	(Standard disk drives)
disk.inf	Not Available				
SCSI\DISK&VEN_IBM&PROD_SERVERAID&REV_6.06\5&29697B4D&0&010					
Disk drive	Yes	DISKDRIVE	5.2.3790.0	10/1/2002	(Standard disk drives)
disk.inf	Not Available				
SCSI\DISK&VEN_IBM&PROD_SERVERAID&REV_6.06\5&29697B4D&0&020					
Disk drive	Yes	DISKDRIVE	5.2.3790.0	10/1/2002	(Standard disk drives)
disk.inf	Not Available				
SCSI\DISK&VEN_IBM&PROD_SERVERAID&REV_6.06\5&29697B4D&0&030					
Disk drive	Yes	DISKDRIVE	5.2.3790.0	10/1/2002	(Standard disk drives)
disk.inf	Not Available				
SCSI\DISK&VEN_IBM&PROD_SERVERAID&REV_6.06\5&29697B4D&0&040					
Disk drive	Yes	DISKDRIVE	5.2.3790.0	10/1/2002	(Standard disk drives)
disk.inf	Not Available				
SCSI\DISK&VEN_IBM&PROD_SERVERAID&REV_6.06\5&29697B4D&0&050					
SCSI Processor Device	Yes	SYSTEM	5.2.3790.0	10/1/2002	IBM
scsidev.inf	Not Available				
SCSI\PROCESSOR&VEN_IBM&PROD_EXP400___S320&REV_D110\5&29697B4D&0&1F0					
SCSI Processor Device	Yes	SYSTEM	5.2.3790.0	10/1/2002	IBM
scsidev.inf	Not Available				
SCSI\PROCESSOR&VEN_IBM&PROD_EXP400___S320&REV_D110\5&29697B4D&0&2F0					
IBM Dummy Device	Yes	SYSTEM	5.2.3790.0	10/1/2002	IBM
scsidev.inf	Not Available				
SCSI\BRIDGE&VEN_IBM&PROD_DUMMY_DEVICE&REV_6.06\5&29697B4D&0&300					
Motherboard resources	Yes	SYSTEM	5.2.3790.0	10/1/2002	
(Standard system devices)	machine.inf	Not Available			
ACPI\PNP0C02\20					
PCI bus	Yes	SYSTEM	5.2.3790.0	10/1/2002	(Standard system devices)
machine.inf	Not Available	ACPI\PNP0A03\88			
PCI standard host CPU bridge	Yes	SYSTEM	5.2.3790.0	10/1/2002	
(Standard system devices)	machine.inf	Not Available			
PCI\VEN_1014&DEV_0302&SUBSYS_00000000&REV_05\3&32219A6E&0&00					
PCI bus	Yes	SYSTEM	5.2.3790.0	10/1/2002	(Standard system devices)
machine.inf	Not Available	ACPI\PNP0A03\89			
PCI standard host CPU bridge	Yes	SYSTEM	5.2.3790.0	10/1/2002	
(Standard system devices)	machine.inf	Not Available			
PCI\VEN_1014&DEV_0302&SUBSYS_00000000&REV_05\3&1F67E9C9&0&00					
PCI bus	Yes	SYSTEM	5.2.3790.0	10/1/2002	(Standard system devices)
machine.inf	Not Available	ACPI\PNP0A03\8A			
PCI standard host CPU bridge	Yes	SYSTEM	5.2.3790.0	10/1/2002	
(Standard system devices)	machine.inf	Not Available			
PCI\VEN_1014&DEV_0302&SUBSYS_00000000&REV_05\3&3ACAD158&0&00					
Motherboard resources	Yes	SYSTEM	5.2.3790.0	10/1/2002	
(Standard system devices)	machine.inf	Not Available			
ACPI\PNP0C02\21					
Logical Disk Manager	Yes	SYSTEM	5.2.3790.0	10/1/2002	(Standard system devices)
machine.inf	Not Available	ROOT\DMIO\0000			
Generic volume	Yes	VOLUME	5.2.3790.0	10/1/2002	Microsoft
volume.inf	Not Available				
STORAGE\VOLUME\I&3735C57B&0&LDM#\{0DD5D0DC-7F22-46EC-9E54-78A8F592DCF8}					
Generic volume	Yes	VOLUME	5.2.3790.0	10/1/2002	Microsoft
volume.inf	Not Available				
STORAGE\VOLUME\I&3735C57B&0&LDM#\{7BC5C82F-3751-4C06-AEE4-E02A461BF3DD}					
Generic volume	Yes	VOLUME	5.2.3790.0	10/1/2002	Microsoft
volume.inf	Not Available				

STORAGE\VOLUME\I&3735C57B&0&LDM#\{959B23C6-4BF2-4BDA-8AE4-4D259D4E0CAD}					
Generic volume	Yes	VOLUME	5.2.3790.0	10/1/2002	Microsoft
volume.inf	Not Available				
STORAGE\VOLUME\I&3735C57B&0&LDM#\{8A7949B3-D41C-48FC-907D-B888B61913A6}					
Generic volume	Yes	VOLUME	5.2.3790.0	10/1/2002	Microsoft
volume.inf	Not Available				
STORAGE\VOLUME\I&3735C57B&0&LDM#\{E56053CB-DEA7-45DC-9678-B1E522C6768D}					
Generic volume	Yes	VOLUME	5.2.3790.0	10/1/2002	Microsoft
volume.inf	Not Available				
STORAGE\VOLUME\I&3735C57B&0&LDM#\{1676B3DB-C2B1-4E60-A92C-AB1D1DE7C87B}					
Generic volume	Yes	VOLUME	5.2.3790.0	10/1/2002	Microsoft
volume.inf	Not Available				
STORAGE\VOLUME\I&3735C57B&0&LDM#\{173F6E4D-138A-4D70-A60F-D8E8CE163385}					
Generic volume	Yes	VOLUME	5.2.3790.0	10/1/2002	Microsoft
volume.inf	Not Available				
STORAGE\VOLUME\I&3735C57B&0&LDM#\{09C16D7E-9765-48AD-8602-6915DF096245}					
Generic volume	Yes	VOLUME	5.2.3790.0	10/1/2002	Microsoft
volume.inf	Not Available				
STORAGE\VOLUME\I&3735C57B&0&LDM#\{0CA0E1CC-629C-4994-BA80-3FD38C3DB3DD}					
Generic volume	Yes	VOLUME	5.2.3790.0	10/1/2002	Microsoft
volume.inf	Not Available				
STORAGE\VOLUME\I&3735C57B&0&LDM#\{A5D599F6-62B8-471C-AD76-CB74416A2285}					
Generic volume	Yes	VOLUME	5.2.3790.0	10/1/2002	Microsoft
volume.inf	Not Available				
STORAGE\VOLUME\I&3735C57B&0&LDM#\{F80C6007-670F-4C5A-888C-C72AFA7EFFCE}					
Generic volume	Yes	VOLUME	5.2.3790.0	10/1/2002	Microsoft
volume.inf	Not Available				
STORAGE\VOLUME\I&3735C57B&0&LDM#\{E418AD3E-9CD8-434A-B05E-48EAF64B8CC1}					
Generic volume	Yes	VOLUME	5.2.3790.0	10/1/2002	Microsoft
volume.inf	Not Available				
STORAGE\VOLUME\I&3735C57B&0&LDM#\{DF2F2330-7F2C-4E0D-8911-BFFE63954F70}					
Generic volume	Yes	VOLUME	5.2.3790.0	10/1/2002	Microsoft
volume.inf	Not Available				
STORAGE\VOLUME\I&3735C57B&0&LDM#\{AB781D18-B750-4D00-9C3E-FA42C3A8EC12}					
Generic volume	Yes	VOLUME	5.2.3790.0	10/1/2002	Microsoft
volume.inf	Not Available				
STORAGE\VOLUME\I&3735C57B&0&LDM#\{CCB63029-6692-4878-8201-9EE2393F2445}					
Generic volume	Yes	VOLUME	5.2.3790.0	10/1/2002	Microsoft
volume.inf	Not Available				
STORAGE\VOLUME\I&3735C57B&0&LDM#\{6B5D8565-E731-466C-832E-AC830F0DD72E}					
Generic volume	Yes	VOLUME	5.2.3790.0	10/1/2002	Microsoft
volume.inf	Not Available				
STORAGE\VOLUME\I&3735C57B&0&LDM#\{56DA202F-5BC8-4771-80A6-FEC6818B1D52}					
Generic volume	Yes	VOLUME	5.2.3790.0	10/1/2002	Microsoft
volume.inf	Not Available				
STORAGE\VOLUME\I&3735C57B&0&LDM#\{82D5DC2F-5512-4B12-AA51-7D7EC5033AB5}					
Generic volume	Yes	VOLUME	5.2.3790.0	10/1/2002	Microsoft
volume.inf	Not Available				
STORAGE\VOLUME\I&3735C57B&0&LDM#\{45A21373-43C6-4E5C-9975-54B6A2290B54}					
Generic volume	Yes	VOLUME	5.2.3790.0	10/1/2002	Microsoft
volume.inf	Not Available				
STORAGE\VOLUME\I&3735C57B&0&LDM#\{E3DA7E72-F1B6-49D7-98E6-D56BFB9A1680}					
Generic volume	Yes	VOLUME	5.2.3790.0	10/1/2002	Microsoft
volume.inf	Not Available				
STORAGE\VOLUME\I&3735C57B&0&LDM#\{C8F0912F-6822-4B23-961C-0AD6FA651D5A}					

Generic volume	Yes	VOLUME 5.2.3790.0 10/1/2002 Microsoft
volume.inf	Not Available	
STORAGE\VOLUME\1&3735C57B&0&LDM#{73DCB09A-8231-49D9-ACFC-A04472ADBA8B}		
Generic volume	Yes	VOLUME 5.2.3790.0 10/1/2002 Microsoft
volume.inf	Not Available	
STORAGE\VOLUME\1&3735C57B&0&LDM#{A05DE495-B375-4F9C-821A-3372B5CA5544}		
Generic volume	Yes	VOLUME 5.2.3790.0 10/1/2002 Microsoft
volume.inf	Not Available	
STORAGE\VOLUME\1&3735C57B&0&LDM#{BB948EAA-14BB-4D3C-8803-B6734A88BE74}		
Generic volume	Yes	VOLUME 5.2.3790.0 10/1/2002 Microsoft
volume.inf	Not Available	
STORAGE\VOLUME\1&3735C57B&0&LDM#{70978A99-4576-4756-BECD-D882CBA3A46A}		
Generic volume	Yes	VOLUME 5.2.3790.0 10/1/2002 Microsoft
volume.inf	Not Available	
STORAGE\VOLUME\1&3735C57B&0&LDM#{8A96CB9C-4069-4E50-BA08-69BE165DAE03}		
Generic volume	Yes	VOLUME 5.2.3790.0 10/1/2002 Microsoft
volume.inf	Not Available	
STORAGE\VOLUME\1&3735C57B&0&LDM#{4C66EB00-B879-420B-BACB-22E8030C85ED}		
Generic volume	Yes	VOLUME 5.2.3790.0 10/1/2002 Microsoft
volume.inf	Not Available	
STORAGE\VOLUME\1&3735C57B&0&LDM#{5C2A7F44-D602-4AE6-9254-C75BB61D3C3D}		
Generic volume	Yes	VOLUME 5.2.3790.0 10/1/2002 Microsoft
volume.inf	Not Available	
STORAGE\VOLUME\1&3735C57B&0&LDM#{D1AB3E05-3307-4BC6-86F2-89EC849A859C}		
Generic volume	Yes	VOLUME 5.2.3790.0 10/1/2002 Microsoft
volume.inf	Not Available	
STORAGE\VOLUME\1&3735C57B&0&LDM#{93CA825E-68CA-4BC1-949B-837D28CAFD9}		
Generic volume	Yes	VOLUME 5.2.3790.0 10/1/2002 Microsoft
volume.inf	Not Available	
STORAGE\VOLUME\1&3735C57B&0&LDM#{F60A3568-D340-4F77-8020-F8D062942872}		
Generic volume	Yes	VOLUME 5.2.3790.0 10/1/2002 Microsoft
volume.inf	Not Available	
STORAGE\VOLUME\1&3735C57B&0&LDM#{BE7E71C0-B166-4DBE-9E1A-84EFD0B47866}		
Generic volume	Yes	VOLUME 5.2.3790.0 10/1/2002 Microsoft
volume.inf	Not Available	
STORAGE\VOLUME\1&3735C57B&0&LDM#{6F1841C7-86DC-4064-B6F6-BF87CD63741B}		
Generic volume	Yes	VOLUME 5.2.3790.0 10/1/2002 Microsoft
volume.inf	Not Available	
STORAGE\VOLUME\1&3735C57B&0&LDM#{551AA476-C0E9-48C2-A553-040D050F94FB}		
Generic volume	Yes	VOLUME 5.2.3790.0 10/1/2002 Microsoft
volume.inf	Not Available	
STORAGE\VOLUME\1&3735C57B&0&LDM#{3965E9C9-9958-4A22-9834-D06AF61C7F68}		
Generic volume	Yes	VOLUME 5.2.3790.0 10/1/2002 Microsoft
volume.inf	Not Available	
STORAGE\VOLUME\1&3735C57B&0&LDM#{DA2A3508-F92D-4C80-8BF0-13C196DDE53E}		
Generic volume	Yes	VOLUME 5.2.3790.0 10/1/2002 Microsoft
volume.inf	Not Available	
STORAGE\VOLUME\1&3735C57B&0&LDM#{774A6715-9372-4A09-A865-9E3B6C96F3EA}		
Generic volume	Yes	VOLUME 5.2.3790.0 10/1/2002 Microsoft
volume.inf	Not Available	
STORAGE\VOLUME\1&3735C57B&0&LDM#{AA3F02CE-BA4B-42E5-8C79-B3D0100FE8E1}		
Generic volume	Yes	VOLUME 5.2.3790.0 10/1/2002 Microsoft
volume.inf	Not Available	
STORAGE\VOLUME\1&3735C57B&0&LDM#{62A0838E-8228-495D-968F-F5A89F84D5B5}		
Generic volume	Yes	VOLUME 5.2.3790.0 10/1/2002 Microsoft
volume.inf	Not Available	

STORAGE\VOLUME\1&3735C57B&0&LDM#{E7B39F1B-66D1-430F-B9E0-BF9D3226E0D7}		
Generic volume	Yes	VOLUME 5.2.3790.0 10/1/2002 Microsoft
volume.inf	Not Available	
STORAGE\VOLUME\1&3735C57B&0&LDM#{89950F9C-BECB-447C-B428-B283E0A80F31}		
Generic volume	Yes	VOLUME 5.2.3790.0 10/1/2002 Microsoft
volume.inf	Not Available	
STORAGE\VOLUME\1&3735C57B&0&LDM#{C9120874-F95C-4C44-911B-6AEC4B66E329}		
Generic volume	Yes	VOLUME 5.2.3790.0 10/1/2002 Microsoft
volume.inf	Not Available	
STORAGE\VOLUME\1&3735C57B&0&LDM#{61291629-A35F-4E13-8C7D-17F5D018D13A}		
Generic volume	Yes	VOLUME 5.2.3790.0 10/1/2002 Microsoft
volume.inf	Not Available	
STORAGE\VOLUME\1&3735C57B&0&LDM#{0116BDE1-0381-4602-B8FB-F65AB0C75797}		
Generic volume	Yes	VOLUME 5.2.3790.0 10/1/2002 Microsoft
volume.inf	Not Available	
STORAGE\VOLUME\1&3735C57B&0&LDM#{71452ACE-CA6B-4D07-9EFD-1E62103EE98E}		
Generic volume	Yes	VOLUME 5.2.3790.0 10/1/2002 Microsoft
volume.inf	Not Available	
STORAGE\VOLUME\1&3735C57B&0&LDM#{10B05B93-AB7A-4797-9676-75C20F9CEDB8}		
Generic volume	Yes	VOLUME 5.2.3790.0 10/1/2002 Microsoft
volume.inf	Not Available	
STORAGE\VOLUME\1&3735C57B&0&LDM#{042D734B-D973-4D6C-8CE3-306AF2B23B54}		
Generic volume	Yes	VOLUME 5.2.3790.0 10/1/2002 Microsoft
volume.inf	Not Available	
STORAGE\VOLUME\1&3735C57B&0&LDM#{9A24FC9B-4F55-448C-B51F-E7AC44AE9603}		
Generic volume	Yes	VOLUME 5.2.3790.0 10/1/2002 Microsoft
volume.inf	Not Available	
STORAGE\VOLUME\1&3735C57B&0&LDM#{319E233C-20E6-4405-9DCC-C34786BB3125}		
Generic volume	Yes	VOLUME 5.2.3790.0 10/1/2002 Microsoft
volume.inf	Not Available	
STORAGE\VOLUME\1&3735C57B&0&LDM#{0C246FBF-5D5C-46C0-AF70-E09415B238D0}		
Generic volume	Yes	VOLUME 5.2.3790.0 10/1/2002 Microsoft
volume.inf	Not Available	
STORAGE\VOLUME\1&3735C57B&0&LDM#{843AEE7B-E13B-44C4-95E7-6F09E1CC64FD}		
Generic volume	Yes	VOLUME 5.2.3790.0 10/1/2002 Microsoft
volume.inf	Not Available	
STORAGE\VOLUME\1&3735C57B&0&LDM#{51539B6D-FD60-488B-B29F-3179A817A4A6}		
Generic volume	Yes	VOLUME 5.2.3790.0 10/1/2002 Microsoft
volume.inf	Not Available	
STORAGE\VOLUME\1&3735C57B&0&LDM#{6FCE1BAD-56E9-482A-9ECA-12F81E064018}		
Generic volume	Yes	VOLUME 5.2.3790.0 10/1/2002 Microsoft
volume.inf	Not Available	
STORAGE\VOLUME\1&3735C57B&0&LDM#{EFA368E2-551D-4876-8FA4-7F07EDC57D11}		
Generic volume	Yes	VOLUME 5.2.3790.0 10/1/2002 Microsoft
volume.inf	Not Available	
STORAGE\VOLUME\1&3735C57B&0&LDM#{45DDE400-CE7B-4825-843A-996BF05F9B9F}		
Generic volume	Yes	VOLUME 5.2.3790.0 10/1/2002 Microsoft
volume.inf	Not Available	
STORAGE\VOLUME\1&3735C57B&0&LDM#{EED2A06E-23A7-4E61-92FD-12838371EF9E}		
Generic volume	Yes	VOLUME 5.2.3790.0 10/1/2002 Microsoft
volume.inf	Not Available	
STORAGE\VOLUME\1&3735C57B&0&LDM#{0949C1CD-17DC-46EA-B4B8-AB11BC60403A}		
Generic volume	Yes	VOLUME 5.2.3790.0 10/1/2002 Microsoft
volume.inf	Not Available	
STORAGE\VOLUME\1&3735C57B&0&LDM#{AF638267-2069-4729-AD6C-779535150B89}		

Generic volume Yes VOLUME 5.2.3790.0 10/1/2002 Microsoft
volume.infNot Available
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Generic volume Yes VOLUME 5.2.3790.0 10/1/2002 Microsoft
volume.infNot Available
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Generic volume Yes VOLUME 5.2.3790.0 10/1/2002 Microsoft
volume.infNot Available
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Generic volume Yes VOLUME 5.2.3790.0 10/1/2002 Microsoft
volume.infNot Available
STORAGE\VOLUME\1&3735C57B&0&LDM#{28B3300A-8AF2-40CC-9A25-E44
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Generic volume Yes VOLUME 5.2.3790.0 10/1/2002 Microsoft
volume.infNot Available
STORAGE\VOLUME\1&3735C57B&0&LDM#{8BAC761C-D796-4496-9F74-5931
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Generic volume Yes VOLUME 5.2.3790.0 10/1/2002 Microsoft
volume.infNot Available
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Generic volume Yes VOLUME 5.2.3790.0 10/1/2002 Microsoft
volume.infNot Available
STORAGE\VOLUME\1&3735C57B&0&LDM#{FA3266D1-A6B4-4BD9-B16F-BB
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Generic volume Yes VOLUME 5.2.3790.0 10/1/2002 Microsoft
volume.infNot Available
STORAGE\VOLUME\1&3735C57B&0&LDM#{75BFE6B6-0D94-4586-86C7-2E3F
D7FBBDCF}

Generic volume Yes VOLUME 5.2.3790.0 10/1/2002 Microsoft
volume.infNot Available
STORAGE\VOLUME\1&3735C57B&0&LDM#{6A428E98-1BFB-4E5E-B63A-790
B05F3C85A}

Generic volume Yes VOLUME 5.2.3790.0 10/1/2002 Microsoft
volume.infNot Available
STORAGE\VOLUME\1&3735C57B&0&LDM#{A9F397D7-7531-4037-A98A-A14
5A3CEC911}

Generic volume Yes VOLUME 5.2.3790.0 10/1/2002 Microsoft
volume.infNot Available
STORAGE\VOLUME\1&3735C57B&0&LDM#{B3E086ED-3926-4450-B8BD-E35
87A94359D}

Generic volume Yes VOLUME 5.2.3790.0 10/1/2002 Microsoft
volume.infNot Available
STORAGE\VOLUME\1&3735C57B&0&LDM#{AEE7E941-FD82-4577-8EC1-0CB
317CA514B}

Generic volume Yes VOLUME 5.2.3790.0 10/1/2002 Microsoft
volume.infNot Available
STORAGE\VOLUME\1&3735C57B&0&LDM#{B3A45A1A-7A92-4796-9388-45C
8451DDCEC}

Generic volume Yes VOLUME 5.2.3790.0 10/1/2002 Microsoft
volume.infNot Available
STORAGE\VOLUME\1&3735C57B&0&LDM#{6004330C-181A-4AF3-AEE2-F4C
20FB7BDE0}

Generic volume Yes VOLUME 5.2.3790.0 10/1/2002 Microsoft
volume.infNot Available
STORAGE\VOLUME\1&3735C57B&0&LDM#{DB58D7F5-2CE6-4999-8B36-68B
9F08CE302}

Generic volume Yes VOLUME 5.2.3790.0 10/1/2002 Microsoft
volume.infNot Available
STORAGE\VOLUME\1&3735C57B&0&LDM#{4D411C33-7C34-4D65-9995-D46
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Generic volume Yes VOLUME 5.2.3790.0 10/1/2002 Microsoft
volume.infNot Available
STORAGE\VOLUME\1&3735C57B&0&LDM#{89617C83-1030-4EF8-8BDD-1C9
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Generic volume Yes VOLUME 5.2.3790.0 10/1/2002 Microsoft
volume.infNot Available
STORAGE\VOLUME\1&3735C57B&0&LDM#{26F439F8-81AF-4474-9BC8-FDD
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Generic volume Yes VOLUME 5.2.3790.0 10/1/2002 Microsoft
volume.infNot Available

STORAGE\VOLUME\1&3735C57B&0&LDM#{975F7E0B-DF6E-45F2-9DE0-A30
231735D53}

Generic volume Yes VOLUME 5.2.3790.0 10/1/2002 Microsoft
volume.infNot Available
STORAGE\VOLUME\1&3735C57B&0&LDM#{02E59345-57BA-4342-B4E5-9952
DC0C6F2D}

Generic volume Yes VOLUME 5.2.3790.0 10/1/2002 Microsoft
volume.infNot Available
STORAGE\VOLUME\1&3735C57B&0&LDM#{CE29EBD6-72D2-4375-91D7-831
49AB76789}

Generic volume Yes VOLUME 5.2.3790.0 10/1/2002 Microsoft
volume.infNot Available
STORAGE\VOLUME\1&3735C57B&0&LDM#{2B33D88F-65DA-431B-B7A7-1E1
4F10B2CD1}

Generic volume Yes VOLUME 5.2.3790.0 10/1/2002 Microsoft
volume.infNot Available
STORAGE\VOLUME\1&3735C57B&0&LDM#{AC0AC19B-73AC-4B7B-9923-D3
EA555B1B82}

Generic volume Yes VOLUME 5.2.3790.0 10/1/2002 Microsoft
volume.infNot Available
STORAGE\VOLUME\1&3735C57B&0&LDM#{E5D95D0C-B9C9-4C3A-9E1B-92
96F19C9400}

Generic volume Yes VOLUME 5.2.3790.0 10/1/2002 Microsoft
volume.infNot Available
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Generic volume Yes VOLUME 5.2.3790.0 10/1/2002 Microsoft
volume.infNot Available
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Generic volume Yes VOLUME 5.2.3790.0 10/1/2002 Microsoft
volume.infNot Available
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Generic volume Yes VOLUME 5.2.3790.0 10/1/2002 Microsoft
volume.infNot Available
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CD16ADD03}

Generic volume Yes VOLUME 5.2.3790.0 10/1/2002 Microsoft
volume.infNot Available
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Generic volume Yes VOLUME 5.2.3790.0 10/1/2002 Microsoft
volume.infNot Available
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Generic volume Yes VOLUME 5.2.3790.0 10/1/2002 Microsoft
volume.infNot Available
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Generic volume Yes VOLUME 5.2.3790.0 10/1/2002 Microsoft
volume.infNot Available
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Generic volume Yes VOLUME 5.2.3790.0 10/1/2002 Microsoft
volume.infNot Available
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Generic volume Yes VOLUME 5.2.3790.0 10/1/2002 Microsoft
volume.infNot Available
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F93D66664}

Generic volume Yes VOLUME 5.2.3790.0 10/1/2002 Microsoft
volume.infNot Available
STORAGE\VOLUME\1&3735C57B&0&LDM#{5640A09A-4A96-4E6C-AE6D-6A
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Generic volume Yes VOLUME 5.2.3790.0 10/1/2002 Microsoft
volume.infNot Available
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06101648D}

Generic volume Yes VOLUME 5.2.3790.0 10/1/2002 Microsoft
volume.infNot Available
STORAGE\VOLUME\1&3735C57B&0&LDM#{B6AAD3ED-F53B-41A3-98D2-B3
7628CA65E9}

Generic volume	Yes	VOLUME 5.2.3790.0 10/1/2002	Microsoft
volume.inf	Not Available		
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Generic volume	Yes	VOLUME 5.2.3790.0 10/1/2002	Microsoft
volume.inf	Not Available		
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Generic volume	Yes	VOLUME 5.2.3790.0 10/1/2002	Microsoft
volume.inf	Not Available		
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Generic volume	Yes	VOLUME 5.2.3790.0 10/1/2002	Microsoft
volume.inf	Not Available		
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Generic volume	Yes	VOLUME 5.2.3790.0 10/1/2002	Microsoft
volume.inf	Not Available		
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Generic volume	Yes	VOLUME 5.2.3790.0 10/1/2002	Microsoft
volume.inf	Not Available		
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Generic volume	Yes	VOLUME 5.2.3790.0 10/1/2002	Microsoft
volume.inf	Not Available		
STORAGE\VOLUME\I&3735C57B&0&LDM#{5A677FB3-48EF-4A68-9570-C9E5ABE481EA}			
Generic volume	Yes	VOLUME 5.2.3790.0 10/1/2002	Microsoft
volume.inf	Not Available		
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volume.inf	Not Available		
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Generic volume	Yes	VOLUME 5.2.3790.0 10/1/2002	Microsoft
volume.inf	Not Available		
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Generic volume	Yes	VOLUME 5.2.3790.0 10/1/2002	Microsoft
volume.inf	Not Available		
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Generic volume	Yes	VOLUME 5.2.3790.0 10/1/2002	Microsoft
volume.inf	Not Available		
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Generic volume	Yes	VOLUME 5.2.3790.0 10/1/2002	Microsoft
volume.inf	Not Available		
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Generic volume	Yes	VOLUME 5.2.3790.0 10/1/2002	Microsoft
volume.inf	Not Available		
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Generic volume	Yes	VOLUME 5.2.3790.0 10/1/2002	Microsoft
volume.inf	Not Available		
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Generic volume	Yes	VOLUME 5.2.3790.0 10/1/2002	Microsoft
volume.inf	Not Available		
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Generic volume	Yes	VOLUME 5.2.3790.0 10/1/2002	Microsoft
volume.inf	Not Available		
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volume.inf	Not Available		
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Generic volume	Yes	VOLUME 5.2.3790.0 10/1/2002	Microsoft
volume.inf	Not Available		

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Generic volume	Yes	VOLUME 5.2.3790.0 10/1/2002	Microsoft
volume.inf	Not Available		
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Generic volume	Yes	VOLUME 5.2.3790.0 10/1/2002	Microsoft
volume.inf	Not Available		
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Generic volume	Yes	VOLUME 5.2.3790.0 10/1/2002	Microsoft
volume.inf	Not Available		
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Generic volume	Yes	VOLUME 5.2.3790.0 10/1/2002	Microsoft
volume.inf	Not Available		
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Generic volume	Yes	VOLUME 5.2.3790.0 10/1/2002	Microsoft
volume.inf	Not Available		
STORAGE\VOLUME\I&3735C57B&0&LDM#{BB345F1B-EA96-4167-89B2-6887C0B8C215}			
Generic volume	Yes	VOLUME 5.2.3790.0 10/1/2002	Microsoft
volume.inf	Not Available		
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Generic volume	Yes	VOLUME 5.2.3790.0 10/1/2002	Microsoft
volume.inf	Not Available		
STORAGE\VOLUME\I&3735C57B&0&LDM#{9260919D-9248-4232-A968-012BD216922C}			
Generic volume	Yes	VOLUME 5.2.3790.0 10/1/2002	Microsoft
volume.inf	Not Available		
STORAGE\VOLUME\I&3735C57B&0&LDM#{1CE95974-E2ED-4C87-A6DC-CA778E0AC3AE}			
Generic volume	Yes	VOLUME 5.2.3790.0 10/1/2002	Microsoft
volume.inf	Not Available		
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Generic volume	Yes	VOLUME 5.2.3790.0 10/1/2002	Microsoft
volume.inf	Not Available		
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Generic volume	Yes	VOLUME 5.2.3790.0 10/1/2002	Microsoft
volume.inf	Not Available		
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volume.inf	Not Available		
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Generic volume	Yes	VOLUME 5.2.3790.0 10/1/2002	Microsoft
volume.inf	Not Available		
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Generic volume	Yes	VOLUME 5.2.3790.0 10/1/2002	Microsoft
volume.inf	Not Available		
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Generic volume	Yes	VOLUME 5.2.3790.0 10/1/2002	Microsoft
volume.inf	Not Available		
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volume.inf	Not Available		
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volume.inf	Not Available		
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Volume Manager	Yes	SYSTEM 5.2.3790.0 10/1/2002	(Standard system devices)
machine.inf	Not Available	ROOT\FTDISK\0000	
Generic volume	Yes	VOLUME 5.2.3790.0 10/1/2002	Microsoft
volume.inf	Not Available		

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GTH878EE1200

Generic volume Yes VOLUME 5.2.3790.0 10/1/2002 Microsoft
volume.inf Not Available

STORAGE\VOLUME\1&30A96598&0&SIGNATURE9A91A81BOFFSET7E00LE
NGTH8796B9400

AFD Networking Support Environment Not Available LEGACYDRIVER
Not Available Not Available Not Available Not Available
Not Available ROOT\LEGACY_AFD\0000

Beep Not Available LEGACYDRIVER Not Available Not
Available Not Available Not Available Not Available
ROOT\LEGACY_BEEP\0000

CRC Disk Filter Driver Not Available LEGACYDRIVER Not
Available Not Available Not Available Not Available
Available ROOT\LEGACY_CRCDISK\0000

dmboot Not Available LEGACYDRIVER Not Available Not
Available Not Available Not Available Not Available
ROOT\LEGACY_DMBOOT\0000

dmload Not Available LEGACYDRIVER Not Available Not
Available Not Available Not Available Not Available
ROOT\LEGACY_DMLOAD\0000

Fips Not Available LEGACYDRIVER Not Available Not
Available Not Available Not Available Not Available
ROOT\LEGACY_FIPS\0000

Generic Packet Classifier Not Available LEGACYDRIVER Not
Available Not Available Not Available Not Available
Available ROOT\LEGACY_GPC\0000

IPSEC driver Not Available LEGACYDRIVER Not Available
Not Available Not Available Not Available Not Available
ROOT\LEGACY_IPSEC\0000

ksecdd Not Available LEGACYDRIVER Not Available Not
Available Not Available Not Available Not Available
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mmdd Not Available LEGACYDRIVER Not Available Not
Available Not Available Not Available Not Available
ROOT\LEGACY_MNMDD\0000

mountmgr Not Available LEGACYDRIVER Not Available Not
Available Not Available Not Available Not Available
ROOT\LEGACY_MOUNTMGR\0000

NDIS System Driver Not Available LEGACYDRIVER Not Available
Not Available Not Available Not Available Not Available
ROOT\LEGACY_NDIS\0000

Remote Access NDIS TAPI Driver Not Available LEGACYDRIVER
Not Available Not Available Not Available Not Available
Not Available ROOT\LEGACY_NDISTAPI\0000

NDIS Usermode I/O Protocol Not Available LEGACYDRIVER Not
Available Not Available Not Available Not Available
Available ROOT\LEGACY_NDISUIO\0000

NDProxy Not Available LEGACYDRIVER Not Available Not
Available Not Available Not Available Not Available
ROOT\LEGACY_NDPROXY\0000

NetBios over Tcpip Not Available LEGACYDRIVER Not Available
Not Available Not Available Not Available Not Available
ROOT\LEGACY_NETBT\0000

Null Not Available LEGACYDRIVER Not Available Not
Available Not Available Not Available Not Available
ROOT\LEGACY_NULL\0000

Partition Manager Not Available LEGACYDRIVER Not Available
Not Available Not Available Not Available Not Available
ROOT\LEGACY_PARTMGR\0000

Remote Access Auto Connection Driver Not Available LEGACYDRIVER
Not Available Not Available Not Available Not Available
Not Available ROOT\LEGACY_RASACD\0000

RDPDCC Not Available LEGACYDRIVER Not Available Not
Available Not Available Not Available Not Available
ROOT\LEGACY_RDPDCC\0000

RDPWD Not Available LEGACYDRIVER Not Available Not
Available Not Available Not Available Not Available
ROOT\LEGACY_RDPWD\0000

TCP/IP Protocol Driver Not Available LEGACYDRIVER Not
Available Not Available Not Available Not Available
Available ROOT\LEGACY_TCPIP\0000

TDTCP Not Available LEGACYDRIVER Not Available Not
Available Not Available Not Available Not Available
ROOT\LEGACY_TDTCP\0000

VGA Display Controller. Not Available LEGACYDRIVER Not
Available Not Available Not Available Not Available
Available ROOT\LEGACY_VGASAVE\0000

volsnap Not Available LEGACYDRIVER Not Available Not
Available Not Available Not Available Not Available
ROOT\LEGACY_VOLSnap\0000

Remote Access IP ARP Driver Not Available LEGACYDRIVER Not
Available Not Available Not Available Not Available
Available ROOT\LEGACY_WANARP\0000

Audio Codecs Yes MEDIA 5.2.3790.0 10/1/2002 (Standard system
devices) wave.inf Not Available ROOT\MEDIA\MS_MMCM

Legacy Audio Drivers Yes MEDIA 5.2.3790.0 10/1/2002 (Standard system
devices) wave.inf Not Available ROOT\MEDIA\MS_MMDRV

Media Control Devices Yes MEDIA 5.2.3790.0 10/1/2002
(Standard system devices) wave.inf Not Available
ROOT\MEDIA\MS_MMMCI

Legacy Video Capture Devices Yes MEDIA 5.2.3790.0 10/1/2002
(Standard system devices) wave.inf Not Available
ROOT\MEDIA\MS_MMVCD

Video Codecs Yes MEDIA 5.2.3790.0 10/1/2002 (Standard system
devices) wave.inf Not Available ROOT\MEDIA\MS_MMVID

WAN Miniport (L2TP) Yes NET 5.2.3790.0 10/1/2002
Microsoft netrasa.inf Not Available ROOT\MS_L2TPMINIPORT\0000

WAN Miniport (IP) Yes NET 5.2.3790.0 10/1/2002 Microsoft
netrasa.inf Not Available ROOT\MS_NDISWANIP\0000

WAN Miniport (PPPOE) Yes NET 5.2.3790.0 10/1/2002
Microsoft netrasa.inf Not Available ROOT\MS_PPPOEMINIPORT\0000

WAN Miniport (PTP) Yes NET 5.2.3790.0 10/1/2002
Microsoft netrasa.inf Not Available ROOT\MS_PPTPMINIPORT\0000

Direct Parallel Yes NET 5.2.3790.0 10/1/2002 Microsoft
netrasa.inf Not Available ROOT\MS_PTMINIPORT\0000

Terminal Server Device Redirector Yes SYSTEM 5.2.3790.0
10/1/2002 (Standard system devices) machine.inf Not Available
ROOT\RDPDR\0000

Terminal Server Keyboard Driver Yes SYSTEM 5.2.3790.0
10/1/2002 (Standard system devices) machine.inf Not Available
ROOT\RDP_KBD\0000

Terminal Server Mouse Driver Yes SYSTEM 5.2.3790.0 10/1/2002
(Standard system devices) machine.inf Not Available
ROOT\RDP_MOUSE\0000

Plug and Play Software Device Enumerator Yes SYSTEM 5.2.3790.0
10/1/2002 (Standard system devices) machine.inf Not Available
ROOT\SYSTEM\0000

Microcode Update Device Yes SYSTEM 5.2.3790.0 10/1/2002
(Standard system devices) machine.inf Not Available
ROOT\SYSTEM\0001

[Environment Variables]
Variable Value User Name
CLASSPATH
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QLLIB\bin;D:\SQLLIB\java\common.jar <SYSTEM>
ClusterLog C:\WINDOWS\Cluster\cluster.log <SYSTEM>
ComSpec %SystemRoot%\system32\cmd.exe <SYSTEM>
DB2INSTANCE tpch <SYSTEM>
DB2TEMPDIR D:\SQLLIB\ <SYSTEM>
INCLUDE D:\SQLLIB\INCLUDE;D:\SQLLIB\LIB;C:\Program Files\Microsoft
Visual Studio .NET 2003\Vc7\include;C:\Program Files\Microsoft Visual Studio
.NET 2003\Vc7\PlatformSDK\include <SYSTEM>
LIB D:\SQLLIB\LIB;C:\Program Files\Microsoft Visual Studio .NET
2003\Vc7\lib;C:\Program Files\Microsoft Visual Studio .NET
2003\Vc7\PlatformSDK\Lib <SYSTEM>
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OS Windows_NT <SYSTEM>
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LIB\BIN;D:\SQLLIB\FUNCTION;D:\SQLLIB\SAMPLES\REPL;C:\Program
Files\Microsoft Visual Studio .NET 2003\Vc7\bin;C:\Program Files\Microsoft Visual
Studio .NET 2003\Common7\IDE;d:\tools;d:\nttools; <SYSTEM>
PATHEXT .COM;.EXE;.BAT;.CMD;.VBS;.VBE;.JS;.JSE;.WSF;.WSH
<SYSTEM>

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PROCESSOR_ARCHITECTURE      x86      <SYSTEM>
PROCESSOR_IDENTIFIER        x86 Family 15 Model 2 Stepping 6, GenuineIntel
<SYSTEM>
PROCESSOR_LEVEL             15      <SYSTEM>
PROCESSOR_REVISION          0206    <SYSTEM>
TEMP      %SystemRoot%\TEMP  <SYSTEM>
TMP       %SystemRoot%\TEMP  <SYSTEM>
VS71COMNTOOLS C:\Program Files\Microsoft Visual Studio .NET
2003\Common7\Tools\        <SYSTEM>
windir     %SystemRoot%      <SYSTEM>
TEMP      %USERPROFILE%\Local Settings\Temp NT AUTHORITY\SYSTEM
TMP       %USERPROFILE%\Local Settings\Temp NT AUTHORITY\SYSTEM
TEMP      %USERPROFILE%\Local Settings\Temp NT AUTHORITY\LOCAL
SERVICE
TMP       %USERPROFILE%\Local Settings\Temp NT AUTHORITY\LOCAL
SERVICE
TEMP      %USERPROFILE%\Local Settings\Temp NT
AUTHORITY\NETWORK SERVICE
TMP       %USERPROFILE%\Local Settings\Temp NT
AUTHORITY\NETWORK SERVICE
TEMP      %USERPROFILE%\Local Settings\Temp RUTHLESS1\tpch
TMP       %USERPROFILE%\Local Settings\Temp RUTHLESS1\tpch
[Print Jobs]
Document Size  Owner  Notify  Status  Time Submitted  Start
Time  Until Time Elapsed Time  Pages Printed  Job ID  Priority
Parameters Driver  Print Processor  Host Print Queue  Data Type Name
[Network Connections]
Local Name  Remote Name  Type  Status  User Name
V:          \\fsserv.raleigh.ibm.com\drive  Disk  Persistent Connection
FSSERV\triciat
X:          \\fsserv.raleigh.ibm.com\drive  Disk  Persistent Connection
FSSERV\triciat
Y:          \\fsserv.raleigh.ibm.com\drive  Disk  Persistent Connection
FSSERV\triciat
z:          \\9.26.14.159\db2nt  Disk  Persistent Connection
[Running Tasks]
Name  Path  Process ID Priority  Min Working Set  Max Working Set
Start Time Version  Size  File Date
system idle process  Not Available  0  0  Not Available
Not Available  Not Available  Not Available  Not Available
Not Available
system  Not Available  4  8  0  1413120  Not
Available  Not Available  Not Available  Not Available
smss.exe  Not Available  380  11  204800  1413120
2/24/2004 12:38 PM  Not Available  Not Available  Not Available
csrss.exe  Not Available  564  13  Not Available  Not
Available  2/24/2004 12:38 PM  Not Available  Not Available  Not
Available
winlogon.exe  c:\windows\system32\winlogon.exe  588  13
204800  1413120  2/24/2004 12:38 PM  5.2.3790.0 (srv03_rtm.030324-2048)
536.50 KB (549,376 bytes)  3/25/2003 7:00 AM
services.exe  c:\windows\system32\services.exe  632  9
204800  1413120  2/24/2004 12:38 PM  5.2.3790.0 (srv03_rtm.030324-2048)
102.00 KB (104,448 bytes)  3/25/2003 7:00 AM
lsass.exe  c:\windows\system32\lsass.exe  644  9  204800
1413120  2/24/2004 12:38 PM  5.2.3790.0 (srv03_rtm.030324-2048)  13.00
KB (13,312 bytes)  3/25/2003 7:00 AM
svchost.exe  c:\windows\system32\svchost.exe  812  8
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Not Available
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msdtc.exe  Not Available  1116  8  Not Available  Not
Available  2/24/2004 12:38 PM  Not Available  Not Available  Not
Available
mdm.exe  c:\program files\common files\microsoft shared\vs7debug\mdm.exe
1512  8  204800  1413120  2/24/2004 12:38 PM  7.10.3077 328.00
KB (335,872 bytes)  3/19/2003 4:55 AM
ntfrs.exe  c:\windows\system32\ntfrs.exe  1532  8  204800
1413120  2/24/2004 12:38 PM  5.2.3790.0 (srv03_rtm.030324-2048)  748.50
KB (766,464 bytes)  3/25/2003 7:00 AM
dfssvc.exe  c:\windows\system32\dfssvc.exe  1860  8  204800
1413120  2/24/2004 12:38 PM  5.2.3790.0 (srv03_rtm.030324-2048)  130.50
KB (133,632 bytes)  3/25/2003 7:00 AM
wmiprvse.exe  Not Available  2004  8  Not Available
Not Available  2/24/2004 12:39 PM  Not Available  Not Available
Not Available
explorer.exe  c:\windows\explorer.exe  496  8  204800
1413120  2/24/2004 12:47 PM  6.00.3790.0 (srv03_rtm.030324-2048)
1,008.50 KB (1,032,704 bytes)  3/25/2003 7:00 AM
wordpad.exe  c:\program files\windows nt\accessories\wordpad.exe  3716
8  204800  1413120  2/25/2004 10:27 AM  5.2.3790.0
(srv03_rtm.030324-2048)  197.00 KB (201,728 bytes)  2/16/2004 11:32
AM
rundll32.exe  c:\windows\system32\rundll32.exe  2184  8
204800  1413120  2/25/2004 11:32 AM  5.2.3790.0 (srv03_rtm.030324-2048)
32.00 KB (32,768 bytes)  3/25/2003 7:00 AM
rundll32.exe  c:\windows\system32\rundll32.exe  3172  8
204800  1413120  2/25/2004 11:32 AM  5.2.3790.0 (srv03_rtm.030324-2048)
32.00 KB (32,768 bytes)  3/25/2003 7:00 AM
rundll32.exe  c:\windows\system32\rundll32.exe  2472  8
204800  1413120  2/25/2004 11:32 AM  5.2.3790.0 (srv03_rtm.030324-2048)
32.00 KB (32,768 bytes)  3/25/2003 7:00 AM
rundll32.exe  c:\windows\system32\rundll32.exe  848  8
204800  1413120  2/25/2004 11:32 AM  5.2.3790.0 (srv03_rtm.030324-2048)
32.00 KB (32,768 bytes)  3/25/2003 7:00 AM
rundll32.exe  c:\windows\system32\rundll32.exe  2788  8
204800  1413120  2/25/2004 11:32 AM  5.2.3790.0 (srv03_rtm.030324-2048)
32.00 KB (32,768 bytes)  3/25/2003 7:00 AM
rundll32.exe  c:\windows\system32\rundll32.exe  2608  8
204800  1413120  2/25/2004 11:32 AM  5.2.3790.0 (srv03_rtm.030324-2048)
32.00 KB (32,768 bytes)  3/25/2003 7:00 AM
rundll32.exe  c:\windows\system32\rundll32.exe  3112  8
204800  1413120  2/25/2004 11:32 AM  5.2.3790.0 (srv03_rtm.030324-2048)
32.00 KB (32,768 bytes)  3/25/2003 7:00 AM
rundll32.exe  c:\windows\system32\rundll32.exe  3092  8
204800  1413120  2/25/2004 11:37 AM  5.2.3790.0 (srv03_rtm.030324-2048)
32.00 KB (32,768 bytes)  3/25/2003 7:00 AM
rundll32.exe  c:\windows\system32\rundll32.exe  2716  8
204800  1413120  2/25/2004 11:37 AM  5.2.3790.0 (srv03_rtm.030324-2048)
32.00 KB (32,768 bytes)  3/25/2003 7:00 AM
rundll32.exe  c:\windows\system32\rundll32.exe  3048  8
204800  1413120  2/25/2004 11:39 AM  5.2.3790.0 (srv03_rtm.030324-2048)
32.00 KB (32,768 bytes)  3/25/2003 7:00 AM
rundll32.exe  c:\windows\system32\rundll32.exe  2812  8
204800  1413120  2/25/2004 11:39 AM  5.2.3790.0 (srv03_rtm.030324-2048)
32.00 KB (32,768 bytes)  3/25/2003 7:00 AM
rundll32.exe  c:\windows\system32\rundll32.exe  3008  8
204800  1413120  2/25/2004 11:40 AM  5.2.3790.0 (srv03_rtm.030324-2048)
32.00 KB (32,768 bytes)  3/25/2003 7:00 AM
rundll32.exe  c:\windows\system32\rundll32.exe  2476  8
204800  1413120  2/25/2004 11:42 AM  5.2.3790.0 (srv03_rtm.030324-2048)
32.00 KB (32,768 bytes)  3/25/2003 7:00 AM
rundll32.exe  c:\windows\system32\rundll32.exe  2728  8
204800  1413120  2/25/2004 11:42 AM  5.2.3790.0 (srv03_rtm.030324-2048)
32.00 KB (32,768 bytes)  3/25/2003 7:00 AM
rundll32.exe  c:\windows\system32\rundll32.exe  1160  8
204800  1413120  2/25/2004 11:44 AM  5.2.3790.0 (srv03_rtm.030324-2048)
32.00 KB (32,768 bytes)  3/25/2003 7:00 AM
undll32.exe  c:\windows\system32\rundll32.exe  2268  8
204800  1413120  2/25/2004 11:46 AM  5.2.3790.0 (srv03_rtm.030324-2048)
32.00 KB (32,768 bytes)  3/25/2003 7:00 AM
svchost.exe  c:\windows\system32\svchost.exe  3968  8
204800  1413120  2/25/2004 1:47 PM  5.2.3790.0 (srv03_rtm.030324-2048)
13.00 KB (13,312 bytes)  3/25/2003 7:00 AM

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cmd.exe c:\windows\system32\cmd.exe 2920 8 204800
1413120 2/25/2004 3:58 PM 5.2.3790.0 (srv03_rtm.030324-2048) 374.00
KB (382,976 bytes) 3/25/2003 7:00 AM
db2rcmd.exe Not Available 2636 8 Not Available
Not Available 2/25/2004 4:00 PM Not Available Not Available
Not Available
db2bp.exe d:\sql\lib\bin\db2bp.exe 2736 8 204800
1413120 2/25/2004 4:01 PM 8.1.4.341 817.20 KB (836,816 bytes)
11/1/2003 2:00 AM
db2syscs.exe Not Available 2560 8 Not Available
Not Available 2/25/2004 4:30 PM Not Available Not Available
Not Available
db2syscs.exe Not Available 2180 8 Not Available
Not Available 2/25/2004 4:30 PM Not Available Not Available
Not Available
cmd.exe c:\windows\system32\cmd.exe 2704 8 204800
1413120 2/25/2004 4:40 PM 5.2.3790.0 (srv03_rtm.030324-2048) 374.00
KB (382,976 bytes) 3/25/2003 7:00 AM
db2bp.exe d:\sql\lib\bin\db2bp.exe 1784 8 204800
1413120 2/25/2004 4:48 PM 8.1.4.341 817.20 KB (836,816 bytes)
11/1/2003 2:00 AM
helpctr.exe c:\windows\pchealth\helpctr\binaries\helpctr.exe 156 8
204800 1413120 2/25/2004 5:05 PM 5.2.3790.0 (srv03_rtm.030324-2048)
764.00 KB (782,336 bytes) 2/16/2004 11:35 AM
wmiprvse.exe Not Available 3620 8 Not Available
Not Available 2/25/2004 5:05 PM Not Available Not Available
Not Available
helpsvc.exe c:\windows\pchealth\helpctr\binaries\helpsvc.exe 3428
8 204800 1413120 2/25/2004 5:05 PM 5.2.3790.0
(srv03_rtm.030324-2048) 720.00 KB (737,280 bytes) 2/16/2004 11:35
AM
[Loaded Modules]
Name Version Size File Date Manufacturer Path
winlogon 5.2.3790.0 (srv03_rtm.030324-2048) 536.50 KB (549,376 bytes)
3/25/2003 7:00 AM Microsoft Corporation
c:\windows\system32\winlogon.exe
ntdll 5.2.3790.0 (srv03_rtm.030324-2048) 722.50 KB (739,840 bytes)
3/25/2003 7:00 AM Microsoft Corporation
c:\windows\system32\ntdll.dll
kernel32 5.2.3790.0 (srv03_rtm.030324-2048) 965.00 KB (988,160 bytes)
3/25/2003 7:00 AM Microsoft Corporation
c:\windows\system32\kernel32.dll
msvcrt 7.0.3790.0 (srv03_rtm.030324-2048) 319.50 KB (327,168 bytes)
3/25/2003 7:00 AM Microsoft Corporation
c:\windows\system32\msvcrt.dll
advapi32 5.2.3790.0 (srv03_rtm.030324-2048) 559.50 KB (572,928 bytes)
3/25/2003 7:00 AM Microsoft Corporation
c:\windows\system32\advapi32.dll
rpcrt4 5.2.3790.0 (srv03_rtm.030324-2048) 643.50 KB (658,944 bytes)
3/25/2003 7:00 AM Microsoft Corporation
c:\windows\system32\rpcrt4.dll
user32 5.2.3790.0 (srv03_rtm.030324-2048) 562.00 KB (575,488 bytes)
3/25/2003 7:00 AM Microsoft Corporation
c:\windows\system32\user32.dll
gdi32 5.2.3790.0 (srv03_rtm.030324-2048) 263.00 KB (269,312 bytes)
3/25/2003 7:00 AM Microsoft Corporation
c:\windows\system32\gdi32.dll
userenv 5.2.3790.0 (srv03_rtm.030324-2048) 732.50 KB (750,080 bytes)
3/25/2003 7:00 AM Microsoft Corporation
c:\windows\system32\userenv.dll
nddeapi 5.2.3790.0 (srv03_rtm.030324-2048) 16.00 KB (16,384 bytes)
3/25/2003 7:00 AM Microsoft Corporation
c:\windows\system32\nddeapi.dll
crypt32 5.131.3790.0 (srv03_rtm.030324-2048) 598.00 KB (612,352 bytes)
3/25/2003 7:00 AM Microsoft Corporation
c:\windows\system32\crypt32.dll
msasn1 5.2.3790.0 (srv03_rtm.030324-2048) 58.00 KB (59,392 bytes)
3/25/2003 7:00 AM Microsoft Corporation
c:\windows\system32\msasn1.dll
secur32 5.2.3790.0 (srv03_rtm.030324-2048) 63.00 KB (64,512 bytes)
3/25/2003 7:00 AM Microsoft Corporation
c:\windows\system32\secur32.dll
winsta 5.2.3790.0 (srv03_rtm.030324-2048) 51.00 KB (52,224 bytes)
3/25/2003 7:00 AM Microsoft Corporation
c:\windows\system32\winsta.dll

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netapi32 5.2.3790.0 (srv03_rtm.030324-2048) 317.00 KB (324,608 bytes)
3/25/2003 7:00 AM Microsoft Corporation
c:\windows\system32\netapi32.dll
profmap 5.2.3790.0 (srv03_rtm.030324-2048) 22.00 KB (22,528 bytes)
3/25/2003 7:00 AM Microsoft Corporation
c:\windows\system32\profmap.dll
regapi 5.2.3790.0 (srv03_rtm.030324-2048) 48.50 KB (49,664 bytes)
3/25/2003 7:00 AM Microsoft Corporation
c:\windows\system32\regapi.dll
ws2_32 5.2.3790.0 (srv03_rtm.030324-2048) 87.50 KB (89,600 bytes)
3/25/2003 7:00 AM Microsoft Corporation
c:\windows\system32\ws2_32.dll
ws2help 5.2.3790.0 (srv03_rtm.030324-2048) 19.50 KB (19,968 bytes)
3/25/2003 7:00 AM Microsoft Corporation
c:\windows\system32\ws2help.dll
psapi 5.2.3790.0 (srv03_rtm.030324-2048) 21.50 KB (22,016 bytes)
3/25/2003 7:00 AM Microsoft Corporation
c:\windows\system32\psapi.dll
version 5.2.3790.0 (srv03_rtm.030324-2048) 17.00 KB (17,408 bytes)
3/25/2003 7:00 AM Microsoft Corporation
c:\windows\system32\version.dll
setupapi 5.2.3790.0 (srv03_rtm.030324-2048) 1,014.50 KB (1,038,848
bytes) 3/25/2003 7:00 AM Microsoft Corporation
c:\windows\system32\setupapi.dll
msgina 5.2.3790.0 (srv03_rtm.030324-2048) 1.14 MB (1,191,936 bytes)
3/25/2003 7:00 AM Microsoft Corporation
c:\windows\system32\msgina.dll
shsvcs 6.00.3790.0 (srv03_rtm.030324-2048) 121.50 KB (124,416 bytes)
3/25/2003 7:00 AM Microsoft Corporation
c:\windows\system32\shsvcs.dll
shlwapi 6.00.3790.0 (srv03_rtm.030324-2048) 281.00 KB (287,744 bytes)
3/25/2003 7:00 AM Microsoft Corporation
c:\windows\system32\shlwapi.dll
sfc 5.2.3790.0 (srv03_rtm.030324-2048) 4.50 KB (4,608 bytes)
3/25/2003 7:00 AM Microsoft Corporation
c:\windows\system32\sfc.dll
sfc_os 5.2.3790.0 (srv03_rtm.030324-2048) 133.00 KB (136,192 bytes)
3/25/2003 7:00 AM Microsoft Corporation
c:\windows\system32\sfc_os.dll
wintrust 5.131.3790.0 (srv03_rtm.030324-2048) 161.50 KB (165,376 bytes)
3/25/2003 7:00 AM Microsoft Corporation
c:\windows\system32\wintrust.dll
ole32 5.2.3790.0 (srv03_rtm.030324-2048) 1.13 MB (1,187,328 bytes)
3/25/2003 7:00 AM Microsoft Corporation
c:\windows\system32\ole32.dll
imagehlp 5.2.3790.0 (srv03_rtm.030324-2048) 142.50 KB (145,920 bytes)
3/25/2003 7:00 AM Microsoft Corporation
c:\windows\system32\imagehlp.dll
comctl32 6.0 (srv03_rtm.030324-2048) 907.00 KB (928,768 bytes)
2/16/2004 6:17 AM Microsoft Corporation
c:\windows\winsxs\x86_microsoft.windows.common-controls_6595b64144ccf1df_6.0
.100.0_x-ww_8417450b\comctl32.dll
winscard 5.2.3790.0 (srv03_rtm.030324-2048) 98.50 KB (100,864 bytes)
3/25/2003 7:00 AM Microsoft Corporation
c:\windows\system32\winscard.dll
wtsapi32 5.2.3790.0 (srv03_rtm.030324-2048) 17.50 KB (17,920 bytes)
3/25/2003 7:00 AM Microsoft Corporation
c:\windows\system32\wtsapi32.dll
sxs 5.2.3790.0 (srv03_rtm.030324-2048) 733.00 KB (750,592 bytes)
3/25/2003 7:00 AM Microsoft Corporation
c:\windows\system32\sxs.dll
winmm 5.2.3790.0 (srv03_rtm.030324-2048) 166.00 KB (169,984 bytes)
3/25/2003 7:00 AM Microsoft Corporation
c:\windows\system32\winmm.dll
shell32 6.00.3790.0 (srv03_rtm.030324-2048) 7.79 MB (8,166,400 bytes)
3/25/2003 7:00 AM Microsoft Corporation
c:\windows\system32\shell32.dll
wldap32 5.2.3790.0 (srv03_rtm.030324-2048) 158.00 KB (161,792 bytes)
3/25/2003 7:00 AM Microsoft Corporation
c:\windows\system32\wldap32.dll
rsaenh 5.2.3790.0 (srv03_rtm.030324-2048) 176.83 KB (181,072 bytes)
3/25/2003 7:00 AM Microsoft Corporation
c:\windows\system32\rsaenh.dll
csdcll 5.2.3790.0 (srv03_rtm.030324-2048) 99.00 KB (101,376 bytes)
3/25/2003 7:00 AM Microsoft Corporation
c:\windows\system32\csdcll.dll

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wlnotify 5.2.3790.0 (srv03_rtm.030324-2048)	87.50 KB (89,600 bytes)	ntdsapi 5.2.3790.0 (srv03_rtm.030324-2048)	76.00 KB (77,824 bytes)
3/25/2003 7:00 AM Microsoft Corporation		3/25/2003 7:00 AM Microsoft Corporation	
c:\windows\system32\wlnotify.dll		c:\windows\system32\ntdsapi.dll	
winspool 5.2.3790.0 (srv03_rtm.030324-2048)	140.00 KB (143,360 bytes)	dnsapi 5.2.3790.0 (srv03_rtm.030324-2048)	147.50 KB (151,040 bytes)
3/25/2003 7:00 AM Microsoft Corporation		3/25/2003 7:00 AM Microsoft Corporation	
c:\windows\system32\winspool.drv		c:\windows\system32\dnsapi.dll	
mpr 5.2.3790.0 (srv03_rtm.030324-2048)	56.00 KB (57,344 bytes)	services 5.2.3790.0 (srv03_rtm.030324-2048)	102.00 KB (104,448 bytes)
3/25/2003 7:00 AM Microsoft Corporation		3/25/2003 7:00 AM Microsoft Corporation	
c:\windows\system32\mpr.dll		c:\windows\system32\services.exe	
comctl32 5.82 (srv03_rtm.030324-2048)	561.00 KB (574,464 bytes)	scserv 5.2.3790.0 (srv03_rtm.030324-2048)	316.50 KB (324,096 bytes)
2/16/2004 6:17 AM Microsoft Corporation		3/25/2003 7:00 AM Microsoft Corporation	
c:\windows\winsxs\x86_microsoft.windows.common-controls_6595b64144ccf1df_5.8		c:\windows\system32\scserv.dll	
2.0.0_x-ww_8a69ba05\comctl32.dll		authz 5.2.3790.0 (srv03_rtm.030324-2048)	67.00 KB (68,608 bytes)
uxtheme 6.00.3790.0 (srv03_rtm.030324-2048)	196.00 KB (200,704 bytes)	3/25/2003 7:00 AM Microsoft Corporation	
3/25/2003 7:00 AM Microsoft Corporation		c:\windows\system32\authz.dll	
c:\windows\system32\uxtheme.dll		umpnprmgr 5.2.3790.0 (srv03_rtm.030324-2048)	121.50 KB (124,416 bytes)
samlib 5.2.3790.0 (srv03_rtm.030324-2048)	49.00 KB (50,176 bytes)	3/25/2003 7:00 AM Microsoft Corporation	
3/25/2003 7:00 AM Microsoft Corporation		c:\windows\system32\umpnprmgr.dll	
c:\windows\system32\samlib.dll		ncobjapi 5.2.3790.0 (srv03_rtm.030324-2048)	34.50 KB (35,328 bytes)
clbcatq 2001.12.4720.0 (srv03_rtm.030324-2048)	481.00 KB (492,544 bytes)	3/25/2003 7:00 AM Microsoft Corporation	
2/16/2004 11:32 AM Microsoft Corporation		c:\windows\system32\ncobjapi.dll	
c:\windows\system32\clbcatq.dll		eventlog 5.2.3790.0 (srv03_rtm.030324-2048)	60.50 KB (61,952 bytes)
oleaut32 5.2.3790.0 486.00 KB (497,664 bytes)	3/25/2003 7:00 AM	3/25/2003 7:00 AM Microsoft Corporation	
Microsoft Corporation		c:\windows\system32\eventlog.dll	
c:\windows\system32\oleaut32.dll		cryptnet 5.131.3790.0 (srv03_rtm.030324-2048)	59.50 KB (60,928 bytes)
comres 2001.12.4720.0 (srv03_rtm.030324-2048)	778.00 KB (796,672 bytes)	3/25/2003 7:00 AM Microsoft Corporation	
3/25/2003 7:00 AM Microsoft Corporation		c:\windows\system32\cryptnet.dll	
c:\windows\system32\comres.dll		sensapi 5.2.3790.0 (srv03_rtm.030324-2048)	6.00 KB (6,144 bytes)
cscui 5.2.3790.0 (srv03_rtm.030324-2048)	305.00 KB (312,320 bytes)	3/25/2003 7:00 AM Microsoft Corporation	
3/25/2003 7:00 AM Microsoft Corporation		c:\windows\system32\sensapi.dll	
c:\windows\system32\cscui.dll		cabinet 5.2.3790.0 (srv03_rtm.030324-2048)	61.00 KB (62,464 bytes)
drprov 5.2.3790.0 (srv03_rtm.030324-2048)	12.50 KB (12,800 bytes)	3/25/2003 7:00 AM Microsoft Corporation	
3/25/2003 7:00 AM Microsoft Corporation		c:\windows\system32\cabinet.dll	
c:\windows\system32\drprov.dll		imm32 5.2.3790.0 (srv03_rtm.030324-2048)	105.50 KB (108,032 bytes)
ntlanman 5.2.3790.0 (srv03_rtm.030324-2048)	41.00 KB (41,984 bytes)	3/25/2003 7:00 AM Microsoft Corporation	
3/25/2003 7:00 AM Microsoft Corporation		c:\windows\system32\imm32.dll	
c:\windows\system32\ntlanman.dll		apphelp 5.2.3790.0 (srv03_rtm.030324-2048)	122.00 KB (124,928 bytes)
netui0 5.2.3790.0 (srv03_rtm.030324-2048)	75.50 KB (77,312 bytes)	3/25/2003 7:00 AM Microsoft Corporation	
3/25/2003 7:00 AM Microsoft Corporation		c:\windows\system32\apphelp.dll	
c:\windows\system32\netui0.dll		lsass 5.2.3790.0 (srv03_rtm.030324-2048)	13.00 KB (13,312 bytes)
netui1 5.2.3790.0 (srv03_rtm.030324-2048)	184.00 KB (188,416 bytes)	3/25/2003 7:00 AM Microsoft Corporation	
3/25/2003 7:00 AM Microsoft Corporation		c:\windows\system32\lsass.exe	
c:\windows\system32\netui1.dll		lsasrv 5.2.3790.0 (srv03_rtm.030324-2048)	780.50 KB (799,232 bytes)
davclnt 5.2.3790.0 (srv03_rtm.030324-2048)	23.50 KB (24,064 bytes)	3/25/2003 7:00 AM Microsoft Corporation	
3/25/2003 7:00 AM Microsoft Corporation		c:\windows\system32\lsasrv.dll	
c:\windows\system32\davclnt.dll		samsrv 5.2.3790.0 (srv03_rtm.030324-2048)	452.00 KB (462,848 bytes)
mprui 5.2.3790.0 (srv03_rtm.030324-2048)	49.00 KB (50,176 bytes)	3/25/2003 7:00 AM Microsoft Corporation	
3/25/2003 7:00 AM Microsoft Corporation		c:\windows\system32\samsrv.dll	
c:\windows\system32\mprui.dll		cryptdll 5.2.3790.0 (srv03_rtm.030324-2048)	34.00 KB (34,816 bytes)
netui2 5.2.3790.0 (srv03_rtm.030324-2048)	309.50 KB (316,928 bytes)	3/25/2003 7:00 AM Microsoft Corporation	
3/25/2003 7:00 AM Microsoft Corporation		c:\windows\system32\cryptdll.dll	
c:\windows\system32\netui2.dll		msprivs 5.2.3790.0 (srv03_rtm.030324-2048)	46.50 KB (47,616 bytes)
comdlg32 6.00.3790.0 (srv03_rtm.030324-2048)	261.00 KB (267,264 bytes)	3/25/2003 7:00 AM Microsoft Corporation	
3/25/2003 7:00 AM Microsoft Corporation		c:\windows\system32\msprivs.dll	
c:\windows\system32\comdlg32.dll		kerberos 5.2.3790.0 (srv03_rtm.030324-2048)	332.50 KB (340,480 bytes)
netmsg 5.2.3790.0 (srv03_rtm.030324-2048)	178.00 KB (182,272 bytes)	3/25/2003 7:00 AM Microsoft Corporation	
3/25/2003 7:00 AM Microsoft Corporation		c:\windows\system32\kerberos.dll	
c:\windows\system32\netmsg.dll		msv1_0 5.2.3790.0 (srv03_rtm.030324-2048)	127.00 KB (130,048 bytes)
ntmarta 5.2.3790.0 (srv03_rtm.030324-2048)	114.00 KB (116,736 bytes)	3/25/2003 7:00 AM Microsoft Corporation	
3/25/2003 7:00 AM Microsoft Corporation		c:\windows\system32\msv1_0.dll	
c:\windows\system32\ntmarta.dll		netlogon 5.2.3790.0 (srv03_rtm.030324-2048)	409.00 KB (418,816 bytes)
wbemprox 5.2.3790.0 (srv03_rtm.030324-2048)	17.50 KB (17,920 bytes)	3/25/2003 7:00 AM Microsoft Corporation	
2/16/2004 11:32 AM Microsoft Corporation		c:\windows\system32\netlogon.dll	
c:\windows\system32\wbem\wbemprox.dll		w32time 5.2.3790.0 (srv03_rtm.030324-2048)	216.00 KB (221,184 bytes)
wbemcomn 5.2.3790.0 (srv03_rtm.030324-2048)	211.50 KB (216,576 bytes)	3/25/2003 7:00 AM Microsoft Corporation	
3/25/2003 7:00 AM Microsoft Corporation		c:\windows\system32\w32time.dll	
c:\windows\system32\wbem\wbemcomn.dll		iphlpapi 5.2.3790.0 (srv03_rtm.030324-2048)	82.50 KB (84,480 bytes)
wbemsvc 5.2.3790.0 (srv03_rtm.030324-2048)	42.50 KB (43,520 bytes)	3/25/2003 7:00 AM Microsoft Corporation	
2/16/2004 11:32 AM Microsoft Corporation		c:\windows\system32\iphlpapi.dll	
c:\windows\system32\wbem\wbemsvc.dll		schannel 5.2.3790.0 (srv03_rtm.030324-2048)	149.50 KB (153,088 bytes)
fastprox 5.2.3790.0 (srv03_rtm.030324-2048)	443.00 KB (453,632 bytes)	3/25/2003 7:00 AM Microsoft Corporation	
2/16/2004 11:32 AM Microsoft Corporation		c:\windows\system32\schannel.dll	
c:\windows\system32\wbem\fastprox.dll			
msvcpe60 6.05.2144.0 388.00 KB (397,312 bytes)	3/25/2003 7:00		
AM Microsoft Corporation			
c:\windows\system32\msvcpe60.dll			

wdigest 5.2.3790.0 (srv03_rtm.030324-2048) 3/25/2003 7:00 AM Microsoft Corporation c:\windows\system32\wdigest.dll	61.00 KB (62,464 bytes)	rdpwsx 5.2.3790.0 (srv03_rtm.030324-2048) 2/16/2004 11:32 AM Microsoft Corporation c:\windows\system32\rdpwsx.dll	80.13 KB (82,056 bytes)
rassfm 5.2.3790.0 (srv03_rtm.030324-2048) 3/25/2003 7:00 AM Microsoft Corporation c:\windows\system32\rassfm.dll	20.50 KB (20,992 bytes)	wkssvc 5.2.3790.0 (srv03_rtm.030324-2048) 3/25/2003 7:00 AM Microsoft Corporation c:\windows\system32\wkssvc.dll	125.00 KB (128,000 bytes)
kdcsvc 5.2.3790.0 (srv03_rtm.030324-2048) 3/25/2003 7:00 AM Microsoft Corporation c:\windows\system32\kdcsvc.dll	221.00 KB (226,304 bytes)	wiarpc 5.2.3790.0 (srv03_rtm.030324-2048) 3/25/2003 7:00 AM Microsoft Corporation c:\windows\system32\wiarpc.dll	30.00 KB (30,720 bytes)
ntdsa 5.2.3790.0 (srv03_rtm.030324-2048) 3/25/2003 7:00 AM Microsoft Corporation c:\windows\system32\ntdsa.dll	1.45 MB (1,520,640 bytes)	dmserver 5.2.3790.0 (srv03_rtm.030324-2048) 3/25/2003 7:00 AM Microsoft Corporation c:\windows\system32\dmserver.dll	24.00 KB (24,576 bytes)
ntdsatq 5.2.3790.0 (srv03_rtm.030324-2048) 3/25/2003 7:00 AM Microsoft Corporation c:\windows\system32\ntdsatq.dll	32.00 KB (32,768 bytes)	es 2001.12.4720.0 (srv03_rtm.030324-2048) 3/25/2003 7:00 AM Microsoft Corporation c:\windows\system32\es.dll	221.50 KB (226,816 bytes)
msswsock 5.2.3790.0 (srv03_rtm.030324-2048) 3/25/2003 7:00 AM Microsoft Corporation c:\windows\system32\msswsock.dll	254.00 KB (260,096 bytes)	srsvcs 5.2.3790.0 (srv03_rtm.030324-2048) 3/25/2003 7:00 AM Microsoft Corporation c:\windows\system32\srsvcs.dll	89.00 KB (91,136 bytes)
esent 5.2.3790.0 (srv03_rtm.030324-2048) 3/25/2003 7:00 AM Microsoft Corporation c:\windows\system32\esent.dll	1.01 MB (1,056,256 bytes)	seclogon 5.2.3790.0 (srv03_rtm.030324-2048) 3/25/2003 7:00 AM Microsoft Corporation c:\windows\system32\seclogon.dll	16.50 KB (16,896 bytes)
scecli 5.2.3790.0 (srv03_rtm.030324-2048) 3/25/2003 7:00 AM Microsoft Corporation c:\windows\system32\scecli.dll	179.50 KB (183,808 bytes)	sens 5.2.3790.0 (srv03_rtm.030324-2048) 3/25/2003 7:00 AM Microsoft Corporation c:\windows\system32\sens.dll	35.50 KB (36,352 bytes)
wshtcpip 5.2.3790.0 (srv03_rtm.030324-2048) 3/25/2003 7:00 AM Microsoft Corporation c:\windows\system32\wshtcpip.dll	18.00 KB (18,432 bytes)	wmisvc 5.2.3790.0 (srv03_rtm.030324-2048) 2/16/2004 11:32 AM Microsoft Corporation c:\windows\system32\wbem\wmisvc.dll	131.00 KB (134,144 bytes)
ipsecsvc 5.2.3790.0 (srv03_rtm.030324-2048) 3/25/2003 7:00 AM Microsoft Corporation c:\windows\system32\ipsecsvc.dll	162.50 KB (166,400 bytes)	vssapi 5.2.3790.0 (srv03_rtm.030324-2048) 3/25/2003 7:00 AM Microsoft Corporation c:\windows\system32\vssapi.dll	528.00 KB (540,672 bytes)
oakley 5.2.3790.0 (srv03_rtm.030324-2048) 3/25/2003 7:00 AM Microsoft Corporation c:\windows\system32\oakley.dll	325.50 KB (333,312 bytes)	comsvcs 2001.12.4720.0 (srv03_rtm.030324-2048) 2/16/2004 11:32 AM Microsoft Corporation c:\windows\system32\comsvcs.dll	1.14 MB (1,199,616 bytes)
winipsec 5.2.3790.0 (srv03_rtm.030324-2048) 3/25/2003 7:00 AM Microsoft Corporation c:\windows\system32\winipsec.dll	34.50 KB (35,328 bytes)	wbemcore 5.2.3790.0 (srv03_rtm.030324-2048) 2/16/2004 11:32 AM Microsoft Corporation c:\windows\system32\wbem\wbemcore.dll	457.00 KB (467,968 bytes)
pstorsvc 5.2.3790.0 (srv03_rtm.030324-2048) 3/25/2003 7:00 AM Microsoft Corporation c:\windows\system32\pstorsvc.dll	24.00 KB (24,576 bytes)	esscli 5.2.3790.0 (srv03_rtm.030324-2048) 2/16/2004 11:32 AM Microsoft Corporation c:\windows\system32\wbem\esscli.dll	235.50 KB (241,152 bytes)
psbase 5.2.3790.0 (srv03_rtm.030324-2048) 3/25/2003 7:00 AM Microsoft Corporation c:\windows\system32\psbase.dll	81.00 KB (82,944 bytes)	wmiutils 5.2.3790.0 (srv03_rtm.030324-2048) 2/16/2004 11:32 AM Microsoft Corporation c:\windows\system32\wbem\wmiutils.dll	90.50 KB (92,672 bytes)
dsenh 5.2.3790.0 (srv03_rtm.030324-2048) 3/25/2003 7:00 AM Microsoft Corporation c:\windows\system32\dsenh.dll	131.33 KB (134,480 bytes)	repdrvfs 5.2.3790.0 (srv03_rtm.030324-2048) 2/16/2004 11:32 AM Microsoft Corporation c:\windows\system32\wbem\repdrvfs.dll	165.00 KB (168,960 bytes)
wlbsctrl 5.2.3790.0 (srv03_rtm.030324-2048) 3/25/2003 7:00 AM Microsoft Corporation c:\windows\system32\wlbsctrl.dll	78.00 KB (79,872 bytes)	wmiprvsd 5.2.3790.0 (srv03_rtm.030324-2048) 2/16/2004 11:32 AM Microsoft Corporation c:\windows\system32\wbem\wmiprvsd.dll	405.50 KB (415,232 bytes)
svchost 5.2.3790.0 (srv03_rtm.030324-2048) 3/25/2003 7:00 AM Microsoft Corporation c:\windows\system32\svchost.exe	13.00 KB (13,312 bytes)	wbemess 5.2.3790.0 (srv03_rtm.030324-2048) 2/16/2004 11:32 AM Microsoft Corporation c:\windows\system32\wbem\wbemess.dll	256.50 KB (262,656 bytes)
rpss 5.2.3790.0 (srv03_rtm.030324-2048) 3/25/2003 7:00 AM Microsoft Corporation c:\windows\system32\rpss.dll	276.50 KB (283,136 bytes)	ncprov 5.2.3790.0 (srv03_rtm.030324-2048) 2/16/2004 11:32 AM Microsoft Corporation c:\windows\system32\wbem\ncprov.dll	43.00 KB (44,032 bytes)
termsrv 5.2.3790.0 (srv03_rtm.030324-2048) 2/16/2004 11:32 AM Microsoft Corporation c:\windows\system32\termsrv.dll	216.50 KB (221,696 bytes)	netman 5.2.3790.0 (srv03_rtm.030324-2048) 3/25/2003 7:00 AM Microsoft Corporation c:\windows\system32\netman.dll	209.00 KB (214,016 bytes)
icaapi 5.2.3790.0 (srv03_rtm.030324-2048) 2/16/2004 11:32 AM Microsoft Corporation c:\windows\system32\icaapi.dll	10.50 KB (10,752 bytes)	mprapi 5.2.3790.0 (srv03_rtm.030324-2048) 3/25/2003 7:00 AM Microsoft Corporation c:\windows\system32\mprapi.dll	81.00 KB (82,944 bytes)
mstlsapi 5.2.3790.0 (srv03_rtm.030324-2048) 3/25/2003 7:00 AM Microsoft Corporation c:\windows\system32\mstlsapi.dll	104.50 KB (107,008 bytes)	rtutils 5.2.3790.0 (srv03_rtm.030324-2048) 3/25/2003 7:00 AM Microsoft Corporation c:\windows\system32\rtutils.dll	32.00 KB (32,768 bytes)
activeds 5.2.3790.0 (srv03_rtm.030324-2048) 3/25/2003 7:00 AM Microsoft Corporation c:\windows\system32\activeds.dll	189.00 KB (193,536 bytes)	rasapi32 5.2.3790.0 (srv03_rtm.030324-2048) 3/25/2003 7:00 AM Microsoft Corporation c:\windows\system32\rasapi32.dll	227.50 KB (232,960 bytes)
adslpc 5.2.3790.0 (srv03_rtm.030324-2048) 3/25/2003 7:00 AM Microsoft Corporation c:\windows\system32\adslpc.dll	142.50 KB (145,920 bytes)	rasman 5.2.3790.0 (srv03_rtm.030324-2048) 3/25/2003 7:00 AM Microsoft Corporation c:\windows\system32\rasman.dll	56.50 KB (57,856 bytes)
credui 5.2.3790.0 (srv03_rtm.030324-2048) 3/25/2003 7:00 AM Microsoft Corporation c:\windows\system32\credui.dll	159.00 KB (162,816 bytes)	tapi32 5.2.3790.0 (srv03_rtm.030324-2048) 3/25/2003 7:00 AM Microsoft Corporation c:\windows\system32\tapi32.dll	175.00 KB (179,200 bytes)
atl 3.05.2283 83.00 KB (84,992 bytes) 3/25/2003 7:00 AM Microsoft Corporation c:\windows\system32\atl.dll		wzcsvc 5.2.3790.0 (srv03_rtm.030324-2048) 3/25/2003 7:15 AM Microsoft Corporation c:\windows\system32\wzcsvc.dll	272.50 KB (279,040 bytes)

wmi	5.2.3790.0 (srv03_rtm.030324-2048)	6.50 KB (6,656 bytes)	msdbg2	7.10.3077 188.00 KB (192,512 bytes)	3/19/2003 4:58 AM
3/25/2003 7:00 AM	Microsoft Corporation	c:\windows\system32\wmi.dll	Microsoft Corporation	c:\program files\common files\microsoft	
dhcpcsvc	5.2.3790.0 (srv03_rtm.030324-2048)	101.50 KB (103,936 bytes)	shared\vs7debug\msdbg2.dll		
3/25/2003 7:00 AM	Microsoft Corporation		ntfrs	5.2.3790.0 (srv03_rtm.030324-2048)	748.50 KB (766,464 bytes)
c:\windows\system32\dhcpcsvc.dll			3/25/2003 7:00 AM	Microsoft Corporation	
wzcsapi	5.2.3790.0 (srv03_rtm.030324-2048)	24.50 KB (25,088 bytes)	c:\windows\system32\ntfrs.exe		
3/25/2003 7:15 AM	Microsoft Corporation		dbghelp	5.2.3790.0 (srv03_rtm.030324-2048)	620.00 KB (634,880 bytes)
c:\windows\system32\wzcsapi.dll			3/25/2003 7:00 AM	Microsoft Corporation	
netshell	5.2.3790.0 (srv03_rtm.030324-2048)	1.67 MB (1,747,456 bytes)	c:\windows\system32\dbghelp.dll		
3/25/2003 7:00 AM	Microsoft Corporation		ntfrsapi	5.2.3790.0 (srv03_rtm.030324-2048)	56.00 KB (57,344 bytes)
c:\windows\system32\netshell.dll			3/25/2003 7:00 AM	Microsoft Corporation	
clusapi	5.2.3790.0 (srv03_rtm.030324-2048)	56.00 KB (57,344 bytes)	c:\windows\system32\ntfrsapi.dll		
3/25/2003 7:00 AM	Microsoft Corporation		dfssvc	5.2.3790.0 (srv03_rtm.030324-2048)	130.50 KB (133,632 bytes)
c:\windows\system32\clusapi.dll			3/25/2003 7:00 AM	Microsoft Corporation	
netcfgx	5.2.3790.0 (srv03_rtm.030324-2048)	726.00 KB (743,424 bytes)	c:\windows\system32\dfssvc.exe		
3/25/2003 7:00 AM	Microsoft Corporation		resutils	5.2.3790.0 (srv03_rtm.030324-2048)	59.00 KB (60,416 bytes)
c:\windows\system32\netcfgx.dll			3/25/2003 7:00 AM	Microsoft Corporation	
hnetcfg	5.2.3790.0 (srv03_rtm.030324-2048)	243.50 KB (249,344 bytes)	c:\windows\system32\resutils.dll		
3/25/2003 7:00 AM	Microsoft Corporation		mfc42u	6.05.3014.0	960.00 KB (983,040 bytes) 3/25/2003 7:00 AM
c:\windows\system32\hnetcfg.dll			Microsoft Corporation	c:\windows\system32\mfc42u.dll	
wininet	6.00.3790.0 (srv03_rtm.030324-2048)	609.00 KB (623,616 bytes)	wsock32	5.2.3790.0 (srv03_rtm.030324-2048)	22.00 KB (22,528 bytes)
3/25/2003 7:00 AM	Microsoft Corporation		3/25/2003 7:00 AM	Microsoft Corporation	
c:\windows\system32\wininet.dll			c:\windows\system32\wsock32.dll		
rasmans	5.2.3790.0 (srv03_rtm.030324-2048)	163.50 KB (167,424 bytes)	explorer	6.00.3790.0 (srv03_rtm.030324-2048)	1,008.50 KB (1,032,704 bytes)
3/25/2003 7:00 AM	Microsoft Corporation		3/25/2003 7:00 AM	Microsoft Corporation	
c:\windows\system32\rasmans.dll			c:\windows\explorer.exe		
rasdlg	5.2.3790.0 (srv03_rtm.030324-2048)	642.00 KB (657,408 bytes)	browseui	6.00.3790.0 (srv03_rtm.030324-2048)	1.01 MB (1,057,280 bytes)
3/25/2003 7:00 AM	Microsoft Corporation		3/25/2003 7:00 AM	Microsoft Corporation	
c:\windows\system32\rasdlg.dll			c:\windows\system32\browseui.dll		
rasadhlp	5.2.3790.0 (srv03_rtm.030324-2048)	6.50 KB (6,656 bytes)	shdocvw	6.00.3790.0 (srv03_rtm.030324-2048)	1.33 MB (1,393,664 bytes)
3/25/2003 7:00 AM	Microsoft Corporation		3/25/2003 7:00 AM	Microsoft Corporation	
c:\windows\system32\rasadhlp.dll			c:\windows\system32\shdocvw.dll		
cryptsvc	5.2.3790.0 (srv03_rtm.030324-2048)	51.00 KB (52,224 bytes)	themeui	6.00.3790.0 (srv03_rtm.030324-2048)	360.50 KB (369,152 bytes)
3/25/2003 7:00 AM	Microsoft Corporation		3/25/2003 7:00 AM	Microsoft Corporation	
c:\windows\system32\cryptsvc.dll			c:\windows\system32\themeui.dll		
certcli	5.2.3790.0 (srv03_rtm.030324-2048)	228.00 KB (233,472 bytes)	msimg32	5.2.3790.0 (srv03_rtm.030324-2048)	4.50 KB (4,608 bytes)
3/25/2003 7:00 AM	Microsoft Corporation		3/25/2003 7:00 AM	Microsoft Corporation	
c:\windows\system32\certcli.dll			c:\windows\system32\msimg32.dll		
rastapi	5.2.3790.0 (srv03_rtm.030324-2048)	57.00 KB (58,368 bytes)	linkinfo	5.2.3790.0 (srv03_rtm.030324-2048)	16.50 KB (16,896 bytes)
3/25/2003 7:00 AM	Microsoft Corporation		3/25/2003 7:00 AM	Microsoft Corporation	
c:\windows\system32\rastapi.dll			c:\windows\system32\linkinfo.dll		
rasppp	5.2.3790.0 (srv03_rtm.030324-2048)	195.00 KB (199,680 bytes)	ntshrui	6.00.3790.0 (srv03_rtm.030324-2048)	136.00 KB (139,264 bytes)
3/25/2003 7:00 AM	Microsoft Corporation		3/25/2003 7:00 AM	Microsoft Corporation	
c:\windows\system32\rasppp.dll			c:\windows\system32\ntshrui.dll		
ntlsapi	5.2.3790.0 (srv03_rtm.030324-2048)	8.00 KB (8,192 bytes)	webcheck	6.00.3790.0 (srv03_rtm.030324-2048)	261.50 KB (267,776 bytes)
3/25/2003 7:00 AM	Microsoft Corporation		3/25/2003 7:00 AM	Microsoft Corporation	
c:\windows\system32\ntlsapi.dll			c:\windows\system32\webcheck.dll		
raschap	5.2.3790.0 (srv03_rtm.030324-2048)	106.00 KB (108,544 bytes)	stobject	5.2.3790.0 (srv03_rtm.030324-2048)	117.50 KB (120,320 bytes)
3/25/2003 7:00 AM	Microsoft Corporation		3/25/2003 7:00 AM	Microsoft Corporation	
c:\windows\system32\raschap.dll			c:\windows\system32\stobject.dll		
rastls	5.2.3790.0 (srv03_rtm.030324-2048)	155.00 KB (158,720 bytes)	batmeter	6.00.3790.0 (srv03_rtm.030324-2048)	28.50 KB (29,184 bytes)
3/25/2003 7:00 AM	Microsoft Corporation		3/25/2003 7:00 AM	Microsoft Corporation	
c:\windows\system32\rastls.dll			c:\windows\system32\batmeter.dll		
cryptui	5.131.3790.0 (srv03_rtm.030324-2048)	473.50 KB (484,864 bytes)	powrprof	6.00.3790.0 (srv03_rtm.030324-2048)	14.50 KB (14,848 bytes)
3/25/2003 7:00 AM	Microsoft Corporation		3/25/2003 7:00 AM	Microsoft Corporation	
c:\windows\system32\cryptui.dll			c:\windows\system32\powrprof.dll		
ipbootp	5.2.3790.0 (srv03_rtm.030324-2048)	34.50 KB (35,328 bytes)	browseui	6.00.3790.0 (srv03_rtm.030324-2048)	62.00 KB (63,488 bytes)
3/25/2003 7:00 AM	Microsoft Corporation		3/25/2003 7:00 AM	Microsoft Corporation	
c:\windows\system32\ipbootp.dll			c:\windows\system32\browseui.dll		
pchsvc	5.2.3790.0 (srv03_rtm.030324-2048)	31.50 KB (32,256 bytes)	urlmon	6.00.3790.0 (srv03_rtm.030324-2048)	501.50 KB (513,536 bytes)
2/16/2004 11:35 AM	Microsoft Corporation		3/25/2003 7:00 AM	Microsoft Corporation	
c:\windows\pchealth\helpctr\binaries\pchsvc.dll			c:\windows\system32\urlmon.dll		
wbemcons	5.2.3790.0 (srv03_rtm.030324-2048)	69.00 KB (70,656 bytes)	shdoclc	6.00.3790.0 (srv03_rtm.030324-2048)	588.50 KB (602,624 bytes)
2/16/2004 11:32 AM	Microsoft Corporation		3/25/2003 7:00 AM	Microsoft Corporation	
c:\windows\system32\wbem\wbemcons.dll			c:\windows\system32\shdoclc.dll		
mdm	7.10.3077 328.00 KB (335,872 bytes)	3/19/2003 4:55 AM	netplwiz	5.2.3790.0 (srv03_rtm.030324-2048)	843.00 KB (863,232 bytes)
Microsoft Corporation	c:\program files\common files\microsoft		3/25/2003 7:00 AM	Microsoft Corporation	
shared\vs7debug\mdm.exe			c:\windows\system32\netplwiz.dll		
csm	7.10.3077 56.00 KB (57,344 bytes)	3/19/2003 4:56 AM	printui	5.2.3790.0 (srv03_rtm.030324-2048)	536.50 KB (549,376 bytes)
Microsoft Corporation	c:\program files\common files\microsoft		3/25/2003 7:00 AM	Microsoft Corporation	
shared\vs7debug\csm.dll			c:\windows\system32\printui.dll		
msvcr71	7.10.3052.4	340.00 KB (348,160 bytes) 2/21/2003 7:42 AM	cfgmgr32	5.2.3790.0 (srv03_rtm.030324-2048)	17.50 KB (17,920 bytes)
Microsoft Corporation	c:\windows\system32\msvcr71.dll		3/25/2003 7:00 AM	Microsoft Corporation	
			c:\windows\system32\cfgmgr32.dll		

mydocs 6.00.3790.0 (srv03_rtm.030324-2048)	88.00 KB (90,112 bytes)	db2bp 8.1.4.341 817.20 KB (836,816 bytes)	11/1/2003 2:00 AM
3/25/2003 7:00 AM Microsoft Corporation		International Business Machines Corporation	d:\sql\bin\db2bp.exe
c:\windows\system32\mydocs.dll		db2wint 8.1.4.341 48.06 KB (49,215 bytes)	10/31/2003 11:22 PM
twext 6.00.3790.0 (srv03_rtm.030324-2048)	66.50 KB (68,096 bytes)	International Business Machines Corporation	d:\sql\bin\db2wint.dll
3/25/2003 7:00 AM Microsoft Corporation		db2osse 8.1.4.341 312.07 KB (319,561 bytes)	10/31/2003 11:22 PM
c:\windows\system32\twext.dll		International Business Machines Corporation	d:\sql\bin\db2osse.dll
zipfldr 6.00.3790.0 (srv03_rtm.030324-2048)	316.00 KB (323,584 bytes)	db2sys 8.1.4.341 2.36 MB (2,478,142 bytes)	10/31/2003 11:22 PM
3/25/2003 7:00 AM Microsoft Corporation		International Business Machines Corporation	d:\sql\bin\db2sys.dll
c:\windows\system32\zipfldr.dll		db2sysp 8.1.4.341 88.06 KB (90,176 bytes)	10/31/2003 11:22 PM
mlang 6.00.3790.0 (srv03_rtm.030324-2048)	570.00 KB (583,680 bytes)	International Business Machines Corporation	d:\sql\bin\db2sysp.dll
3/25/2003 7:00 AM Microsoft Corporation		db2app 8.1.4.341 2.48 MB (2,601,022 bytes)	10/31/2003 11:21 PM
c:\windows\system32\mlang.dll		International Business Machines Corporation	d:\sql\bin\db2app.dll
srchui 1.00 708.56 KB (725,566 bytes)	2/16/2004 11:35 AM	db2util 8.1.4.341 1.18 MB (1,237,055 bytes)	10/31/2003 11:22 PM
Microsoft Corporation	c:\windows\srchasst\srchui.dll	International Business Machines Corporation	d:\sql\bin\db2util.dll
msacm32 5.2.3790.0 (srv03_rtm.030324-2048)	67.50 KB (69,120 bytes)	db2abind 8.1.4.341 244.06 KB (249,920 bytes)	10/31/2003 11:21 PM
3/25/2003 7:00 AM Microsoft Corporation		International Business Machines Corporation	d:\sql\bin\db2abind.dll
c:\windows\system32\msacm32.dll		db2g1ln 8.1.4.341 364.06 KB (372,799 bytes)	10/31/2003 11:19 PM
oleacc 4.2.5406.0 (srv03_rtm.030324-2048)	171.00 KB (175,104 bytes)	International Business Machines Corporation	d:\sql\bin\db2g1ln.dll
3/25/2003 7:00 AM Microsoft Corporation		db2locale 8.1.4.341 48.06 KB (49,217 bytes)	10/31/2003 11:19 PM
c:\windows\system32\oleacc.dll		International Business Machines Corporation	d:\sql\bin\db2locale.dll
msi 2.0.3790.0 2.06 MB (2,160,128 bytes)	3/25/2003 7:00 AM	db2cli 8.1.4.341 2.60 MB (2,723,902 bytes)	10/31/2003 11:21 PM
Microsoft Corporation	c:\windows\system32\msi.dll	International Business Machines Corporation	d:\sql\bin\db2cli.dll
srchctls 1.00 57.06 KB (58,434 bytes)	2/16/2004 11:35 AM	db2install 8.1.4.341 28.06 KB (28,738 bytes)	10/31/2003 11:19 PM
Microsoft Corporation	c:\windows\srchasst\srchctls.dll	International Business Machines Corporation	d:\sql\bin\db2install.dll
msxml3 8.40.9419.0 1.28 MB (1,337,344 bytes)	3/25/2003 7:00 AM	db2trcapi 8.1.4.341 36.07 KB (36,938 bytes)	10/31/2003 11:19 PM
Microsoft Corporation	c:\windows\system32\msxml3.dll	International Business Machines Corporation	d:\sql\bin\db2trcapi.dll
jscrip 5.6.0.8515 436.00 KB (446,464 bytes)	3/25/2003 7:00 AM	db2dasapi 8.1.4.341 312.07 KB (319,559 bytes)	10/31/2003 11:20 PM
Microsoft Corporation	c:\windows\system32\jscrip.dll	International Business Machines Corporation	d:\sql\bin\db2dasapi.dll
actxprxy 6.00.3790.0 (srv03_rtm.030324-2048)	95.00 KB (97,280 bytes)	db2dascmn 8.1.4.341 80.07 KB (81,991 bytes)	10/31/2003 11:20 PM
3/25/2003 7:00 AM Microsoft Corporation		International Business Machines Corporation	d:\sql\bin\db2dascmn.dll
c:\windows\system32\actxprxy.dll		db2genreg 8.1.4.341 152.07 KB (155,722 bytes)	10/31/2003 11:19 PM
sendmail 6.00.3790.0 (srv03_rtm.030324-2048)	52.00 KB (53,248 bytes)	International Business Machines Corporation	d:\sql\bin\db2genreg.dll
3/25/2003 7:00 AM Microsoft Corporation		db2osse_db2 8.1.4.341 60.08 KB (61,517 bytes)	10/31/2003 11:22 PM
c:\windows\system32\sendmail.dll		International Business Machines Corporation	d:\sql\bin\db2osse_db2.dll
wordpad 5.2.3790.0 (srv03_rtm.030324-2048)	197.00 KB (201,728 bytes)	db2daskrb 8.1.4.341 36.07 KB (36,935 bytes)	10/31/2003 11:21 PM
2/16/2004 11:32 AM Microsoft Corporation	c:\program files\windows	International Business Machines Corporation	d:\sql\bin\db2daskrb.dll
nt\accessories\wordpad.exe		winmr 5.2.3790.0 (srv03_rtm.030324-2048)	15.00 KB (15,360 bytes)
msftedit 5.41.21.2500 496.00 KB (507,904 bytes)	3/25/2003 7:00 AM	3/25/2003 7:00 AM Microsoft Corporation	
Microsoft Corporation	c:\windows\system32\msftedit.dll	c:\windows\system32\winmr.dll	
oledlg 1.0 (srv03_rtm.030324-2048)	116.00 KB (118,784 bytes)	helpctr 5.2.3790.0 (srv03_rtm.030324-2048)	764.00 KB (782,336 bytes)
3/25/2003 7:00 AM Microsoft Corporation		2/16/2004 11:35 AM Microsoft Corporation	
c:\windows\system32\oledlg.dll		c:\windows\pchealth\helpctr\binaries\helpctr.exe	
rundll32 5.2.3790.0 (srv03_rtm.030324-2048)	32.00 KB (32,768 bytes)	hcappres 5.2.3790.0 (srv03_rtm.030324-2048)	6.50 KB (6,656 bytes)
3/25/2003 7:00 AM Microsoft Corporation		2/16/2004 11:35 AM Microsoft Corporation	
c:\windows\system32\rundll32.exe		c:\windows\pchealth\helpctr\binaries\hcappres.dll	
tapisrv 5.2.3790.0 (srv03_rtm.030324-2048)	238.50 KB (244,224 bytes)	itss 5.2.3790.0 (srv03_rtm.030324-2048)	119.50 KB (122,368 bytes)
3/25/2003 7:00 AM Microsoft Corporation		3/25/2003 7:00 AM Microsoft Corporation	c:\windows\system32\itss.dll
c:\windows\system32\tapisrv.dll		pchshell 5.2.3790.0 (srv03_rtm.030324-2048)	100.50 KB (102,912 bytes)
unimdm 5.2.3790.0 (srv03_rtm.030324-2048)	190.50 KB (195,072 bytes)	2/16/2004 11:35 AM Microsoft Corporation	
3/25/2003 7:00 AM Microsoft Corporation		c:\windows\pchealth\helpctr\binaries\pchshell.dll	
c:\windows\system32\unimdm.tsp		mshtml 6.00.3790.0 (srv03_rtm.030324-2048)	2.78 MB (2,916,352 bytes)
uniplat 5.2.3790.0 (srv03_rtm.030324-2048)	15.00 KB (15,360 bytes)	3/25/2003 7:00 AM Microsoft Corporation	
3/25/2003 7:00 AM Microsoft Corporation		c:\windows\system32\mshtml.dll	
c:\windows\system32\uniplat.dll		msimtf 5.2.3790.0 (srv03_rtm.030324-2048)	149.00 KB (152,576 bytes)
kmddsp 5.2.3790.0 (srv03_rtm.030324-2048)	34.00 KB (34,816 bytes)	3/25/2003 7:00 AM Microsoft Corporation	
3/25/2003 7:00 AM Microsoft Corporation		c:\windows\system32\msimtf.dll	
c:\windows\system32\kmddsp.tsp		mctf 5.2.3790.0 (srv03_rtm.030324-2048)	287.00 KB (293,888 bytes)
ndptsp 5.2.3790.0 (srv03_rtm.030324-2048)	54.50 KB (55,808 bytes)	3/25/2003 7:00 AM Microsoft Corporation	
3/25/2003 7:00 AM Microsoft Corporation		c:\windows\system32\mctf.dll	
c:\windows\system32\ndptsp.tsp		msls31 3.10.349.0 147.00 KB (150,528 bytes)	3/25/2003 7:00 AM
ipconf 5.2.3790.0 (srv03_rtm.030324-2048)	16.50 KB (16,896 bytes)	Microsoft Corporation	c:\windows\system32\msls31.dll
3/25/2003 7:00 AM Microsoft Corporation		mshtml 6.00.3790.0 (srv03_rtm.030324-2048)	443.50 KB (454,144 bytes)
c:\windows\system32\ipconf.tsp		3/25/2003 7:00 AM Microsoft Corporation	
h323 5.2.3790.0 (srv03_rtm.030324-2048)	250.00 KB (256,000 bytes)	c:\windows\system32\mshtml.dll	
3/25/2003 7:00 AM Microsoft Corporation		vbscript 5.6.0.8515 404.00 KB (413,696 bytes)	3/25/2003 7:00 AM
c:\windows\system32\h323.tsp		Microsoft Corporation	c:\windows\system32\vbscript.dll
hidphone 5.2.3790.0 (srv03_rtm.030324-2048)	28.00 KB (28,672 bytes)	mfc42 6.05.3014.0 960.00 KB (983,040 bytes)	3/25/2003 7:00 AM
3/25/2003 7:00 AM Microsoft Corporation		AM Microsoft Corporation	c:\windows\system32\mfc42.dll
c:\windows\system32\hidphone.tsp		msinfo 5.2.3790.0 (srv03_rtm.030324-2048)	358.50 KB (367,104 bytes)
hid 5.2.3790.0 (srv03_rtm.030324-2048)	17.50 KB (17,920 bytes)	2/16/2004 11:35 AM Microsoft Corporation	
3/24/2003 8:48 PM Microsoft Corporation	c:\windows\system32\hid.dll	c:\windows\pchealth\helpctr\binaries\msinfo.dll	
cmd 5.2.3790.0 (srv03_rtm.030324-2048)	374.00 KB (382,976 bytes)		
3/25/2003 7:00 AM Microsoft Corporation	c:\windows\system32\cmd.exe		

riched32 5.2.3790.0 (srv03_rtm.030324-2048) 3.50 KB (3,584 bytes)
 3/25/2003 7:00 AM Microsoft Corporation
 c:\windows\system32\riched32.dll
 riched20 5.31.23.1218 406.00 KB (415,744 bytes) 3/25/2003 7:00
 AM Microsoft Corporation c:\windows\system32\riched20.dll
 helpsvc 5.2.3790.0 (srv03_rtm.030324-2048) 720.00 KB (737,280 bytes)
 2/16/2004 11:35 AM Microsoft Corporation
 c:\windows\pchealth\helpctr\binaries\helpsvc.exe
 [Services]
 Display Name Name State Start ModeService Type Path
 Error Control Start NameTag ID
 Alerter Alerter Stopped Disabled Share Process
 c:\windows\system32\svchost.exe -k localservice Normal NT
 AUTHORITY\LocalService 0
 Application Layer Gateway Service ALG Stopped Manual Own
 Process c:\windows\system32\alg.exe Normal NT
 AUTHORITY\LocalService 0
 Application Management AppMgmt Stopped Manual Share Process
 c:\windows\system32\svchost.exe -k netsvcs Normal LocalSystem 0
 Windows Audio AudioSrv Stopped Disabled Share Process
 c:\windows\system32\svchost.exe -k netsvcs Normal LocalSystem 0
 Background Intelligent Transfer Service BITS Stopped Manual Share
 Process c:\windows\system32\svchost.exe -k netsvcs Normal LocalSystem
 0
 Computer Browser Browser Stopped Manual Share Process
 c:\windows\system32\svchost.exe -k netsvcs Normal LocalSystem 0
 Indexing Service Ctsvc 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
 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 Manual Share Process
 c:\windows\system32\svchost.exe -k netsvcs Normal LocalSystem 0
 DB2 - DB2-0 DB2-0 Stopped Manual Own Process
 d:\sql\lib\bin\db2syscs.exe Normal .tpch 0
 DB2 - DB2-1 DB2-1 Stopped Manual Own Process
 d:\sql\lib\bin\db2syscs.exe Normal .tpch 0
 DB2 - DB2-2 DB2-2 Stopped Manual Own Process
 d:\sql\lib\bin\db2syscs.exe Normal .tpch 0
 DB2 - DB2-3 DB2-3 Stopped Manual Own Process
 d:\sql\lib\bin\db2syscs.exe Normal .tpch 0
 DB2DAS - DB2DAS00 DB2DAS00 Stopped Auto Own
 Process "d:\sql\lib\bin\db2dasrm.exe" Normal .tpch 0
 DB2 Governor DB2GOVERNOR Stopped Manual Own Process
 "d:\sql\lib\bin\db2govds.exe" Normal .tpch 0
 DB2 JDBC Applet Server DB2JDS Stopped Auto Own Process
 "d:\sql\lib\bin\db2jds.exe" Normal LocalSystem 0
 DB2 License Server DB2LICD Stopped Auto Own Process
 d:\sql\lib\bin\db2licd.exe Ignore LocalSystem 0
 DB2 Security Server DB2NTSECSERVER Stopped Auto Own Process
 "d:\sql\lib\bin\db2sec.exe" Normal LocalSystem 0
 DB2 Remote Command Server DB2REMOTECD Running Auto Own
 Process "d:\sql\lib\bin\db2rcmd.exe" Ignore .tpch 0
 Distributed File System Dfs Running Auto Own Process
 c:\windows\system32\dfssvc.exe Normal LocalSystem 0
 DHCP Client Dhcp Stopped Manual Share Process
 c:\windows\system32\svchost.exe -k networkservice Normal NT
 AUTHORITY\NetworkService 0
 Logical Disk Manager Administrative Service dmadmin Stopped Manual
 Share Process c:\windows\system32\dmadmin.exe /com Normal
 LocalSystem 0
 Logical Disk Managerdmsrv 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 Stopped Manual Share Process
 c:\windows\system32\svchost.exe -k winerr Ignore LocalSystem 0
 Event Log Eventlog Running Auto Share Process
 c:\windows\system32\services.exe Normal LocalSystem 0

COM+ Event System EventSystem Running Manual Share Process
 c:\windows\system32\svchost.exe -k netsvcs Normal LocalSystem 0
 Help and Support helpsvc Running Manual Share Process
 c:\windows\system32\svchost.exe -k netsvcs Normal LocalSystem 0
 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
 IMAPI CD-Burning COM Service ImapiService Stopped
 Disabled Own Process c:\windows\system32\imapi.exe Normal
 LocalSystem 0
 InterSite Messaging IsmServ Stopped Disabled Own Process
 c:\windows\system32\ismsserv.exe Normal LocalSystem 0
 Kerberos Key Distribution Center kdc Stopped Disabled Share
 Process c:\windows\system32\lsass.exe Normal LocalSystem 0
 Server lanmanserver Running Auto Share Process
 c:\windows\system32\svchost.exe -k netsvcs Normal LocalSystem 0
 Workstation lanmanworkstation Running Auto Share Process
 c:\windows\system32\svchost.exe -k netsvcs Normal LocalSystem 0
 License Logging LicenseService Stopped Disabled Own Process
 c:\windows\system32\llssrv.exe Normal NT AUTHORITY\NetworkService
 0
 TCP/IP NetBIOS Helper LmHosts Running Auto Share Process
 c:\windows\system32\svchost.exe -k localservice Normal NT
 AUTHORITY\LocalService 0
 Machine Debug Manager MDM Running Auto Own Process
 "c:\program files\common files\microsoft shared\vs7debug\mdm.exe" Normal
 LocalSystem 0
 Messenger Messenger Stopped Disabled Share Process
 c:\windows\system32\svchost.exe -k netsvcs Normal LocalSystem 0
 NetMeeting Remote Desktop Sharing mnmsrvc Stopped Disabled Own
 Process c:\windows\system32\mnmsrvc.exe Normal LocalSystem
 0
 Distributed Transaction Coordinator MSDTC Running Auto Own
 Process c:\windows\system32\msdtc.exe Normal NT
 AUTHORITY\NetworkService 0
 Windows Installer MSIServer Stopped Manual Share Process
 c:\windows\system32\msiexec.exe /v Normal LocalSystem 0
 Network DDE NetDDE Stopped Disabled Share Process
 c:\windows\system32\netdde.exe Normal LocalSystem 0
 Network DDE DSDMNetDDEdsdm Stopped Disabled Share Process
 c:\windows\system32\netdde.exe Normal LocalSystem 0
 Net Logon Netlogon Stopped Manual Share Process
 c:\windows\system32\lsass.exe Normal LocalSystem 0
 Network Connections Netman Running Manual Share Process
 c:\windows\system32\svchost.exe -k netsvcs Normal LocalSystem 0
 Network Location Awareness (NLA) Nla Running Manual Share
 Process c:\windows\system32\svchost.exe -k netsvcs Normal LocalSystem
 0
 File Replication Service Ntfrs Running Auto Own Process
 c:\windows\system32\ntfrs.exe Ignore LocalSystem 0
 NT LM Security Support Provider NtLmSsp Stopped Manual Share
 Process c:\windows\system32\lsass.exe Normal LocalSystem 0
 Removable Storage NtmsSvc Stopped Manual Share Process
 c:\windows\system32\svchost.exe -k netsvcs Normal LocalSystem 0
 Plug and Play PlugPlay Running Auto Share Process
 c:\windows\system32\services.exe Normal LocalSystem 0
 IPSEC Services PolicyAgent Running Auto Share Process
 c:\windows\system32\lsass.exe Normal LocalSystem 0
 Protected Storage ProtectedStorage Running Auto Share Process
 c:\windows\system32\lsass.exe Normal LocalSystem 0
 Remote Access Auto Connection Manager RasAuto Stopped Manual Share
 Process c:\windows\system32\svchost.exe -k netsvcs Normal LocalSystem
 0
 Remote Access Connection Manager RasMan Running Manual Share
 Process c:\windows\system32\svchost.exe -k netsvcs Normal LocalSystem
 0
 Remote Desktop Help Session Manager RDSessMgr Stopped Manual
 Own Process c:\windows\system32\sessmgr.exe Normal
 LocalSystem 0
 Routing and Remote Access RemoteAccess Stopped Disabled Share
 Process c:\windows\system32\svchost.exe -k netsvcs Normal LocalSystem
 0

Remote Registry	RemoteRegistry	Stopped	Manual	Share Process	Uninterruptible Power Supply	UPS	Stopped	Manual	Own Process
c:\windows\system32\svchost.exe -k regsvc		Normal	NT		c:\windows\system32\ups.exe	Normal	NT	AUTHORITY\LocalService	0
AUTHORITY\LocalService	0				Virtual Disk Service	vds	Stopped	Manual	Own Process
Remote Procedure Call (RPC) Locator	RpcLocator		Stopped	Manual	c:\windows\system32\vds.exe	Normal	LocalSystem	0	
Own Process	c:\windows\system32\locator.exe	Normal	NT		Volume Shadow Copy	VSS	Stopped	Manual	Own Process
AUTHORITY\NetworkService	0				c:\windows\system32\vssvc.exe	Normal	LocalSystem	0	
Remote Procedure Call (RPC)	RpcSs	Running	Auto	Share Process	Windows Time	W32Time	Stopped	Manual	Share Process
c:\windows\system32\svchost.exe -k rpcss		Normal	LocalSystem	0	c:\windows\system32\svchost.exe -k netsvcs	Normal	LocalSystem	0	
Resultant Set of Policy Provider	RSOPProv	Stopped	Manual	Share Process	WebClient	WebClient	Stopped	Disabled	Share Process
c:\windows\system32\rsopprov.exe		Normal	LocalSystem	0	c:\windows\system32\svchost.exe -k localservice		Normal	NT	
Special Administration Console Helper	sacsvr	Stopped	Manual	Share	AUTHORITY\LocalService	0			
Process	c:\windows\system32\svchost.exe -k netsvcs	Normal	LocalSystem		WinHTTP Web Proxy Auto-Discovery Service		WinHttpAutoProxySvc		
0					Stopped	Manual	Share Process	c:\windows\system32\svchost.exe -k	
Security Accounts Manager	SamSs	Running	Auto	Share Process	localservice	Normal	NT	AUTHORITY\LocalService	0
c:\windows\system32\lsass.exe	Normal	LocalSystem	0		Windows Management Instrumentation	winmgmt	Running	Auto	Share
Smart Card	SCardSvr	Stopped	Manual	Share Process	Process	c:\windows\system32\svchost.exe -k netsvcs	Ignore	LocalSystem	
c:\windows\system32\scardsvr.exe		Ignore	NT		0				
AUTHORITY\LocalService	0				Portable Media Serial Number Service	WmdmPmSN	Stopped	Manual	
Task Scheduler	Schedule	Stopped	Manual	Share Process	Share Process	c:\windows\system32\svchost.exe -k netsvcs	Normal		
c:\windows\system32\svchost.exe -k netsvcs		Normal	LocalSystem	0	LocalSystem	0			
Secondary Logon	seclogon	Running	Auto	Share Process	Windows Management Instrumentation Driver Extensions		Wmi		
c:\windows\system32\svchost.exe -k netsvcs	Ignore	LocalSystem	0		Stopped	Manual	Share Process	c:\windows\system32\svchost.exe -k	
System Event Notification	SENS	Running	Auto	Share Process	netsvcs	Normal	LocalSystem	0	
c:\windows\system32\svchost.exe -k netsvcs		Normal	LocalSystem	0	WMI Performance Adapter	WmiApSrv	Stopped	Manual	Own
Internet Connection Firewall (ICF) / Internet Connection Sharing (ICS)					Process	c:\windows\system32\wbem\wmiapsrv.exe	Normal	LocalSystem	
SharedAccess	Stopped	Disabled	Share Process		0				
c:\windows\system32\svchost.exe -k netsvcs	Normal	LocalSystem	0		Automatic Updates	wuauclt	Stopped	Manual	Share Process
Shell Hardware Detection	ShellHWDetection	Running	Auto	Share	c:\windows\system32\svchost.exe -k netsvcs	Normal	LocalSystem	0	
Process	c:\windows\system32\svchost.exe -k netsvcs	Ignore	LocalSystem		Wireless Configuration	WZCSVC	Stopped	Manual	Share Process
0					c:\windows\system32\svchost.exe -k netsvcs	Normal	LocalSystem	0	
Print Spooler	Spooler	Stopped	Manual	Own Process	DB2 - QUAL-0	QUAL-0	Running	Manual	Own Process
c:\windows\system32\spoolsv.exe		Normal	LocalSystem	0	d:\sql\lib\bin\db2syscs.exe		Normal	.\tpch	0
Windows Image Acquisition (WIA)	stisvc	Stopped	Disabled	Share	DB2 - QUAL-1	QUAL-1	Running	Manual	Own Process
Process	c:\windows\system32\svchost.exe -k imgs	Normal	NT		d:\sql\lib\bin\db2syscs.exe		Normal	.\tpch	0
AUTHORITY\LocalService	0				[Program Groups]				
Microsoft Software Shadow Copy Provider	swprv	Stopped	Manual	Own	Group Name	Name	User Name		
Process	c:\windows\system32\svchost.exe -k swprv	Normal	LocalSystem		Accessories	Default User:Accessories	Default User		
0					Accessories\Accessibility	Default User:Accessories\Accessibility	Default		
Performance Logs and Alerts	SysmonLog	Stopped	Manual	Own	User				
Process	c:\windows\system32\smlogsvc.exe	Normal	NT		Accessories\Entertainment	Default User:Accessories\Entertainment	Default		
Authority\NetworkService	0				User				
Telephony TapiSrv	Running	Manual	Share Process		Startup	Default User:Startup	Default User		
c:\windows\system32\svchost.exe -k tapisrv		Normal	LocalSystem	0	Accessories	All Users:Accessories	All Users		
Terminal Services	TermService	Running	Manual	Share Process	Accessories\Accessibility	All Users:Accessories\Accessibility	All		
c:\windows\system32\svchost.exe -k termsvcs		Normal	LocalSystem		Users				
0					Accessories\Communications	All Users:Accessories\Communications	All		
Themes	Themes	Stopped	Disabled	Share Process	Users				
c:\windows\system32\svchost.exe -k netsvcs		Normal	LocalSystem	0	Accessories\Entertainment	All Users:Accessories\Entertainment	All		
Telnet	TlntSvr	Stopped	Disabled	Own Process	Users				
c:\windows\system32\tlntsvr.exe		Normal	NT	AUTHORITY\LocalService	0				
DB2 - TPCH-0	TPCH-0	Stopped	Manual	Own Process	Accessories\System Tools	All Users:Accessories\System Tools	All		
d:\sql\lib\bin\db2syscs.exe		Normal	.\tpch	0	Users				
DB2 - TPCH-1	TPCH-1	Stopped	Manual	Own Process	Administrative Tools	All Users:Administrative Tools	All Users		
d:\sql\lib\bin\db2syscs.exe		Normal	.\tpch	0	IBM DB2	All Users:IBM DB2	All Users		
DB2 - TPCH-2	TPCH-2	Stopped	Manual	Own Process	IBM DB2\Command Line Tools	All Users:IBM DB2\Command Line Tools	All		
d:\sql\lib\bin\db2syscs.exe		Normal	.\tpch	0	Users				
DB2 - TPCH-3	TPCH-3	Stopped	Manual	Own Process	IBM DB2\Development Tools	All Users:IBM DB2\Development Tools	All		
d:\sql\lib\bin\db2syscs.exe		Normal	.\tpch	0	Users				
DB2 - TPCH-4	TPCH-4	Stopped	Manual	Own Process	IBM DB2\General Administration Tools	All Users:IBM DB2\General			
d:\sql\lib\bin\db2syscs.exe		Normal	.\tpch	0	Administration Tools	All Users			
DB2 - TPCH-5	TPCH-5	Stopped	Manual	Own Process	IBM DB2\Information	All Users:IBM DB2\Information	All Users		
d:\sql\lib\bin\db2syscs.exe		Normal	.\tpch	0	IBM DB2\Monitoring Tools	All Users:IBM DB2\Monitoring Tools	All		
DB2 - TPCH-6	TPCH-6	Stopped	Manual	Own Process	Users				
d:\sql\lib\bin\db2syscs.exe		Normal	.\tpch	0	IBM DB2\Set-up Tools	All Users:IBM DB2\Set-up Tools	All		
DB2 - TPCH-7	TPCH-7	Stopped	Manual	Own Process	Users				
d:\sql\lib\bin\db2syscs.exe		Normal	.\tpch	0	Microsoft Visual Studio .NET 2003	All Users:Microsoft Visual Studio .NET			
Distributed Link Tracking Server	TrkSvr	Stopped	Disabled	Share Process	2003	All Users			
c:\windows\system32\svchost.exe -k netsvcs		Normal	LocalSystem	0	Microsoft Visual Studio .NET 2003\Visual Studio .NET Tools	All			
Distributed Link Tracking Client	TrkWks	Stopped	Manual	Share Process	Users:Microsoft Visual Studio .NET 2003\Visual Studio .NET Tools	All			
c:\windows\system32\svchost.exe -k netsvcs		Normal	LocalSystem	0	Startup	All Users:Startup	All Users		
Terminal Services Session Directory	Tssdis	Stopped	Disabled	Own	Accessories	NT	AUTHORITY\SYSTEM:Accessories	NT	
Process	c:\windows\system32\tssdis.exe	Normal	LocalSystem	0	AUTHORITY\SYSTEM				
Upload Manager	uploadmgr	Stopped	Manual	Share Process	Accessories\Accessibility	NT			
c:\windows\system32\svchost.exe -k netsvcs		Normal	LocalSystem	0	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 RUTHLESS1\tpch:Accessories RUTHLESS1\tpch
 Accessories\Accessibility RUTHLESS1\tpch:Accessories\Accessibility
 RUTHLESS1\tpch
 Accessories\Entertainment RUTHLESS1\tpch:Accessories\Entertainment
 RUTHLESS1\tpch
 Startup RUTHLESS1\tpch:Startup RUTHLESS1\tpch
 [Startup Programs]
 Program Command User NameLocation
 desktop desktop.iniNT AUTHORITY\SYSTEM Startup
 desktop desktop.iniRUTHLESS1\tpch Startup
 desktop desktop.ini.DEFAULT Startup
 desktop desktop.iniAll Users Common Startup
 [OLE Registration]
 Object Local Server
 Sound (OLE2) sndrec32.exe
 Media Clip mplay32.exe
 Video Clipmplay32.exe /avi
 MIDI Sequence mplay32.exe /mid
 Sound Not Available
 Media Clip Not Available
 WordPad Document "%programfiles%\windows nt\accessories\wordpad.exe"
 Windows Media Services DRM Storage object Not Available
 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 6.0.3790.0
 Build 63790
 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 6.0.3790.0 95 KB 3/25/2003 7:00:00 AM
 C:\WINDOWS\system32 Microsoft Corporation
 actxprxy.dll 4.70.0.1215 37 KB 10/15/1996 5:40:38 AM
 D:\tools Microsoft Corporation
 advpack.dll 6.0.3790.0 94 KB 3/25/2003 7:00:00 AM
 C:\WINDOWS\system32 Microsoft Corporation
 advpack.dll 4.70.0.1144 23 KB 10/15/1996 5:40:38 AM
 D:\tools Microsoft Corporation
 asctrls.ocx 6.0.3790.0 90 KB 3/25/2003 7:00:00 AM
 C:\WINDOWS\system32 Microsoft Corporation
 browsele.dll 6.0.3790.0 62 KB 3/25/2003 7:00:00 AM
 C:\WINDOWS\system32 Microsoft Corporation
 browseui.dll 6.0.3790.0 1,033 KB 3/25/2003 7:00:00 AM
 C:\WINDOWS\system32 Microsoft Corporation
 cdfview.dll 6.0.3790.0 144 KB 3/25/2003 7:00:00 AM
 C:\WINDOWS\system32 Microsoft Corporation
 comctl32.dll 5.82.3790.0 561 KB 3/25/2003 7:00:00 AM
 C:\WINDOWS\system32 Microsoft Corporation
 dxtrans.dll 6.3.3790.0 198 KB 3/25/2003 7:00:00 AM
 C:\WINDOWS\system32 Microsoft Corporation
 dxtmsft.dll 6.3.3790.0 344 KB 3/25/2003 7:00:00 AM
 C:\WINDOWS\system32 Microsoft Corporation
 iecont.dll <File Missing> Not Available Not Available Not
 Available Not Available
 iecontlc.dll<File Missing> Not Available Not Available Not
 Available Not Available
 iedkcs32.dll 16.0.3790.0 300 KB 3/25/2003 7:00:00 AM
 C:\WINDOWS\system32 Microsoft Corporation
 iepers.dll 6.0.3790.0 230 KB 3/25/2003 7:00:00 AM
 C:\WINDOWS\system32 Microsoft Corporation

iesetup.dll 6.0.3790.0 59 KB 3/25/2003 7:00:00 AM
 C:\WINDOWS\system32 Microsoft Corporation
 ieuinit.inf Not Available 20 KB 3/25/2003 7:00:00 AM
 C:\WINDOWS\system32 Not Available
 iexplore.exe 6.0.3790.0 90 KB 3/25/2003 7:00:00 AM
 C:\Program Files\Internet Explorer Microsoft Corporation
 imgutil.dll 5.2.3790.0 35 KB 3/25/2003 7:00:00 AM
 C:\WINDOWS\system32 Microsoft Corporation
 inetctl.cpl 6.0.3790.0 303 KB 3/25/2003 7:00:00 AM
 C:\WINDOWS\system32 Microsoft Corporation
 inetctl.dll 6.0.3790.0 109 KB 3/25/2003 7:00:00 AM
 C:\WINDOWS\system32 Microsoft Corporation
 inseng.dll 6.0.3790.0 72 KB 3/25/2003 7:00:00 AM
 C:\WINDOWS\system32 Microsoft Corporation
 mlang.dll 6.0.3790.0 570 KB 3/25/2003 7:00:00 AM
 C:\WINDOWS\system32 Microsoft Corporation
 msencode.dll 2002.10.4.0 112 KB 3/25/2003 7:00:00 AM
 C:\WINDOWS\system32 Not Available
 mshta.exe 6.0.3790.0 26 KB 3/25/2003 7:00:00 AM
 C:\WINDOWS\system32 Microsoft Corporation
 mshtml.dll 6.0.3790.0 2,848 KB 3/25/2003 7:00:00 AM
 C:\WINDOWS\system32 Microsoft Corporation
 mshtml.tlb 6.0.3790.0 1,319 KB 3/25/2003 7:00:00 AM
 C:\WINDOWS\system32 Microsoft Corporation
 mshtml.dll 6.0.3790.0 444 KB 3/25/2003 7:00:00 AM
 C:\WINDOWS\system32 Microsoft Corporation
 mshtmlr.dll 6.0.3790.0 55 KB 3/25/2003 7:00:00 AM
 C:\WINDOWS\system32 Microsoft Corporation
 msident.dll 6.0.3790.0 47 KB 3/25/2003 7:00:00 AM
 C:\WINDOWS\system32 Microsoft Corporation
 msidntld.dll 6.0.3790.0 15 KB 3/25/2003 7:00:00 AM
 C:\WINDOWS\system32 Microsoft Corporation
 msieftp.dll 6.0.3790.0 230 KB 3/25/2003 7:00:00 AM
 C:\WINDOWS\system32 Microsoft Corporation
 msrating.dll 6.0.3790.0 132 KB 3/25/2003 7:00:00 AM
 C:\WINDOWS\system32 Microsoft Corporation
 mstime.dll 6.0.3790.0 491 KB 3/25/2003 7:00:00 AM
 C:\WINDOWS\system32 Microsoft Corporation
 occache.dll 6.0.3790.0 89 KB 3/25/2003 7:00:00 AM
 C:\WINDOWS\system32 Microsoft Corporation
 proctexe.ocx 6.3.3790.0 78 KB 3/25/2003 7:00:00 AM
 C:\WINDOWS\system32 Intel Corporation
 sendmail.dll 6.0.3790.0 52 KB 3/25/2003 7:00:00 AM
 C:\WINDOWS\system32 Microsoft Corporation
 shdoclc.dll 6.0.3790.0 589 KB 3/25/2003 7:00:00 AM
 C:\WINDOWS\system32 Microsoft Corporation
 shdocvw.dll 6.0.3790.0 1,361 KB 3/25/2003 7:00:00 AM
 C:\WINDOWS\system32 Microsoft Corporation
 shfolder.dll 6.0.3790.0 23 KB 3/25/2003 7:00:00 AM
 C:\WINDOWS\system32 Microsoft Corporation
 shlwapi.dll 6.0.3790.0 281 KB 3/25/2003 7:00:00 AM
 C:\WINDOWS\system32 Microsoft Corporation
 tdc.ocx 1.3.0.3130 58 KB 3/25/2003 7:00:00 AM
 C:\WINDOWS\system32 Microsoft Corporation
 url.dll 6.0.3790.0 36 KB 3/25/2003 7:00:00 AM
 C:\WINDOWS\system32 Microsoft Corporation
 urlmon.dll 6.0.3790.0 502 KB 3/25/2003 7:00:00 AM
 C:\WINDOWS\system32 Microsoft Corporation
 webcheck.dll 6.0.3790.0 262 KB 3/25/2003 7:00:00 AM
 C:\WINDOWS\system32 Microsoft Corporation
 wininet.dll 6.0.3790.0 609 KB 3/25/2003 7:00:00 AM
 C:\WINDOWS\system32 Microsoft Corporation
 [Connectivity]
 Item Value
 Connection Preference Never dial
 LAN Settings
 AutoConfigProxy Not Available
 AutoProxyDetectMode Disabled
 AutoConfigURL
 Proxy Disabled
 ProxyServer
 ProxyOverride
 [Cache]
 [Following are sub-categories of this main category]

[Summary]
Item Value
Page Refresh Type Automatic
Temporary Internet Files Folder C:\Documents and Settings\NetworkService\Local
Settings\Temporary Internet Files
Total Disk Space Not Available
Available Disk Space Not Available
Maximum Cache Size Not Available
Available Cache Size Not Available
[List of Objects]
Program File Status CodeBase
No cached object information available
[Content]
[Following are sub-categories of this main category]
[Summary]
Item Value
Content Advisor Disabled
[Personal Certificates]
Issued To Issued By Validity Signature Algorithm
No personal certificate information available
[Other People Certificates]
Issued To Issued By Validity Signature Algorithm
No other people certificate information available
[Publishers]
Name
No publisher information available
[Security]
Zone Security Level
My Computer Custom
Local intranet Medium-low
Trusted sites Medium
Internet High
Restricted sites High

Appendix B: Database Build Scripts

buildtpcd

```
#!/usr/bin/perl
# usage buildtpcd [QUAL]
# ASSUMPTIONS: all ddl files have commits in them!
($myName = $0) =~ s@.*\/@@; $usage=""
Usage: buildtpcd [QUAL]
    where QUAL is the optional parameter saying to build the qualification
        database (sf = 1 - 1GB)\n";

$qual="";
if (@ARGV == 1){
    $qual = $ARGV[0];
}

# get TPC-D specific environment variables
require "getvars";
require "macro.pl";
require "tpcdmacro.pl";
require "version";

# Make output unbuffered.
select(STDOUT);
$| = 1;
#-----#
# verify that necessary environment variables for building the database #
# are present. Default those that aren't necessary #
#-----#

# variables that must be specified for script to run
@reqVars = ("TPCD_PLATFORM",
    "TPCD_PRODUCT",
    "TPCD_VERSION",
    "TPCD_DBNAME",
    "TPCD_MODE",
    "TPCD_SF",
    "TPCD_DDLPATH",
    "TPCD_AUDIT",
    "TPCD_AUDIT_DIR",
    "TPCD_BUILD_STAGE");

# variables default to 'NULL' if unspecified
@defNullVars = ("TPCD_LOAD_SCRIPT",
    "TPCD_LOAD_SCRIPT_QUAL",
    "TPCD_INPUT",
    "TPCD_QUAL_INPUT",
    "TPCD_DBGEN",
    "TPCD_LOGPRIMARY",
    "TPCD_LOGSECOND",
    "TPCD_LOGFILSIZ",
    "TPCD_LOG_DIR",
    "TPCD_MACHINE",
    "TPCD_AGENTPRI",
    "TPCD_STAGING_TABLE_DDL",
    "TPCD_PRELOAD_STAGING_TABLE_SCRIPT",
    "TPCD_DELETE_STAGING_TABLE_SQL",
    "TPCD_RUNSTATSHORT",
    "TPCD_ADD_RI",
    "TPCD_AST",
    "TPCD_DBM_CONFIG",
    "TPCD_EXPLAIN_DDL",
    "TPCD_NODEGROUP_DEF",
    "TPCD_BUFFERPOOL_DEF",
    "TPCD_LOAD_DB2SET_SCRIPT",
    "TPCD_DB2SET_SCRIPT",
    "TPCD_LOG_DIR_SETUP_SCRIPT",
    "TPCD_LOAD_CONFIGFILE",
    "TPCD_LOAD_DBM_CONFIGFILE",
    "TPCD_TEMP");
```

```
&setVar(@reqVars, "ERROR");
&setVar(@defNullVars, "NULL");

if ( $qual eq "QUAL" ){
    @reqQualVars = ("TPCD_QUAL_DBNAME",
        "TPCD_QUAL_DDL",
        "TPCD_QUAL_TBSP_DDL",
        "TPCD_QUALCONFIGFILE",
        "TPCD_DBM_QUALCONFIG",
        "TPCD_LOAD_QUALCONFIGFILE",
        "TPCD_LOAD_DBM_QUALCONFIGFILE");

    &setVar(@reqQualVars, "ERROR");

    if ( ($ENV{"TPCD_QUAL_INPUT"}) eq "NULL" ){
        if (((($ENV{"TPCD_DBGEN"}) eq "NULL") ||
            (($ENV{"TPCD_TEMP"}) eq "NULL"))){
            die "TPCD_DBGEN and TPCD_TEMP must be set if flatfiles are not
provided.\n";
        }
    }
}

$platform=$ENV{"TPCD_PLATFORM"};

if (length($ENV{"TPCD_DBPATH"}) <= 0){
    # if no db pathname specified, build the db in the home directory
    if ( $platform eq "aix" ||
        $platform eq "sun" ||
        $platform eq "ptx" ||
        $platform eq "hp" ||
        $platform eq "linux"){
        $ENV{"TPCD_DBPATH"} = $ENV{"HOME"};
    }
    elsif ( $platform eq "nt" ){
        $ENV{"TPCD_DBPATH"} = $ENV{"HOMEDRIVE"};
    }
    else{
        die "platform '$platform' not supported yet\n";
    }
}

if ( ($ENV{"TPCD_INPUT"}) eq "NULL" ){
    if (((($ENV{"TPCD_DBGEN"}) eq "NULL") ||
        (($ENV{"TPCD_TEMP"}) eq "NULL"))){
        die "TPCD_DBGEN and TPCD_TEMP must be set if flatfiles are not
provided.\n";
    }
}
#-----#
# ddl script files found under custom directory #
#-----#

if (length($ENV{"TPCD_DDL"}) <= 0){
    $ENV{"TPCD_DDL"} = "dss.ddl";
}

if (length($ENV{"TPCD_TBSP_DDL"}) <= 0){
    $ENV{"TPCD_TBSP_DDL"} = "dss.tbsp.ddl";
}

if (length($ENV{"TPCD_INDEXDDL"}) <= 0){
    $ENV{"TPCD_INDEXDDL"} = "dss.index";
}

if (length($ENV{"TPCD_RUNSTATS"}) <= 0){
    $ENV{"TPCD_RUNSTATS"} = "dss.runstats";
}

if (length($ENV{"TPCD_CONFIGFILE"}) <= 0){
    $ENV{"TPCD_CONFIGFILE"} = "dss.dbconfig";
}

#-----#
```

```
# other settings                                     #
#-----#

if (length($ENV{"TPCD_BACKUP_DIR"}) <= 0){
    $ENV{"TPCD_BACKUP_DIR"} = "${delim}dev${delim}null";
}
if (length($ENV{"TPCD_COPY_DIR"}) <= 0){
    $ENV{"TPCD_COPY_DIR"} = "${delim}dev${delim}null";
}
if (length($ENV{"TPCD_TEMP"}) <= 1){
    $ENV{"TPCD_TEMP"} = "/u/$instance/sql/lib/tmp";
}
if (length($ENV{"TPCD_PHYS_NODE"}) <= 0){
    $ENV{"TPCD_NODEGROUP_DEF"}="NULL"
}
if (length($ENV{"TPCD_GENERATE_SEED_FILE"}) <= 0){
    $ENV{"TPCD_GENERATE_SEED_FILE"} = "no";
}
if (length($ENV{"TPCD_SORTBUF"}) <= 0){
    $ENV{"TPCD_SORTBUF"} = 4096;
}
if (length($ENV{"TPCD_LOAD_PARALLELISM"}) <= 0){
    $ENV{"TPCD_LOAD_PARALLELISM"} = 0;
}
if (length($ENV{"TPCD_LOADSTATS"}) <= 0){
    $ENV{"TPCD_LOADSTATS"} = "no";
}
if (length($ENV{"TPCD_FASTPARSE"}) <= 0){
    $ENV{"TPCD_FASTPARSE"} = "no";
}
if (length($ENV{"TPCD_LOG"}) <= 0){
    $ENV{"TPCD_LOG"} = "no";
}
if (length($ENV{"TPCD_SMPDEGREE"}) <= 0){
    $ENV{"TPCD_SMPDEGREE"} = 1;
}
if (length($ENV{"TPCD_ACTIVATE"}) <= 0){
    $ENV{"TPCD_ACTIVATE"} = "no";
}
if (length($ENV{"TPCD_APPEND_ON"}) <= 0){
    $ENV{"TPCD_APPEND_ON"}="yes"
}
if (length($ENV{"TPCD_GENERATE_SEED_FILE"}) <= 0){
    $ENV{"TPCD_GENERATE_SEED_FILE"}="no";
}

#setup global variables
$tpcdVersion=    $ENV{"TPCD_VERSION"};
$buildStage=    $ENV{"TPCD_BUILD_STAGE"};
$mode=          $ENV{"TPCD_MODE"};
$delim =        $ENV{"TPCD_PATH_DELIM"};
$sep =          $ENV{"COMMAND_SEP"};
$dddlpath=      $ENV{"TPCD_DDLPATH"};
$extraindex=    $ENV{"TPCD_EXTRAINDEX"};
$earlyindex=    $ENV{"TPCD_EARLYINDEX"};
$loadstats=     $ENV{"TPCD_LOADSTATS"};
$saddRI=        $ENV{"TPCD_ADD_RI"};
$sastFile=      $ENV{"TPCD_AST"};
$genSeed=       $ENV{"TPCD_GENERATE_SEED_FILE"};
$log=           $ENV{"TPCD_LOG"};
$activate=      $ENV{"TPCD_ACTIVATE"};
$RealAudit=     $ENV{"TPCD_AUDIT"};
$auditDir=      $ENV{"TPCD_AUDIT_DIR"};
$loadsetScript= $ENV{"TPCD_LOAD_DB2SET_SCRIPT"};
$user=          $ENV{"USER"};
$logDirScript=  $ENV{"TPCD_LOG_DIR_SETUP_SCRIPT"};
$logprimary=    $ENV{"TPCD_LOGPRIMARY"};
$logsecond=     $ENV{"TPCD_LOGSECOND"};
$logfilsize=    $ENV{"TPCD_LOGFILSIZE"};
$dbpath =       $ENV{"TPCD_DBPATH"};
$explainDDL=    $ENV{"TPCD_EXPLAIN_DDL"};
$platform=      $ENV{"TPCD_PLATFORM"};
$buffpooldef=   $ENV{"TPCD_BUFFERPOOL_DEF"};
$stagingTbl =   $ENV{"TPCD_STAGING_TABLE_DDL"};
```

```
$preloadSampleUF=
$ENV{"TPCD_PRELOAD_STAGING_TABLE_SCRIPT"};
$deleteSampleUF= $ENV{"TPCD_DELETE_STAGING_TABLE_SQL"};
$machine=        $ENV{"TPCD_MACHINE"};
$runstatShort =  $ENV{"TPCD_RUNSTATSHORT"};
$runstats =      $ENV{"TPCD_RUNSTATS"};
$smpdegree =     $ENV{"TPCD_SMPDEGREE"};
$agentpri =      $ENV{"TPCD_AGENTPRI"};
$setScript =     $ENV{"TPCD_DB2SET_SCRIPT"};
$backupdir =     $ENV{"TPCD_BACKUP_DIR"};
$nodegroupdef=   $ENV{"TPCD_NODEGROUP_DEF"};
$dbgen=          $ENV{"TPCD_DBGEN"};
$appendOn=       $ENV{"TPCD_APPEND_ON"};
$indexddl=       $ENV{"TPCD_INDEXDDL"};

if($qual eq "QUAL"){
    $logDir=      $ENV{"TPCD_LOG_QUAL_DIR"};
    $dbname=      $ENV{"TPCD_QUAL_DBNAME"};
    $input=       $ENV{"TPCD_QUAL_INPUT"};
    $sf=          $ENV{"TPCD_QUAL_SF"};
    $loadconfigfile=$ENV{"TPCD_LOAD_QUALCONFIGFILE"};
    $loadDBMconfig= $ENV{"TPCD_LOAD_DBM_QUALCONFIGFILE"};
    $loadscript =  $ENV{"TPCD_LOAD_SCRIPT_QUAL"};
    $configfile =  $ENV{"TPCD_QUALCONFIGFILE"};
    $dbmconfig =   $ENV{"TPCD_DBM_QUALCONFIG"};
    $ddl=          $ENV{"TPCD_QUAL_DDL"};
    $tbspddl=      $ENV{"TPCD_QUAL_TBSP_DDL"};
}
else{
    $logDir=      $ENV{"TPCD_LOG_DIR"};
    $dbname=      $ENV{"TPCD_DBNAME"};
    $input=       $ENV{"TPCD_INPUT"};
    $sf=          $ENV{"TPCD_SF"};
    $loadconfigfile=$ENV{"TPCD_LOAD_CONFIGFILE"};
    $loadDBMconfig= $ENV{"TPCD_LOAD_DBM_CONFIGFILE"};
    $loadscript =  $ENV{"TPCD_LOAD_SCRIPT"};
    $configfile =  $ENV{"TPCD_CONFIGFILE"};
    $dbmconfig =   $ENV{"TPCD_DBM_CONFIG"};
    $ddl=          $ENV{"TPCD_DDL"};
    $tbspddl=      $ENV{"TPCD_TBSP_DDL"};
}

if ( ( $mode eq "uni" ) || ( $mode eq "smp" ) ){
    $all_ln="once";
    $all_pn="once";
    $once="once";
}
else {
    $all_ln="all_ln";
    $all_pn="all_pn";
    $once="once";
}

#-----#
# echo parameter settings to acknowledge what is being built      #
# and set db2set options for database load                          #
#-----#

&printSummary;

print "\nSleeping for 15 seconds to give you a chance to reconsider...\n";
sleep 15;

system("db2start");

if ( $platform eq "nt" ){
    if (($mode eq "uni") || ($mode eq "smp")){
        #spaces required for NT
        $src=&doddb_noconn("db2set DB2OPTIONS=\\ -t -v +c\\";db2set
        DB2NTNOCACHE=ON",$all_ln);
    }
    else {
        $src=&doddb_noconn("db2set DB2OPTIONS=\\ -t -v +c\\";db2set
        DB2NTNOCACHE=ON",$all_ln);
    }
}
```

```

    }
}
else{
    if (($mode eq "uni") || ($mode eq "smp")){
        $rc=&dodb_noconn("db2set DB2OPTIONS=-t -v +c\\", $all_ln);
    }
    else{
        $rc=&dodb_noconn("db2set DB2OPTIONS=\\-t -v +c\\", $all_ln);
    }
}
if ( $rc != 0 ){
    die "failure setting db2 environment variable : rc = $rc\n";
}

#-----#
# set the db2 env vars for loading, from the TPCD_LOAD_DB2SET_SCRIPT
script #
#-----#

if ( $loadsetScript ne "NULL" )
{
    if ( $platform eq "nt" ){
        if (( $mode eq "uni" ) || ( $mode eq "smp" )){
            $rc=system("$ddlpath${delim}$loadsetScript");
        }
        else{
            print "db2_all \n" call ${ddlpath}${delim}$loadsetScript " ";
            $rc=system(" db2_all \n" call ${ddlpath}${delim}$loadsetScript " ");
        }
    }
    else{
        $rc=system("${ddlpath}${delim}$loadsetScript");
    }
    ($rc == 0) || die "failure loading db2set parms from $loadsetScript \n";
}

#!&stopStart || die;
!&stopStart;
#-----#
# Begin complete build: TPCD_BUILDSTAGE = ALL #
#-----#

if($buildStage eq "ALL") {
    #create the database
    $rc = &createDb;
    ($rc == 0) || die "ERROR: create database failed. rc = $rc\n ";
    &setLog;
};

$rc = &setLoadConfig;

#-----#
# Begin build from CreateTablespace or early Indexes #
#-----#

if( $buildStage eq "ALL" ||
    $buildStage eq "CRTTBSP" ||
    ($buildStage eq "INDEX" && $earlyindex eq "yes")){
    !&createNodegroups || print "ERROR: create nodegroups failed.\n";
    !&createBufferPools || print "ERROR: create bufferpools failed.\n";
    &outtime("*** Start of audited Load Time - starting to create tables");
    !&createTablespaces || print "WARNING: create tablespaces error.\n";
    !&createExplainTbls || print "ERROR: create EXPLAIN tables failed.\n";
    !&createTables || print "ERROR: create tables failed.\n";

    mkdir("${delim}tmp${delim}${instance}",0777);

    # if earlyindex requested, create indexes
    if ( $earlyindex eq "yes" ){
        !&createIndexes("early") || die "ERROR: create early indexes failed.\n";
    }
    # start the dbgen and load.....call the specific mode for loading (uni,smp,mln)
    !&loadData || die "ERROR: failure during load data\n";
}

```

```

# remove the update.pair.num file so when setupDir runs, it doesn't
# hang waiting for an answer on nt
&rm("${auditDir}${delim}${dbname}.${user}.update.pair.num");
# verify that the audit directory exists
$filename="${auditDir}";
if (-e $filename){
    # set up the $auditDir/$dbname.$user.update.pair.num file
    # to start at update pair 1
    $filename="${auditDir}${delim}${dbname}.${user}.update.pair.num";
} else{
    mkdir ("${auditDir}", 0775) || die "cannot mkdir $auditDir";
}
print "setting update pair num to 1\n";
system("echo 1 > $filename");
};
#-----#
# Begin build from Index or Load #
#-----#

if( $buildStage eq "ALL" ||
    $buildStage eq "CRTTBSP" ||
    $buildStage eq "LOAD" ||
    $buildStage eq "INDEX"){

    # if indexes haven't been created, do so now
    if( $earlyindex ne "yes" ){
        !&createIndexes("normal") || die "ERROR: create indexes failed.\n";
    }
    if( $extraindex ne "no" ){
        !&createIndexes("extra") || die "ERROR: create extra indexes failed.\n";
    }
}

}; # end create/load/index phase of the build

#-----#
# Begin build from runstats #
#-----#

if( $buildStage eq "ALL" ||
    $buildStage eq "CRTTBSP" ||
    $buildStage eq "LOAD" ||
    $buildStage eq "INDEX" ||
    $buildStage eq "RUNSTATS"){
    # if statistics not gathered on the load, run runstats (we have to run the
    # stats at the same time as the index creation whether it be both during load,
    # or after load)
    # We need to run the runstats as well if we have specified an extra index file
    # for "after load" indexes
    if (( $loadstats eq "no" ) || ( $earlyindex eq "no" ) || ( $extraindex ne "no" )){
        &doRunStats;
    }
}

};

#-----#
# End build phase: all/load/index/runstats #
#-----#
# Add RI/AST, set run configuration #
#-----#

if ( $addRI ne "NULL" ){
    &outtime("*** Adding RI constraints started");
    &dodb2file($dbname,"$ddlpath${delim}$addRI", $once);
    &outtime("*** Adding RI constraints completed");
}

#add the AST if it has been requested
if ( $astFile ne "NULL" ){
    &outtime("*** Adding AST started");
    &dodb2file($dbname,"$ddlpath${delim}$astFile", $once);
    &outtime("*** Adding AST completed");
}

# check tbspc info
&dodb_conn($dbname,"db2 list tablespaces show detail", $once);

```

```

# set the configuration
&outtime("**** Set Configuration started");
&outtime("**** Setting degree of parallelism");

&setConfiguration;
# if logging is enabled, we must take a backup of the database
!&stopStart;
print"Logging Enabled  $log \n";
if ( $log eq "YES" ){
    &outtime("**** Create Backups");
    print"Creating Backups\n";
    &createBackup;
    &outtime("**** Backups done");
}

# stop and restart the database to get config parms recognized
!&stopStart;
#!&stopStart || die;

&outtime("**** Set Configuration completed");
&outtime("**** End of audited Load Time");

#create generated seeds
if ( $genSeed ne "no" ){
    $rc = system("perl createmseedme.pl 1000");
    ($rc != 0) || warn "createmseedme failed\n";
}

#-----#
# Call buildtpcdbatch to compile tpcdbatch #
#-----#
# - if we are in real audit mode then we have to do a number of things #
# set up the audit directory structure and the run directory structure #
# so that once we have completed the buildtpcd, we are ready to run. #
# first remove any old "update pair number" file so we won't be prompted #
# doing setupDir. #
# - before we stop the database for the final time #
# if we are in the real audit mode then run dbtables and dbcheck before #
# we print out the notice that we're ready to run performance tests #
# if we are building the qualification database then we'll bind to both #
# the dbname database and the qualification database #
#-----#

$rc = system("perl buildtpcdbatch $qual");
($rc == 0) || die "buildtpcdbatch failed rc=$rc\n";

if ( $RealAudit eq "yes" ){
    &rm("$auditDir${delim}tools${delim}tpcd.runsetup");
    system("perl setupRun");
    if ( $qual eq "QUAL" ){
        $verifyType="q";
    }
    else{
        $verifyType="t";
    }
    system("perl tablesdb $verifyType");

&dodb2file($dbname,"$auditDir${delim}tools${delim}first10rows.sql",$once);
}

#-----#
# Create Catalog info #
#-----#
$rc = system("perl catinfo.pl b");
($rc == 0) || warn "catinfo failed!!! rc = $rc\n";

$rc=system("db2stop");
#DJD ($rc == 0) || die "failure during db2stop rc = $rc \n";

&outtime("**** Ready to run the performance tests once the dbm has restarted");

```

```

if ( $RealAudit ne "yes" ){
    # if we are not in a real audit, then we can restart the database manager
    # if we are in a real audit, then we don't want to do this until the
    # power test starts
    $rc=system("db2start");
    #($rc == 0) || die "failure during db2start rc = $rc \n";
    if ( $activate eq "yes" ){
        &dodb_noconn("db2 activate database $dbname",$once);
    }
}

&outtime("**** Finished creating the database");
#-----#
# finished creating the database #
#-----#

#-----#
# Function: setLog #
#-----#
sub setLog{
    # update the log information first
    # set up the log directory before we do any index creation
    my $rc;
    my $setLogs;
    my $setLogString;

    if ($logDirScript ne "NULL"){
        system ("perl $ddlpath${delim}$logDirScript");
    }
    elsif ( $logDir ne "NULL" ){
        &dodb_noconn("db2 update database configuration for $dbname using
newlogpath $logDir", $all_in);
    }
    $setLogs=0;
    $setLogString="";
    if ( $logprimary ne "NULL" ){
        $setLogString.="db2 update db cfg for $dbname using logprimary
$logprimary";
        $setLogs=1;
    }
    if ( $logsecond ne "NULL" ){
        if ( $setLogs != 0 ){
            $setLogString.=" $sep ";
        }
        $setLogString.="db2 update db cfg for $dbname using logsecond
$logsecond";
        $setLogs=1;
    }
    if ( $logfilsiz ne "NULL" ){
        if ( $setLogs != 0 ){
            $setLogString.=" $sep ";
        }
        $setLogString.="db2 update db cfg for $dbname using logfilsiz
$logfilsiz";
        $setLogs=1;
    }
    if ( $setLogs != 0 ){
        $setLogString.=" $sep ";
    }
    $setLogString.="db2 update db cfg for $dbname using logbufsiz 128";
    $rc = &dodb_noconn("$setLogString", $all_in);
}

#-----#
# Function: createDb #
#-----#
sub createDb{
    &outtime("**** Starting to create the database");
    # setup required variables
    my $rc;

```

```

Src = &dodb_noconn("db2 \"create database $dbname on $dbpath collate
using identity with 'TPC-D $sf GB'\", $once);
($rc == 0) || return($rc);
# reset the db and dbm configuration before we start
&dodb_noconn("db2 reset database configuration for $dbname", $all_in);
&dodb_conn($dbname, "db2 alter bufferpool ibmdefaultbp size -1 $sep \
db2 grant connect on database to public $sep \
db2 grant dbadm on database to $dbname $sep \
db2 commit", $once);
&dodb_noconn("db2 reset database manager configuration", $once);
}

#-----#
# Function: createNodegroups                                #
#-----#
sub createNodegroups {
    &outtime("*** Creating the nodegroups.");
    my $rc;
    if ( $nodegroupdef ne "NULL" ) {
        $rc = &dodb2file($dbname, "$ddlpath$ {delim} $nodegroupdef", $once);
    }
}

#-----#
# Function: createExplainTbIs                              #
#-----#
sub createExplainTbIs {
    &outtime("*** Creating the EXPLAIN tables.");
    my $rc;
    my $explnPathFile;
    my $home;
    my $sqlpath;

    if ( $explnDDL ne "NULL" ) {
        $explnPathFile = "$explnDDL";
    }
    else {
        if ( $platform eq "ptx" ) {
            $home = $ENV{"HOME"};
            $sqlpath = "$home$ {delim} sqllib";
        }
        if ( $platform ne "nt" ) {
            $home = $ENV{"HOME"};
            $sqlpath = "$home$ {delim} sqllib";
        }
        else {
            $sqlpath = $ENV{"DB2PATH"};
        }
        $explnPathFile = "$sqlpath$ {delim} misc$ {delim} EXPLAIN.DDL";
    }
    $rc = &dodb_conn($dbname,
"db2 -tvf $explnPathFile $sep \
db2 alter table explain_instance locksize table append on $sep \
db2 alter table explain_statement locksize table append on $sep \
db2 alter table explain_argument locksize table append on $sep \
db2 alter table explain_object locksize table append on $sep \
db2 alter table explain_operator locksize table append on $sep \
db2 alter table explain_predicate locksize table append on $sep \
db2 alter table explain_stream locksize table append on",
    $once);
}

#-----#
# Function: createBufferPools                              #
#-----#
sub createBufferPools {
    my $rc;
    &outtime("*** Creating the bufferpools");
    if ( $buffpooldef ne "NULL" ) {
        #run the create bufferpool ddl
        $rc = &dodb2file($dbname, "$ddlpath$ {delim} $buffpooldef", $once);
    }
}

#-----#

```

```

# Function: createTablespaces                                #
#-----#
sub createTablespaces {
    &outtime("*** Ready to start creating the tablespaces");
    # setup required variables
    my $rc;
    $rc = &dodb2file($dbname, "$ddlpath$ {delim} $tblspddl", $once);
    ($rc == 0) || return $rc;
    # create/populate the staging tables
    if ( $stagingTbl ne "NULL" ) {
        # staging tables must be created for both test and qualification database
        # but they do not need to be populated for the qualification database
        $rc = &dodb2file($dbname, "$ddlpath$ {delim} $stagingTbl", $once);
        ($rc == 0) || return $rc;
        if ( $qual ne "QUAL" ) {
            if ( $preloadSampleUF ne "NULL" ) {
                # preload the sample UF data for statistics gathering
                $rc = system ("perl $ddlpath$ {delim} $preloadSampleUF");
                #($rc == 0) || return $rc;
            }
            if ( $deleteSampleUF ne "NULL" ) {
                # delete the sample rows now that stats have been gathered
                $rc =
&dodb2file($dbname, "$ddlpath$ {delim} $deleteSampleUF", $once);
                #($rc == 0) || return $rc;
            }
        }
    }
}

#-----#
# Function: createTables                                    #
#-----#
sub createTables {
    my $rc;
    $rc = &dodb2file($dbname, "$ddlpath$ {delim} $ddl", $once);
    ($rc == 0) || return $rc;
    # update the locksize on the non-updated tables to be table level locking
    # update the tables for appendmode
    if ( $appendOn eq "yes" ) {
        $rc = &dodb_conn($dbname,
"db2 alter table tpcd.nation locksize table $sep \
db2 alter table tpcd.region locksize table $sep \
db2 alter table tpcd.customer locksize table $sep \
db2 alter table tpcd.supplier locksize table $sep \
db2 alter table tpcd.part locksize table $sep \
db2 alter table tpcd.partsupp locksize table $sep \
db2 alter table tpcd.lineitem append on $sep \
db2 alter table tpcd.orders append on",
        $once);
    }
    else {
        $rc = &dodb_conn($dbname,
"db2 alter table tpcd.nation locksize table $sep \
db2 alter table tpcd.region locksize table $sep \
db2 alter table tpcd.customer locksize table $sep \
db2 alter table tpcd.supplier locksize table $sep \
db2 alter table tpcd.part locksize table $sep \
db2 alter table tpcd.partsupp locksize table $sep \
db2 alter table tpcd.lineitem pctfree 0 $sep \
db2 alter table tpcd.orders pctfree 0",
        $once);
    }
}

#-----#
# Function: createIndexes                                  #
#-----#
sub createIndexes {
    # setup required variables
    local @args = @_;
    my $indexType = @args[0];
    my $rc;
    &outtime("*** Starting to create $indexType indexes");
}

```

```

if( $IndexType eq "extra"){
    $src = &dodb2file($dbname,"$ddlpath${delim}$extraindex",$once);
} else if( $IndexType eq "early" || $IndexType eq "normal"){
    $src = &dodb2file($dbname,"$ddlpath${delim}$indexddl",$once);
}
&outtime("*** Create $IndexType index completed");
# $src = &dodb_conn($dbname,
    "db2 alter table tpcd.orders add primary key (o_orderkey) $sep \
    db2 alter table tpcd.lineitem add primary key (l_orderkey,
l_linenumbers)",
# $once);

return $src;
}

#-----#
# Function: setLoadConfig #
#-----#
sub setLoadConfig {

    &outtime("*** Setting LOAD configuration.");
    my $src;
    my $buffpage;
    my $sortheap;
    my $sheapthres;
    my $util_heap_sz;
    my $ioservers;
    my $ioclnrs= 1;
    my $chngpgs= 60;

    if($loadconfigfile eq "NULL"){
        if( $machine eq "small" ){
            $buffpage = 5000;
            $sortheap = 3000;
            $sheapthres = 8000;
            $util_heap_sz = 5000;
            $ioservers = 6;
        }
        elsif( $machine eq "medium" ){
            $buffpage = 10000;
            $sortheap = 8000;
            $sheapthres = 20000;
            $util_heap_sz = 10000;
            $ioservers = 10;
        }
        elsif( $machine eq "big" ){
            $buffpage = 30000;
            $sortheap = 20000;
            $sheapthres = 50000;
            $util_heap_sz = 30000;
            $ioservers = 20;
        }
        else {
            die "Neither a LOAD config filename nor a valid machine size has
\
            been specified!\n";
        }
        $src = &dodb_noconn("db2 update db cfg for $dbname using buffpage
$buffpage $sep \
db2 update db cfg for $dbname using sortheap $sortheap $sep \
db2 update db cfg for $dbname using num_iocleaners $ioclnrs $sep \
db2 update db cfg for $dbname using num_ioservers $ioservers $sep \
db2 update db cfg for $dbname using util_heap_sz $util_heap_sz $sep \
db2 update db cfg for $dbname using chngpgs_thresh
$chngpgs,$all_ln);
    }
    else {
        print "$ddlpath${delim}$loadconfigfile\n";
        $src = &dodb2file_noconn("$ddlpath${delim}$loadconfigfile",$all_ln);
        print "Rc= $src\n";
        print "Calling Setlogs.\n";
    }
}

```

```

if($qual eq "QUAL"){
    $src = system ("$ddlpath${delim}setlogs_qual $dbname");
}
else {
    $src = system ("$ddlpath${delim}setlogs $dbname");
}
print "Set Logs Rc= $src\n";
}
($src == 0) || return $src;
if($loadDBMconfig ne "NULL"){
    $src =
&dodb2file_noconn("$ddlpath${delim}$loadDBMconfig",$once);
}
else {
    $src = &dodb_noconn("db2 update dbm cfg using sheapthres
$sheapthres",$once);
}
($src == 0) || return $src;
&dodb_noconn("db2 terminate",$once);
$src = &stopStart;
return $src;
}
#-----#
# Function: loadData #
#-----#
sub loadData {
    # start the dbgen and load.....call the specific mode for loading (uni,smp,mln)
    my $src;
    if( ($mode eq "uni" ) || ( $mode eq "smp" )){
        &outtime("*** Starting the load");
        # call the appropriate dbgen/load for uni/smp
        if( $loadscript eq "NULL"){
            $src = system("perl genloaduni $qual");
            ($src == 0) || print "ERROR: genloaduni failed rc = $src\n";
        }
        else {
            $src = &dodb2file_noconn("$ddlpath${delim}$loadscript",$once);
            ($src == 0) || print "ERROR: load script: $loadscript failed. rc =
$src\n";
        }
    }
    elsif( ($mode eq "mln" ) || ( $mode eq "mpp" )){
        &outtime("*** Starting the load");
        # call the appropriate dbgen/split/(sort)/load for mln/mpp
        if( $loadscript eq "NULL"){
            $src = system("perl genloadmpp $qual");
            ($src == 0) || print "ERROR: genloadmpp failed. rc = $src\n";
        }
        else {
            system("$ddlpath${delim}$loadscript");
            # $src = &dodb2file_noconn("$ddlpath${delim}$loadscript $sf");
            # ($src == 0) || print "ERROR: load script $loadscript failed. rc =
$src\n";
        }
    }
    else {
        print "TPCD_MODE not set to one of uni, smp, mln or mpp\n";
        $src = 1;
    }
    ($src == 0) || &outtime("*** Load complete");
    return $src;
}
#-----#
# Function: doRunStats #
#-----#
sub doRunStats {
    # if loadstats not gathered, then index stats not gathered either.
    &outtime("*** Runstats started");
    if( $runstatShort ne "NULL" ){
        # we've specified a second runstats file...This runstats file should do
        # runstats for all table except lineitem. The lineitem runstats command
        # should be left in the main runstats file.
        if( $platform eq "aix" || $platform eq "sun" || $platform eq "ptx" ){

```

```

        print "runstats from $ddlpath${delim}$runstatShort running now\n";
        $rc = system("db2 -tvf \"$ddlpath${delim}$runstatShort\" >
\"$auditDir${delim}tools${delim}runstatShort.out\" & ");
        print "rc from runstatShort=$rc\n";
    }
    elsif ( $platform eq "nt" ){
        system("start db2 -tvf $ddlpath${delim}$runstatShort");
    }
    else
    {
        print "Don't know how to start in background on $platform platform\n";
        print "therefore running runstats serially\n";
        &dodb2file($dbname,"$ddlpath${delim}$runstatShort",&once);
    }
}
# run the full runstats, or the remainder of what wasn't put into the short
# runstats file. You should be sure that this runstats will take longer
# than the short runstats that is running in the background, otherwise
# setting the config will happen before this is done.
&dodb2file($dbname,"$ddlpath${delim}$runstats",&once);
&outtime("*** Runstats completed");
}

#-----#
# Function: setConfiguration                                     #
#-----#
sub setConfiguration{
    my $ret = 0;
    &dodb_noconn("db2 update database configuration for $dbname using
dft_degree $smpdegree",&all_in);
    &dodb_noconn("db2 update database manager configuration using
max_querydegree $smpdegree",&once);
    &dodb2file_noconn("$ddlpath${delim}$configfile",&all_in);
    &dodb2file_noconn("$ddlpath${delim}$dbmconfig",&once);

    if ( $agentpri ne "NULL" ){
        &dodb_noconn("db2 update dbm cfg using AGENTPRI
$agentpri",&once);
    }
    # set the db2 environment variables for running the benchmark
    if ( $setScript ne "NULL" ){
        if ( $platform eq "aix" || $platform eq "sun" || $platform eq "ptx" ){
            $ret=system("$ddlpath${delim}$setScript");
        }
        elsif ( $platform eq "nt" ){
            if (( $mode eq "uni" ) || ( $mode eq "smp" )){
                $ret = system("perl $ddlpath${delim}$setScript");
            }
            else{
                $ret=system(" db2_all \" call $ddlpath${delim}$setScript \" ");
            }
        }
    }
    #($ret == 0) || die "failure setting runtime db2set parms from $setScript
\n";
}

#-----#
# Function: createBackup                                       #
#-----#
sub createBackup{
    my $rc;
    &dodb_noconn("db2 update database configuration for $dbname using
LOGRETAIN yes",&all_in);
    print "\n NOTE: DO NOT RESET THE DATABASE CONFIGURATION
or you will lose logretain\n";
    # force a connection to the database on all nodes to ensure LOGRETAIN is
    # set in effect.
    # An error message will print to screen if the logretain is set properly
    # i.e. SQL116N A connection to or activation of database <database name>
    # cannot be made.
    # This is expected and the lack of this error message should be seen as an
    # error in the database build.
    &dodb_conn($dbname,"db2 \" select count(*) from tpcc.region\"",&all_in);

```

```

system("db2 connect reset");
system("db2 terminate");

if ( $qual eq "QUAL" ){
    &outtime("*** Starting the backup");
    $rc=system("CALL BKUPQUAL2.BAT");
    ($rc == 0) || &outtime("*** Finished the backup");

    #if (( $mode eq "mln" ) || ( $mode eq "mpp" )){
        # must back up catalog node first...assume node 00
        #DJD $rc=system("db2_all \" }<<-000< db2 \"backup database
$dbname to $backupdir without prompting\" \ ");

        #($rc == 0) || print "ERROR: backup of catalog node failed rc =
$rc\n";

        # back up remaining nodes
        # $rc=system("db2_all \" }<<-000< db2 backup database $dbname to
$backupdir without prompting\" ");
        #($rc == 0) || print "ERROR: backup of remaining nodes failed rc =
$rc\n";
    }
    #else{
        # $rc = &dodb_noconn("db2 backup database $dbname to
$backupdir",&once);
        #}
        #($rc == 0) || &outtime("*** Finished the backup");
    }
    else{
        &outtime("*** Starting BACKUP");
        # This is the test database. Clause 3.1.4 states that "the test sponsor is
        # not required to make or have backup copies of the test database;
        # all other mechanisms that guarantee durability of the qualification
        # database must be enabled in the same way for the test database".
        # According to this clause we do need to keep the backup of the
        database.
        #DJD $rc = &dodb_noconn("db2dart $dbname /CHST /WHAT DBBP
OFF",&all_in);
        print "Start taking backups, as RAID 0 is being used\n";
        ($rc == 0) || &outtime("*** Finished the backup");
        &outtime("*** Starting the test db DB backups");
        $rc=system("CALL BKUPTESTDB.BAT");
        &outtime("*** Finished taking backups of test DB ");

    }
    return $rc;
}

#-----#
# Function: printSummary                                       #
#-----#
sub printSummary{
    if ( $buildStage ne "ALL" ){
        print " ***** STARTING the build process at the $buildStage Stage
*****\n";
    }
    print "Building a TPC-D Version $tpcdVersion $sf GB database on $dbpath
with: \n";
    print " Mode = $mode \n";
    print " Tablespace ddl in $ddlpath${delim}$tblspddl \n";
    if ( $nodelist ne "NULL" ){
        print " Nodelist ddl in $ddlpath${delim}$nodelist \n";
    }
    if ( $bufferpool ne "NULL" ){
        print " Bufferpool ddl in $ddlpath${delim}$bufferpool \n";
    }
    print " Table ddl in $ddlpath${delim}$ddl \n";
    print " Index ddl in $ddlpath${delim}$indexddl \n";
    if ( $extraindex ne "no" ){
        print " Indices to create after the load $ddlpath${delim}$extraindex\n";
    }
    if ( $loadscript eq "NULL" ){
        if ( $input eq "NULL" ){
            print " Data generated by DBGEN in $dbgen\n";

```



```

    }
    else{
        print " Data loaded from flat files in $input\n";
    }
}
if ( $earlyindex eq "yes" ){
    print " Indexes created before loading\n";
}
else{
    print " Indexes created after loading\n";
}
if ( $addRI ne "NULL" ){
    print " RI being used from $ddlpath${delim}$addRI\n";
}
if ( $astFile ne "NULL" ){
    print " AST being used from $ddlpath${delim}$astFile\n";
}
if ( $loadstats eq "yes" ){
    if ( $earlyindex eq "yes" ){
        print " Statistics for tables and indexes gathered during load\n";
    }
    else{
        if ( $runstatShort eq "NULL" ){
            print " Statistics for tables and indexes gathered after load using
$ddlpath${delim}$runstats \n";
        }
        else{
            print " Statistics for tables and indexes gathered after load using
$ddlpath${delim}$runstats and $ddlpath${delim}$runstatShort\n";
        }
    }
}
else{
    if ( $runstatShort eq "NULL" ){
        print " Statistics for tables and indexes gathered after load using
$ddlpath${delim}$runstats \n";
    }
    else{
        print " Statistics for tables and indexes gathered after load using
$ddlpath${delim}$runstats and $ddlpath${delim}$runstatShort\n";
    }
}
if ( $loadconfigfile ne "NULL" ){
    print " Database Configuration parameters for LOAD taken from
$ddlpath${delim}$loadconfigfile\n";
}
if ( $loadDBMconfig ne "NULL" ){
    print " Database manager Configuration parameters for LOAD taken from
$ddlpath${delim}$loadDBMconfig\n";
}
if ( $configfile ne "NULL" ){
    print " Database Configuration parameters taken from
$ddlpath${delim}$configfile\n";
}
else{
    print " Database Configuration paramters taken from
$ddlpath${delim}$dss.dbconfig${sfReal}GB\n";
    $configfile="dss.dbconfig${sfReal}GB";
}
if ( $dbmconfig ne "NULL" ){
    print " Database Manager Configuration parameters taken from
$ddlpath${delim}$dbmconfig\n";
}
else{
    print " Database Manager Configuration paramters taken from
$ddlpath${delim}$dss.dbmconfig${sfReal}GB\n";
    $configfile="dss.dbmconfig${sfReal}GB";
}
#print " Copy image for load command created in $copydir\n";
if ( $log eq "yes" ){
    print " Backup files placed in $backupdir\n";
}
else{
    print " No backup will be taken.\n";
}

```

```

}
print " Log retain set to $log\n";
if ( $logDir eq "NULL" ){
    print " Log files remain in database path\n";
}
else{
    print " Log file path set to $logDir\n";
}
if ( $logprimary eq "NULL" ){
    print " Log Primary left at default\n";
}
else{
    print " Log Primary set to $logprimary\n";
}
if ( $logsecond eq "NULL" ){
    print " Log Second left at default\n";
}
else{
    print " Log second set to $logsecond\n";
}
if ( $logfilsiz eq "NULL" ){
    print " Logfilsiz left at default\n";
}
else{
    print " Logfilsiz set to $logfilsiz\n";
}
if (( $loadconfigfile eq "" ) || ( $loadconfigfile eq "NULL" )){
    print " Machine size set to $machine so the following configuration\n";
    print " parameters are used for load, create index and runstats: \n";
    print " BUFFPAGE = $buffpage \n";
    print " SORTHEAP = $sortheap \n";
    print " SHEAPTHRES = $sheapthres\n";
    print " NUM_IOSERVERS = $ioservers\n";
    print " NUM_IOCLEANERS = $ioclnrs\n";
    print " CHNGPGS_THRESH = $chngpgs\n";
    print " UTIL_HEAP_SZ = $util_heap_sz\n";
    print " Degree of parallelism (dft_degree and max_querydegree) set to
$smdegree\n";
    print " Parameters for load are: temp file = $ldtemp\n";
    print " sort buf = $sortbuf\n";
    print " ld parallelism = $load_parallelism\n";
    if ( $fparse eq "yes" ){
        print " FASTPARSE used on load\n";
    }
}
if ( $loadscript ne "NULL" ){
    print " Load commands in $ddlpath${delim}$loadscript\n";
}
print " Degree of parallelism (dft_degree and max_querydegree) set to
$smdegree\n";
if ( $agentpri ne "NULL" ){
    print " AGENTPRI set to $agentpri\n";
}
if ( $activate eq "yes" ){
    print " Database will be activated when build is complete\n";
}
if ( $explainDDL ne "NULL" ){
    print " EXPLAIN DDL being used from
$ddlpath${delim}$explainDDL\n";
}
else{
    print " EXPLAIN DDL being used from default sqllib directory\n";
}
}
1;

```

affinity_8mIn.bat

```

rem Set affinities for LN0 -> LN7 for 8 processor system with hyperthreading.
db2set db2processors=4,12 -i tpch 0
db2set db2processors=5,13 -i tpch 1
db2set db2processors=6,14 -i tpch 2

```

```
db2set db2processors=7,15 -i tpch 3
db2set db2processors=0,8 -i tpch 4
db2set db2processors=1,9 -i tpch 5
db2set db2processors=2,10 -i tpch 6
db2set db2processors=3,11 -i tpch 7
```

bkuptestdb.bat

```
rd o:\backup /s /q
rd p:\backup /s /q
md o:\backup
md p:\backup

time < xxx
db2start
set db2node=4
db2 backup database tpcd to o:\backup WITH 16 BUFFERS PARALLELISM 8
without prompting
time < xxx
rem End of backup node 4
db2stop

db2start
set db2node=5
db2 backup database tpcd to o:\backup WITH 16 BUFFERS PARALLELISM 8
without prompting
time < xxx
rem End of backup node 5
db2stop
time < xxx

db2start
set db2node=6
db2 backup database tpcd to o:\backup WITH 16 BUFFERS PARALLELISM 8
without prompting
time < xxx
rem End of backup node 6
db2stop
time < xxx

db2start
set db2node=7
db2 backup database tpcd to o:\backup WITH 16 BUFFERS PARALLELISM 8
without prompting
time < xxx
rem End of backup node 7
db2stop
time < xxx

db2start
set db2node=0
db2 backup database tpcd to p:\backup WITH 16 BUFFERS PARALLELISM 8
without prompting
time < xxx
rem End of backup node 0
db2stop
time < xxx

db2start
set db2node=1
db2 backup database tpcd to p:\backup WITH 16 BUFFERS PARALLELISM 8
without prompting
time < xxx
rem End of backup node 1
db2stop
time < xxx

db2start
set db2node=2
db2 backup database tpcd to p:\backup WITH 16 BUFFERS PARALLELISM 8
without prompting
time < xxx
rem End of backup node 2
```

```
db2stop
time < xxx
```

```
db2start
set db2node=3
db2 backup database tpcd to p:\backup WITH 16 BUFFERS PARALLELISM 8
without prompting
time < xxx
rem End of backup node 3
time < xxx
```

create_bufferpools

```
-- Create 16K page bufferpool
alter bufferpool ibmdefaultbp size 250;
create bufferpool BP16K size -1 pagesize 16k;
```

create_indexes

```
values(current timestamp);
CREATE UNIQUE INDEX "TPCD"."R_RK" ON "TPCD"."REGION"
("R_REGIONKEY" ASC)
PCTFREE 0 ;
commit work;
```

```
values(current timestamp);
CREATE UNIQUE INDEX "TPCD"."N_NK" ON "TPCD"."NATION"
("N_NATIONKEY" ASC)
PCTFREE 0 ;
commit work;
```

```
values(current timestamp);
CREATE INDEX "TPCD"."N_RK" ON "TPCD"."NATION"
("N_REGIONKEY" ASC)
PCTFREE 0 ;
commit work;
```

```
values(current timestamp);
CREATE UNIQUE INDEX "TPCD"."S_SK" ON "TPCD"."SUPPLIER"
("S_SUPPKEY" ASC)
PCTFREE 0 ;
commit work;
```

```
values(current timestamp);
CREATE INDEX "TPCD"."S_NK" ON "TPCD"."SUPPLIER"
("S_NATIONKEY" ASC)
PCTFREE 0 ;
commit work;
values(current timestamp);
```

```
values(current timestamp);
CREATE UNIQUE INDEX "TPCD"."P_PK" ON "TPCD"."PART"
("P_PARTKEY" ASC)
PCTFREE 0 ;
commit work;
values(current timestamp);
```

```
values(current timestamp);
CREATE INDEX "TPCD"."PS_SK" ON "TPCD"."PARTSUPP"
("PS_SUPPKEY" ASC)
PCTFREE 0 ;
commit work;
```

```
values(current timestamp);
CREATE INDEX "TPCD"."PS_PK" ON "TPCD"."PARTSUPP"
("PS_PARTKEY" ASC)
PCTFREE 0 ;
commit work;
```

```
values(current timestamp);
CREATE UNIQUE INDEX "TPCD"."PS_PSK" ON "TPCD"."PARTSUPP"
("PS_PARTKEY" ASC,
"PS_SUPPKEY" ASC)
```

```

PCTFREE 0 ;
commit work;

values(current timestamp);
CREATE UNIQUE INDEX "TPCD"."PS_SKPK" ON "TPCD"."PARTSUPP"
("PS_SUPPKEY" ASC,
"PS_PARTKEY" ASC)
PCTFREE 0 ;
commit work;

values(current timestamp);
CREATE UNIQUE INDEX "TPCD"."C_CK" ON "TPCD"."CUSTOMER"
("C_CUSTKEY" ASC)
PCTFREE 0 ;
commit work;

values(current timestamp);
CREATE INDEX "TPCD"."C_NK" ON "TPCD"."CUSTOMER"
("C_NATIONKEY" ASC)
PCTFREE 0 ;
commit work;

values(current timestamp);
CREATE UNIQUE INDEX "TPCD"."O_OK" ON "TPCD"."ORDERS"
("O_ORDERKEY" ASC)
PCTFREE 6 ;
commit work;

values(current timestamp);
create unique index tpcd.l_ok_ln on tpcd.lineitem (L_orderkey, l_linenumber)
pctfree 3;
commit work;
values(current timestamp);

alter table tpcd.orders add primary key(o_orderkey);
alter table tpcd.lineitem add primary key(l_orderkey,l_linenumber);
commit work;

```

create_nodegroups

```

-- Create nodegroups.
create nodegroup catalog_node on node (0);
create nodegroup all_nodes;

```

create_tables

```

CREATE TABLE TPCD.NATION ( N_NATIONKEY INTEGER NOT NULL,
N_NAME CHAR(25) NOT NULL,
N_REGIONKEY INTEGER NOT NULL,
N_COMMENT VARCHAR(152) NOT NULL WITH
DEFAULT)
IN SMALL_TABLES;

CREATE TABLE TPCD.REGION ( R_REGIONKEY INTEGER NOT NULL,
R_NAME CHAR(25) NOT NULL,
R_COMMENT VARCHAR(152) NOT NULL WITH
DEFAULT)
IN SMALL_TABLES;

CREATE TABLE TPCD.PART ( P_PARTKEY INTEGER NOT NULL,
P_NAME VARCHAR(55) NOT NULL,
P_MFGR CHAR(25) NOT NULL,
P_BRAND CHAR(10) NOT NULL,
P_TYPE VARCHAR(25) NOT NULL,
P_SIZE INTEGER NOT NULL,
P_CONTAINER CHAR(10) NOT NULL,

```

```

P_RETAILPRICE FLOAT NOT NULL,
P_COMMENT VARCHAR(23) NOT NULL WITH
DEFAULT)
IN OTHER_STUFF
INDEX IN OTHER_INDEX
PARTITIONING KEY(P_PARTKEY) USING HASHING;

CREATE TABLE TPCD.SUPPLIER ( S_SUPPKEY INTEGER NOT NULL,
S_NAME CHAR(25) NOT NULL,
S_ADDRESS VARCHAR(40) NOT NULL,
S_NATIONKEY INTEGER NOT NULL,
S_PHONE CHAR(15) NOT NULL,
S_ACCTBAL FLOAT NOT NULL,
S_COMMENT VARCHAR(101) NOT NULL WITH
DEFAULT)
IN OTHER_STUFF
INDEX IN OTHER_INDEX
PARTITIONING KEY(S_SUPPKEY) USING HASHING
ORGANIZE BY (
("S_NATIONKEY" ) )
;

CREATE TABLE TPCD.PARTSUPP ( PS_PARTKEY INTEGER NOT
NULL,
PS_SUPPKEY INTEGER NOT NULL,
PS_AVAILQTY INTEGER NOT NULL,
PS_SUPPLYCOST FLOAT NOT NULL,
PS_COMMENT VARCHAR(199) NOT NULL WITH
DEFAULT)
IN OTHER_STUFF
INDEX IN OTHER_INDEX
PARTITIONING KEY(PS_PARTKEY) USING HASHING;

CREATE TABLE TPCD.CUSTOMER ( C_CUSTKEY INTEGER NOT
NULL,
C_NAME CHAR(25) NOT NULL,
C_ADDRESS VARCHAR(40) NOT NULL,
C_NATIONKEY INTEGER NOT NULL,
C_PHONE CHAR(15) NOT NULL,
C_ACCTBAL FLOAT NOT NULL,
C_MKTSEGMENT CHAR(10) NOT NULL,
C_COMMENT VARCHAR(117) NOT NULL WITH
DEFAULT)
IN OTHER_STUFF
INDEX IN OTHER_INDEX
PARTITIONING KEY(C_CUSTKEY) USING HASHING
ORGANIZE BY (
("C_NATIONKEY" ) );

CREATE TABLE TPCD.ORDERS ( O_ORDERKEY INTEGER NOT
NULL,
O_CUSTKEY INTEGER NOT NULL,
O_ORDERSTATUS CHAR(1) NOT NULL,
O_TOTALPRICE FLOAT NOT NULL,
O_ORDERDATE DATE NOT NULL,
O_ORDERPRIORITY CHAR(15) NOT NULL,
O_CLERK CHAR(15) NOT NULL,
O_SHIPPRIORITY INTEGER NOT NULL,
O_COMMENT VARCHAR(79) NOT NULL WITH
DEFAULT
-- PRIMARY KEY (O_ORDERKEY)
)
IN OTHER_STUFF
INDEX IN OTHER_INDEX
PARTITIONING KEY(O_ORDERKEY) USING HASHING
ORGANIZE BY (( O_ORDERDATE ) );

CREATE TABLE TPCD.LINEITEM ( L_ORDERKEY INTEGER NOT
NULL,
L_PARTKEY INTEGER NOT NULL,
L_SUPPKEY INTEGER NOT NULL,
L_LINENUMBER INTEGER NOT NULL,
L_QUANTITY FLOAT NOT NULL,
L_EXTENDEDPRICE FLOAT NOT NULL,

```

```

        L_DISCOUNT  FLOAT NOT NULL,
        L_TAX         FLOAT NOT NULL,
        L_RETURNFLAG  CHAR(1) NOT NULL,
        L_LINestatus  CHAR(1) NOT NULL,
        L_SHIPDATE    DATE NOT NULL,
        L_COMMITDATE  DATE NOT NULL,
        L_RECEIPTDATE DATE NOT NULL,
        L_SHIPINSTRUCT CHAR(25) NOT NULL,
        L_SHIPMODE    CHAR(10) NOT NULL,
        L_COMMENT     VARCHAR(44) NOT NULL WITH
DEFAULT
--          PRIMARY KEY (L_ORDERKEY, L_LINENUMBER)
)
IN LINEITEM_TABLE
INDEX IN LINEITEM_INDEXES
PARTITIONING KEY(L_ORDERKEY) USING HASHING
ORGANIZE BY ( (L_SHIPDATE) );

```

COMMIT WORK;

create_ tablespaces

create regular tablespace small_tables

```

in nodegroup catalog_node
managed by system
using ('d:\small_tables')
on node (0)
overhead 1.60
transferrate 0.22;

```

create regular tablespace LINEITEM_TABLE

```

pagesize 16K
managed by database
using ( device 'd:\MP\li_data_D2'      17800M,
        device 'd:\MP\li_data_D14'    17800M) on node(0)
using ( device 'd:\MP\li_data_D3'      17800M,
        device 'd:\MP\li_data_D15'    17800M) on node(1)
using ( device 'd:\MP\li_data_D5'      17800M,
        device 'd:\MP\li_data_D17'    17800M) on node(2)
using ( device 'd:\MP\li_data_D6'      17800M,
        device 'd:\MP\li_data_D18'    17800M) on node(3)
using ( device 'd:\MP\li_data_D8'      17800M,
        device 'd:\MP\li_data_D20'    17800M,
        device 'd:\MP\li_data_D27'    17800M) on node(4)
using ( device 'd:\MP\li_data_D9'      17800M,
        device 'd:\MP\li_data_D21'    17800M,
        device 'd:\MP\li_data_D28'    17800M) on node(5)
using ( device 'd:\MP\li_data_D11'     17800M,
        device 'd:\MP\li_data_D23'    17800M,
        device 'd:\MP\li_data_D30'    17800M) on node(6)
using ( device 'd:\MP\li_data_D12'     17800M,
        device 'd:\MP\li_data_D24'    17800M,
        device 'd:\MP\li_data_D31'    17800M) on node(7)
bufferpool BP16K
extentsize 24
prefetchsize 48
overhead 3.0
transferrate 0.40;

```

create regular tablespace LINEITEM_INDEXES

```

pagesize 16K
managed by database
using ( device 'd:\MP\LI_INDEX_D2'     2900M,
        device 'd:\MP\LI_INDEX_D14'    2900M) on node(0)
using ( device 'd:\MP\LI_INDEX_D3'     2900M,
        device 'd:\MP\LI_INDEX_D15'    2900M) on node(1)
using ( device 'd:\MP\LI_INDEX_D5'     2900M,
        device 'd:\MP\LI_INDEX_D17'    2900M) on node(2)
using ( device 'd:\MP\LI_INDEX_D6'     2900M,
        device 'd:\MP\LI_INDEX_D18'    2900M) on node(3)
using ( device 'd:\MP\LI_INDEX_D8'     2900M,
        device 'd:\MP\LI_INDEX_D20'    2900M,
        device 'd:\MP\LI_INDEX_D27'    2900M) on node(4)

```

```

using ( device 'd:\MP\LI_INDEX_D9'     2900M,
        device 'd:\MP\LI_INDEX_D21'    2900M,
        device 'd:\MP\LI_INDEX_D28'    2900M) on node(5)
using ( device 'd:\MP\LI_INDEX_D11'    2900M,
        device 'd:\MP\LI_INDEX_D23'    2900M,
        device 'd:\MP\LI_INDEX_D30'    2900M) on node(6)
using ( device 'd:\MP\LI_INDEX_D12'    2900M,
        device 'd:\MP\LI_INDEX_D24'    2900M,
        device 'd:\MP\LI_INDEX_D31'    2900M) on node(7)
bufferpool BP16K
extentsize 24
prefetchsize 48
overhead 3.0
transferrate 0.40;

```

create regular tablespace OTHER_STUFF

```

pagesize 16K
managed by database
using ( device 'd:\MP\OTHER_TABLES_D2' 7900M,
        device 'd:\MP\OTHER_TABLES_D14' 7900M) on node(0)
using ( device 'd:\MP\OTHER_TABLES_D3' 7900M,
        device 'd:\MP\OTHER_TABLES_D15' 7900M) on node(1)
using ( device 'd:\MP\OTHER_TABLES_D5' 7900M,
        device 'd:\MP\OTHER_TABLES_D17' 7900M) on node(2)
using ( device 'd:\MP\OTHER_TABLES_D6' 7900M,
        device 'd:\MP\OTHER_TABLES_D18' 7900M) on node(3)
using ( device 'd:\MP\OTHER_TABLES_D8' 7900M,
        device 'd:\MP\OTHER_TABLES_D20' 7900M,
        device 'd:\MP\OTHER_TABLES_D27' 7900M) on node(4)
using ( device 'd:\MP\OTHER_TABLES_D9' 7900M,
        device 'd:\MP\OTHER_TABLES_D21' 7900M,
        device 'd:\MP\OTHER_TABLES_D28' 7900M) on node(5)
using ( device 'd:\MP\OTHER_TABLES_D11' 7900M,
        device 'd:\MP\OTHER_TABLES_D23' 7900M,
        device 'd:\MP\OTHER_TABLES_D30' 7900M) on node(6)
using ( device 'd:\MP\OTHER_TABLES_D12' 7900M,
        device 'd:\MP\OTHER_TABLES_D24' 7900M,
        device 'd:\MP\OTHER_TABLES_D31' 7900M) on node(7)
bufferpool BP16K
extentsize 24
prefetchsize 48
overhead 3.0
transferrate 0.40;

```

create regular tablespace OTHER_INDEX

```

pagesize 16K
managed by database
using ( device 'd:\MP\OTHER_INDEX_D2' 1990M,
        device 'd:\MP\OTHER_INDEX_D14' 1990M) on node(0)
using ( device 'd:\MP\OTHER_INDEX_D3' 1990M,
        device 'd:\MP\OTHER_INDEX_D15' 1990M) on node(1)
using ( device 'd:\MP\OTHER_INDEX_D5' 1990M,
        device 'd:\MP\OTHER_INDEX_D17' 1990M) on node(2)
using ( device 'd:\MP\OTHER_INDEX_D6' 1990M,
        device 'd:\MP\OTHER_INDEX_D18' 1990M) on node(3)
using ( device 'd:\MP\OTHER_INDEX_D8' 1990M,
        device 'd:\MP\OTHER_INDEX_D20' 1990M,
        device 'd:\MP\OTHER_INDEX_D27' 1990M) on node(4)
using ( device 'd:\MP\OTHER_INDEX_D9' 1990M,
        device 'd:\MP\OTHER_INDEX_D21' 1990M,
        device 'd:\MP\OTHER_INDEX_D28' 1990M) on node(5)
using ( device 'd:\MP\OTHER_INDEX_D11' 1990M,
        device 'd:\MP\OTHER_INDEX_D23' 1990M,
        device 'd:\MP\OTHER_INDEX_D30' 1990M) on node(6)
using ( device 'd:\MP\OTHER_INDEX_D12' 1990M,
        device 'd:\MP\OTHER_INDEX_D24' 1990M,
        device 'd:\MP\OTHER_INDEX_D31' 1990M) on node(7)
bufferpool BP16K
extentsize 24
prefetchsize 48
overhead 3.0
transferrate 0.40;

```

```

create temporary tablespace TEMP_TABLES
pagesize 16K
managed by database
using ( device 'd:\MP\temp_D2'      34900M,
       device 'd:\MP\temp_D14'    34900M) on node(0)
using ( device 'd:\MP\temp_D3'      34900M,
       device 'd:\MP\temp_D15'    34900M) on node(1)
using ( device 'd:\MP\temp_D5'      34900M,
       device 'd:\MP\temp_D17'    34900M) on node(2)
using ( device 'd:\MP\temp_D6'      34900M,
       device 'd:\MP\temp_D18'    34900M) on node(3)
using ( device 'd:\MP\temp_D8'      34900M,
       device 'd:\MP\temp_D20'    34900M,
       device 'd:\MP\temp_D27'    34900M) on node(4)
using ( device 'd:\MP\temp_D9'      34900M,
       device 'd:\MP\temp_D21'    34900M,
       device 'd:\MP\temp_D28'    34900M) on node(5)
using ( device 'd:\MP\temp_D11'     34900M,
       device 'd:\MP\temp_D23'    34900M,
       device 'd:\MP\temp_D30'    34900M) on node(6)
using ( device 'd:\MP\temp_D12'     34900M,
       device 'd:\MP\temp_D24'    34900M,
       device 'd:\MP\temp_D31'    34900M) on node(7)
bufferpool BP16K
extentsize 24
prefetchsize 48
overhead 3.0
transferrate 0.40;

commit work;

createuftbls

connect to tpcd;

drop table TPCDTEMP.ORDERS_NEW;
drop table TPCDTEMP.ORDERS_DEL;
drop table TPCDTEMP.LINEITEM_NEW;

commit;

CREATE TABLE TPCDTEMP.ORDERS_NEW ( APP_ID INTEGER NOT
NULL,
        O_ORDERKEY    INTEGER NOT NULL,
        O_CUSTKEY     INTEGER NOT NULL,
        O_ORDERSTATUS CHAR(1) NOT NULL,
        O_TOTALPRICE  FLOAT NOT NULL,
        O_ORDERDATE   DATE NOT NULL,
        O_ORDERPRIORITY CHAR(15) NOT NULL,
        O_CLERK       CHAR(15) NOT NULL,
        O_SHIPPRIORITY INTEGER NOT NULL,
        O_COMMENT     VARCHAR(79) NOT NULL WITH
DEFAULT)
        IN OTHER_STUFF
        INDEX IN OTHER_INDEX
        PARTITIONING KEY(O_ORDERKEY) USING HASHING;

CREATE INDEX "TPCDTEMP"."I_ORDERS_NEW" ON
"TPCDTEMP"."ORDERS_NEW"
("APP_ID" ASC,
 "O_ORDERKEY" ASC,
 "O_CUSTKEY" ASC,
 "O_ORDERSTATUS" ASC,
 "O_TOTALPRICE" ASC,
 "O_ORDERDATE" ASC,
 "O_ORDERPRIORITY" ASC,
 "O_CLERK" ASC,
 "O_SHIPPRIORITY" ASC,
 "O_COMMENT" ASC);

CREATE TABLE TPCDTEMP.ORDERS_DEL ( APP_ID    INTEGER NOT
NULL,

```

```

        O_ORDERKEY    INTEGER NOT NULL)
        IN OTHER_STUFF
        INDEX IN OTHER_INDEX
        PARTITIONING KEY(O_ORDERKEY) USING HASHING;

CREATE UNIQUE INDEX "TPCDTEMP"."I_ORDERS_DEL" ON
"TPCDTEMP"."ORDERS_DEL"
("APP_ID" ASC,
 "O_ORDERKEY" ASC);

CREATE TABLE TPCDTEMP.LINEITEM_NEW ( APP_ID INTEGER NOT
NULL,
        L_ORDERKEY    INTEGER NOT NULL,
        L_PARTKEY     INTEGER NOT NULL,
        L_SUPPKEY     INTEGER NOT NULL,
        L_LINENUMBER  INTEGER NOT NULL,
        L_QUANTITY    FLOAT NOT NULL,
        L_EXTENDEDPRICE FLOAT NOT NULL,
        L_DISCOUNT   FLOAT NOT NULL,
        L_TAX         FLOAT NOT NULL,
        L_RETURNFLAG  CHAR(1) NOT NULL,
        L_LINESTATUS  CHAR(1) NOT NULL,
        L_SHIPDATE    DATE NOT NULL,
        L_COMMITDATE  DATE NOT NULL,
        L_RECEIPTDATE DATE NOT NULL,
        L_SHIPINSTRUCT CHAR(25) NOT NULL,
        L_SHIPMODE    CHAR(10) NOT NULL,
        L_COMMENT     VARCHAR(44) NOT NULL WITH
DEFAULT)
        IN LINEITEM_TABLE
        INDEX IN LINEITEM_INDEXES
        PARTITIONING KEY(L_ORDERKEY);

CREATE INDEX "TPCDTEMP"."I_LINEITEM_NEW" ON
"TPCDTEMP"."LINEITEM_NEW"
("APP_ID" ASC);

COMMIT WORK;

alter table tpcdtemp.orders_new locksize table;
alter table tpcdtemp.orders_del locksize table;
alter table tpcdtemp.lineitem_new locksize table;

COMMIT WORK;

connect reset;

db2nodes.cfg

0 ruthless1 RUTHLESS1 0
1 ruthless1 RUTHLESS1 1
2 ruthless1 RUTHLESS1 2
3 ruthless1 RUTHLESS1 3
4 ruthless1 RUTHLESS1 4
5 ruthless1 RUTHLESS1 5
6 ruthless1 RUTHLESS1 6
7 ruthless1 RUTHLESS1 7

load.db2set_8mIn.bat

db2set DB2_ANTIJOIN=Y
db2set DB2BPVARS=d:\tpch\ddl\scattered_read
db2set DB2OPTIONS="-t -v +c"
db2set DB2NTNOCACHE=ON
db2set DB2_PARALLEL_IO=*
db2set db2memmaxfree=1000000000
db2set DB2_EXTENDED_OPTIMIZATION=YES

run.db2set_8mIn.bat

```

```

db2set DB2_ANTIJOIN=Y
db2set DB2BPVARS=d:\tpch\ddl\scattered_read
db2set DB2OPTIONS="-t -v +c"
db2set DB2NTNOCACHE=ON
db2set DB2_PARALLEL_IO=*
db2set db2memmaxfree=1000000000
db2set DB2_EXTENDED_OPTIMIZATION=YES

```

runstats_UF.bat

```

db2start
db2 connect to tpcd
db2 runstats on table tpcdtemp.lineitem_new with distribution and detailed
indexes all
db2 runstats on table tpcdtemp.orders_new with distribution and detailed indexes
all
db2 runstats on table tpcdtemp.orders_del with distribution and detailed indexes
all
db2 commit
db2 connect reset

```

dss.runstats

```

values (current timestamp, 'TS*** runstats nation START like ');
RUNSTATS ON TABLE TPCD.NATION WITH DISTRIBUTION on all
columns
and columns (
    n_name like statistics,
    n_comment like statistics )
AND INDEXES ALL;
commit;
values (current timestamp, 'TS*** runstats done nation ');
RUNSTATS ON TABLE TPCD.REGION WITH DISTRIBUTION on all
columns
and columns (
    r_name like statistics,
    r_comment like statistics )
AND INDEXES ALL;
commit;
RUNSTATS ON TABLE TPCD.SUPPLIER WITH DISTRIBUTION on all
columns
and columns (
    s_name like statistics,
    s_address like statistics,
    s_phone like statistics,
    s_comment like statistics)
AND INDEXES ALL;
commit;
values (current timestamp, 'TS*** runstats done part ');
RUNSTATS ON TABLE TPCD.PART WITH DISTRIBUTION on all
columns
and columns (
    p_name like statistics,
    p_mfgr like statistics,
    p_brand like statistics,
    p_type like statistics,
    p_container like statistics,
    p_comment like statistics)
AND INDEXES ALL;
commit;
values (current timestamp, 'TS*** runstats done partsupp ');
RUNSTATS ON TABLE TPCD.PARTSUPP WITH DISTRIBUTION on all
columns
and columns (
    ps_comment like statistics)
AND INDEXES ALL;
commit;
values (current timestamp, 'TS*** runstats done customer ');
RUNSTATS ON TABLE TPCD.CUSTOMER WITH DISTRIBUTION on all
columns
and columns (
    c_name like statistics,

```

```

    c_address like statistics,
    c_phone like statistics,
    c_mktsegment like statistics,
    c_comment like statistics)
AND INDEXES ALL;
commit;
values (current timestamp, 'TS*** runstats done orders ');
RUNSTATS ON TABLE TPCD.ORDERS WITH DISTRIBUTION on all
columns
and columns (
    o_orderstatus like statistics,
    o_orderpriority like statistics,
    o_clerk like statistics,
    o_comment like statistics)
AND INDEXES ALL;
commit;
values (current timestamp, 'TS*** runstats done lineitem ');
RUNSTATS ON TABLE TPCD.LINEITEM WITH DISTRIBUTION on all
columns
and columns (
    l_returnflag like statistics,
    l_linestatus like statistics,
    l_shipinstruct like statistics,
    l_shipmode like statistics,
    l_comment like statistics)
AND INDEXES ALL;
COMMIT WORK;
values (current timestamp, 'TS*** runstats END like');

```

load_8mIn.bat

```

cd \tpch\ddl
db2 connect to tpcd
db2 -tvf load_all.sql
db2 connect reset
cd \tpch\tools

```

load_all.sql

```

connect to tpcd;

values(current timestamp, 'TS*** Load Supplier Started ');
load from supplier.tbl.1,
    supplier.tbl.2,
    supplier.tbl.3,
    supplier.tbl.4,
    supplier.tbl.5,
    supplier.tbl.6,
    supplier.tbl.7,
    supplier.tbl.8 of del
MODIFIED BY COLDEL|
FASTPARSE MESSAGES d:\tmp0\supplier.msg
REPLACE INTO TPCD.SUPPLIER NONRECOVERABLE
CPU_PARALLELISM 8 partitioned db config mode load_only
output_dbpartnums (0,1,2,3,4,5,6,7)
part_file_location w:\300GB_8mIn_flatfiles;
commit work;

values(current timestamp, 'TS*** Load done partsupp ');
load from orders.tbl.1,
    orders.tbl.2,
    orders.tbl.3,
    orders.tbl.4,
    orders.tbl.5,
    orders.tbl.6,
    orders.tbl.7,
    orders.tbl.8,
    orders.tbl.9 of del
MODIFIED BY COLDEL| FASTPARSE MESSAGES d:\tmp0\orders.msg
REPLACE INTO TPCD.orders NONRECOVERABLE CPU_PARALLELISM
8
partitioned db config mode load_only output_dbpartnums (0,1,2,3,4,5,6,7)

```

```

part_file_location w:\300GB_8mIn_flatfiles;
commit work;

values(current timestamp, 'TS*** Load done orders ');
load from lineitem.tbl.1,
    lineitem.tbl.2,
    lineitem.tbl.3,
    lineitem.tbl.4,
    lineitem.tbl.5,
    lineitem.tbl.6,
    lineitem.tbl.7,
    lineitem.tbl.8,
    lineitem.tbl.9,
    lineitem.tbl.10,
    lineitem.tbl.11,
    lineitem.tbl.12,
    lineitem.tbl.13,
    lineitem.tbl.14,
    lineitem.tbl.15,
    lineitem.tbl.16 of del
MODIFIED BY COLDEL| FASTPARSE MESSAGES d:\tmp0\lineitem.msg
REPLACE INTO TPCD.lineitem NONRECOVERABLE
CPU_PARALLELISM 8
partitioned db config mode load_only output_dbpartnums (0,1,2,3,4,5,6,7)
part_file_location w:\300GB_8mIn_flatfiles;
commit work;

values(current timestamp, 'TS*** Load done supplier ');
load from customer.tbl.1,
    customer.tbl.2,
    customer.tbl.3,
    customer.tbl.4,
    customer.tbl.5,
    customer.tbl.6,
    customer.tbl.7,
    customer.tbl.8 of del
MODIFIED BY COLDEL|
FASTPARSE MESSAGES d:\tmp0\customer.msg
REPLACE INTO TPCD.customer NONRECOVERABLE
CPU_PARALLELISM 8
partitioned db config mode load_only output_dbpartnums (0,1,2,3,4,5,6,7)
part_file_location w:\300GB_8mIn_flatfiles;
commit work;

values(current timestamp, 'TS*** Load done customer ');
load from part.tbl.1,
    part.tbl.2,
    part.tbl.3,
    part.tbl.4,
    part.tbl.5,
    part.tbl.6,
    part.tbl.7,
    part.tbl.8 of del
MODIFIED BY COLDEL| FASTPARSE MESSAGES d:\tmp0\part.msg
REPLACE INTO TPCD.part NONRECOVERABLE CPU_PARALLELISM 8
partitioned db config mode load_only output_dbpartnums (0,1,2,3,4,5,6,7)
part_file_location w:\300GB_8mIn_flatfiles;
commit work;

values(current timestamp, 'TS*** Load done part ');
load from partsupp.tbl.1,
    partsupp.tbl.2,
    partsupp.tbl.3,
    partsupp.tbl.4,
    partsupp.tbl.5,
    partsupp.tbl.6,
    partsupp.tbl.7,
    partsupp.tbl.8 of del
MODIFIED BY COLDEL| FASTPARSE MESSAGES
d:\tmp0\partsupp.msg
REPLACE INTO TPCD.partsupp NONRECOVERABLE
CPU_PARALLELISM 8
partitioned db config mode load_only output_dbpartnums (0,1,2,3,4,5,6,7)
part_file_location w:\300GB_8mIn_flatfiles;

```

```

commit work;
values(current timestamp, 'TS*** Load done lineitem ');
LOAD FROM w:\300GB_8mIn_flatfiles\region.tbl OF DEL
MODIFIED BY COLDEL| FASTPARSE MESSAGES d:\tmp\region.msg
REPLACE INTO TPCD.REGION STATISTICS NO NONRECOVERABLE;
commit work;

values(current timestamp, 'TS*** Load done region ');
LOAD FROM w:\300GB_8mIn_flatfiles\nation.tbl OF DEL
MODIFIED BY COLDEL| FASTPARSE MESSAGES d:\tmp\nation.msg
REPLACE INTO TPCD.NATION STATISTICS NO NONRECOVERABLE;
values(current timestamp, 'TS*** Load done nation ');
commit work;
connect reset;

```

loadcfg.sql

```

NUM_FREQVALUES 0
NUM_QUANTILES 300
buffpage 20000
catalogcache_sz 386
chngpgs_thresh 10
dbheap 10000
locklist 6000
logbufsz 4096
logfilsiz 16384
logprimary 10
logsecond 2
maxappls 8
maxlocks 20
mincommit 1
num_iocleaners 4
num_ioservers 4
pckcachesz 320
softmax 4000
sortheap 20000
stat_heap_sz 16000
stmheap 4096
util_heap_sz 32000
applheapsz 768
app_ctl_heap_sz 1024
dft_degree 2;
get database configuration for tpcd;

```

--connect reset;

load_dbmcfg_8mIn

```

update database manager configuration using
cpuspeed 7.951129e-7
comm_bandwidth 7
sheapthres 430000
agent_stack_sz 16
aslheapsz 15
rqrioblk 32767
intra_parallel NO
max_querydegree -1
maxagents 200
num_poolagents 4
num_initagents 4
diaglevel 3
svcname db2_db2_end;

```

get database manager configuration;

--connect reset;

run.dbcfg_8mIn

```

update database configuration for tpcd using
buffpage 60000
catalogcache_sz 386

```

```

dbheap 20000
locklist 16384
maxlocks 5
maxappls 40
mincommit 1
num_iocleaners 4
num_ioservers 4
DLCHKTIME 5000
pckcachesz 640
softmax 600
sortheap 6400
stat_heap_sz 10000
stmthead 10000
util_heap_sz 40000
applheapsz 16000
logbufsz 2048
app_ctl_heap_sz 2048
dft_degree 1
dft_queryopt 7
maxfilop 1024
chnngpgs_thresh 15;

```

get database configuration for tpcd;

--connect reset;

run.dbmcfg_8mln

```

update database manager configuration using
cpuspeed 7.951129e-7
comm_bandwidth 7
min_priv_mem 32
priv_mem_thresh 20000
sheapthres 250000
agent_stack_sz 16
aslheapsz 15
rqrioblk 32767
intra_parallel no
max_querydegree -1
maxagents 3600
num_poolagents 64
num_initagents 4
fcm_num_buffers 30000
numdb 1
svcname DB2_TPCH_END
diaglevel 0;
get database manager configuration;

```

scattered_read

```

# 1/2 -> 1/3 of number of prefetchers
NUMPREFETCHQUEUES=2
PREFETCHQUEUESIZE=200
NUMHATESTACKS=4,*

```

```

# turn on scatter read for these types
NT_SCATTER_SMS=1
NT_SCATTER_DMSFILE=1
NT_SCATTER_DMSDEVICE=1

```

```

#diaglevels at which it writes configuration
LOG_CFG=4
LOG_PERF_HINTS=5

```

setlogs.bat

```

set db2node=0
db2start
db2 update db cfg for %1 using newlogpath e:\logs
set db2node=1
db2 update db cfg for %1 using newlogpath h:\logs

```

```

set db2node=2
db2 update db cfg for %1 using newlogpath m:\logs
set db2node=3
db2 update db cfg for %1 using newlogpath n:\logs
set db2node=4
db2 update db cfg for %1 using newlogpath i:\logs
set db2node=5
db2 update db cfg for %1 using newlogpath j:\logs
set db2node=6
db2 update db cfg for %1 using newlogpath g:\logs
set db2node=7
db2 update db cfg for %1 using newlogpath k:\logs
db2stop
set db2node=0
db2start

```

tpcd.setup

```

# NOTE: ALL variable definitions must have a comment at the end.
TPCD_PLATFORM=nt           # aix, nt, sun ....
TPCD_VERSION=2             # 1 or 2 (Version of tpcd). Default 1
TPCD_DBNAME=TPCD           # name to create database under
TPCD_WORKLOAD=H            # TPC version (R for TPCR, H for
TPCH)
TPCD_AUDIT_DIR=d:\tpch     # top level directory of tar file for
                           # all the tpcd scripts
TPCD_PRODUCT=v5            # v5 or pe
                           # Use pe if you really are using pe v1.2!
                           # but I won't guarantee that it will work!
TPCD_MODE=mln              # uni/smp/mln/mpp
TPCD_PHYS_NODE=1           # number of physical nodes
TPCD_LN_PER_PN=8           # number of logical nodes per physical node
TPCD_SF=300                # size of the database (1=1GB,...) to
                           # get test size databases use:
                           # 0.012 = 12MB
                           # 0.1 = 100MB
TPCD_BUILD_STAGE=ALL       # where to start the build - currently the
                           # following is possible:
                           # ALL - do everything (create,load,
                           #      index,stats,config) (Default)
                           # CRTTBSP - start after create db and
                           #      config setting. Start right at
                           #      create tbasp
                           # LOAD - start from the load of the tables
                           # INDEX - start from the index creation
                           #      (NOTE if earlyindex is specified,
                           #      then this will do the create index
                           #      followed by the load...)
                           # RUNSTATS - start from the runstats
                           #      (NOTE Do not use this option if
                           #      distribution stats are gathered
                           #      as part of the load, this will
                           #      start after the load and indices
                           #      have been created.
                           # CONFIG - start from the setting up of
                           #      the benchmark runs config setup
                           #
TPCD_DBPATH=D:              # path for database (defaults to home)
TPCD_DDLPATH=d:\tpch\ddl    # path for all ddl files and customized
                           # scripts (load script), config files,etc
TPCD_BUFFERPOOL_DEF=create # name of file with bufferpool
                           # definitions
                           # and sizes
TPCD_NODEGROUP_DEF=create # name of file in ddlpath with
                           # nodegroup
                           # definitions
TPCD_EXPLAIN_DDL=NULL       # file with DDL for explains statments
                           # if this is NULL then uses the default
                           # and puts it in USERSPACE1 across all
                           # nodes...nt 1TB found it was faster if
                           # just in a single node nodegroup
TPCD_TBSP_DDL=create_tables # ddl file for tablespaces
TPCD_DDL=create_tables     # ddl file for tables

```


TPCD_QUAL_TBSP_DDL=NULL	# ddl file for tablespaces for qual	# load/index/runstats part of the build.
TPCD_QUAL_DDL=NULL	# ddl file for qualification database	# set to NULL if use defaults
	# tablespaces and tables should be identical	TPCD_LOAD_QUALCONFIGFILE=load.dbcfg_8mln # config file with specific database config
	# to regular ddl except container names	# parms for the load/index/runstats part
TPCD_INDEXDDL=create_indexes	# ddl file for indexes	# of the build for qualification db.
TPCD_EXTRAINDEX=no	# no = no extra indexes	# set to NULL if use defaults
	# filename = If you want to create some	TPCD_LOAD_DBM_QUALCONFIGFILE=load.dbmcfg_8mln # config file with specific
	# indices before	# database manager config parts for the
	# the load, and some indices after, then	# load/index/runstats part of the build.
	# use this additional file to specify the	# set to NULL if use defaults
TPCD_ADD_RI=NULL	# file name that contains any RI	TPCD_LOADSTATS=NO
	# constraints to add after index creation	# gather statistics during load
	# set to NULL (default) if unused	# ignored if EARLYINDEX is not set
	# indices to create after the load.	# due to runstats limitation
TPCD_AST=NULL	# file name that contains complete AST	TPCD_TEMP=d:\tmp
	# definition including connection to	# path for LOAD temp files
	# the database, summary table creation,	# defaults to /u/<instance>/sqllib/tmp
	# population, indexing and runstats.	# used in load script only
TPCD_RUNSTATS=dss.runstats	# ddl file for runstats. If you have	TPCD_SORTBUF=4096
	# created indices before the load (ie	# sortbuf size for LOAD
	# TPCD_EARLYINDEX=yes), have specified to	# used in load script only
	# gather stats on the load command (either	TPCD_LOAD_PARALLELISM=0
	# through your own load script or by using	# degree of parallelism to use on load
	# TPCD_LOADSTATS=yes, AND you have	# 0 = use the "intelligent default" that
	# specified a file for TPCD_EXTRAINDEX	# the load will chose at run time
	# then this runstats file should include	# used in load script only
	# the runstats commands specifically for	TPCD_COPY_DIR=NULL
	# the extra indices.	# directory where copy image is created
TPCD_RUNSTATSHORT=NULL	# NOTE!! THIS IS BUGGY....I	# on load command CURRENTLY UNUSED
can't get it to		# used in load script only
	# work on UNI successfully	
	# ddl file for short runstats that are	# Backup and logfile specific parameters follow:
	# run in the background while the	TPCD_BACKUP_DIR=\backupdir
	# TPCD_RUNSTATS are run in the foreground	# directory where backup files are placed
	# of the build. If this is used, then	TPCD_LOGPRIMARY=NULL
	# TPCD_RUNSTATS should have the runstats	# NULL/value = how many primary log files
	# command for lineitem and	# to configure. If NULL is specified then
	# TPCD_RUNSTATSHORT should have runstats	# the default is not changed.
	# commands for all other tables.	TPCD_LOGFILSIZ=NULL
TPCD_DBGEN=\tpch\appendix.v2\dbgen	# path name to data generation code	# NULL/value = how 4KB pages to use for
		# logfilsiz db cfg parameter. If NULL is
	# Parameters used to specify source of	# specified then the default is not changed
	# data for load scripts	TPCD_LOGSECOND=NULL
TPCD_INPUT=300GB_8mln_flatfiles	# NULL - use dbgen generated data	# NULL/value = how many secondary log files
OR		# to configure. If NULL is specified then
	# path name - to the pre-generated	# the default is not changed.
	# flat files	TPCD_LOG_DIR=d:\logs
	# /gw1/dss/12MB - path for pregenerated 12MB	# directory where log files stored..
	# /gw1/dss/300MB - path for pregen'd 300MB	# NULL leaves them in the dbpath
	#	TPCD_LOG_QUAL_DIR=NULL
TPCD_QUAL_INPUT=300GB_QUAL_FLATFILES	# NULL - use dbgen	# directory where qual log files stored
generated data OR		# NULL leaves them in the dbpath
	# path name - to the pre-generated	TPCD_LOG=YES
	# flat files	# yes/no - whether to turn LOG_RETAIN on
		# i.e. are backups needed to be taken
TPCD_TAILOR_DIR=D:\tailor	# path name for the directory used to	
	# generate split specific config files	# CONFIG specific parameters
	# only used for partitioned environment	TPCD_DB2SET_SCRIPT=run.db2set_8mln.bat
		# Script that contains the db2set commands
TPCD_EARLYINDEX=no	# create indexes before the load	# for the benchmark run. Use NULL if not
		# specified
	# LOAD specific parameters follow:	TPCD_CONFIGFILE=run.dbcfg_8mln
TPCD_LOAD_DB2SET_SCRIPT=load.db2set_8mln.bat	# Script that contains the db2set commands	# name of configuration file in ddl path
	# for the load process Use NULL if not	# that will be used for the benchmark run
	# specified	TPCD_DBM_CONFIG=run.dbmcfg_8mln
TPCD_LOAD_CONFIGFILE=load.dbcfg_8mln	# config file with specific database config	# name of config file for database manager
	# parms for the load/index/runstats part	# cfg parms
	# of the build.	TPCD_QUALCONFIGFILE=run.dbcfg_8mln
	# set to NULL if use defaults	# name of database cfg file in ddl path
TPCD_LOAD_DBM_CONFIGFILE=load.dbmcfg_8mln	# config file with specific	# for qualification database
		TPCD_DBM_QUALCONFIG=run.dbmcfg_8mln
		# name of config file for database
		# manager cfg parms
		TPCD_MACHINE=NULL
		# set to NULL if using load config file

```

# big/medium/small size of machine used to
# determine buffpage, sortheap,sheaphres
# and ioservers parms for load, create
# index and runstats
# NOTE that this parameter is ignored if
# a TPCD_LOAD_CONFIGFILE

TPCD_SMPDEGREE=1          # 1...# of degrees of parallelism to run
# with
TPCD_AGENTPRI=NULL        # set agentpri to this value (default
# is SYSTEM)
TPCD_ACTIVATE=yes         # activate the database upon build
# completion
# run specific parameters
TPCD_AUDIT=yes            # no/yes
# no - don't set up qualification db stuff
# yes - set up qualification db queries
# - build the update function tables
# and data before we get into the
# timing of the creation of the
# tables and the load.
TPCD_TMP_DIR=d:\tmp       # place to put temp working files

TPCD_SHARED_TEMP_FULL_PATHNAME=d:\sqllib\tmp # just added
TPCD_QUERY_TEMPLATE_DIR=standard.V2 # subdirectory in
AUDIT_DIR/queries
# to use as the source of the query
# templates. Currently there are
# v2 ones and pe ones. You can make
# your own directory following the same
# form as in the v2 directory using
# any variant you wish
TPCD_QUAL_DBNAME=TPCD     # name of qualification database
TPCD_NUMSTREAM=6          # number of streams for the throughput
test
TPCD_FLATFILES=W\300GB_8mln_UF_flatfiles # where to generate flat files
# for update functions
TPCD_STAGING_TABLE_DDL=createUFtables # script that contains the ddl
for creating
# the staging tables if they are used for
# the update functions
TPCD_PRELOAD_STAGING_TABLE_SCRIPT=LoadSampleUFData # File
containing
# the sql for preloading
# and gathering stats on sample UF data
# Note that the data used is sample data
# and is not data from any of the applied
# update pairs
TPCD_DELETE_STAGING_TABLE_SQL=DELETEDUMMYUFDATA.SQL #
file that contains the sql for deleting
# the preloaded data from the staging
# tables
TPCD_UPDATE_IMPORT=false  # true = use import for the staging
tables
# for UNI/SMP mode only (code change in
# tpcdbatch) (if not uni mode then must
# change load_update)
# false = use load for staging tables
# The default is false if not set.
# NOTE that this parm is only for UNI/SMP
# it is not for multi node invocation

TPCD_SPLIT_UPDATES=256    # number of chunks to split the update
# function into.
TPCD_CONCURRENT_INSERTS=32 # number of insert chunks that are
run
# concurrently. TPCD_SPLIT_UPDATES
# should be evenly divisible by this number
TPCD_CONCURRENT_INSERTS_LOAD=16 # number of insert chunks
that are loaded
# concurrently. TPCD_SPLIT_UPDATES should
# be evenly divisible by this number.

```

```

# this controls the load portion of the
# insert routine for partitioned databases
TPCD_SPLIT_DELETE=256    # number of portions to split the delete
# function into.
# this variable is only valid in UNI/SMP
# mode.
TPCD_CONCURRENT_DELETE=32 # number of DELETE chunks
that are run
# concurrently. TPCD_SPLIT_UPDATES
# should be evenly divisible by this number
TPCD_GEN_UPDATEPAIRS=40  # number of pairs of update function
data
# to generate
# if 0 the update data generation and
# setup will not be done. use this if
# you don't want to run the update
# functions (Update functions not
# fully tested in new env't yet)
TPCD_GENERATE_SEED_FILE=yes # yes/no These are the seed files
for
# generating the query substitution values
# yes - generate a seed file base on
# year/month/day (for audited runs)
# no - use qgen's default seeds
TPCD_RUN_ON_MULTIPLE_NODES=NO # pe V1.2 only - will we be
running each
# query stream of throughput starting at
# different nodes or from same node
TPCD_STATS_INTERVAL=3     # timing interval for vmstats/iostats
TPCD_STATS_THRU_INT=300  # timing interval for vmstats/iostats
for
# throughput run
TPCD_GATHER_STATS=off     # on/off - only implement for AIX yet
# on = gather statistics around power
# test run (vmstat,iostat,netstat)
# off = no stats gathered during power run

TPCD_UFTEMP=UFTEMP       # base name of tablespace(s) where the
# staging tables for the update functions
# are created
# this name will be used as the
# basename for the tablespaces...eg
# UFTEMP1 UFTEMP2 ....
TPCD_HAVECOMPILER=yes    # rebuild tpcdbatch executable
# yes/no
TPCD_SLEEP=5             # ?
TPCD_INLISTMAX=default   # max num of keys to delete at a time
# for UF2, use "default" for default.
TPCD_LOAD_SCRIPT=load_8mln.bat # script to run for loading tables
# in TPCD_DDLPATH directory under mln/mpp
# leave as NULL if using default genloaduni
TPCD_LOAD_SCRIPT_QUAL=NULL # script to run for loading tables
in
# TPCD_DDLPATH directory under mln/mpp
# for QUAL db
TPCD_ROOTPRIV=no         # do you have root privileges to be able
# get values of things like schedtune
# and vmtune (currently on AIX only)
# acid test specific information
TPCD_DB2LOG=d:\sqllib\db2 # directory where the db2diag.log can
# be found for the durability tests
TPCD_APPEND_ON=no        # set to no if the cluster indexes are used

```

Qualification Database

2mln_qual_load.sql

```

LOAD FROM w:\1GB_qual_flatfiles\region.tbl OF DEL
MODIFIED BY COLDEL| FASTPARSE
MESSAGES d:\tmpqual\region.msg
REPLACE INTO TPCD.REGION
STATISTICS NO
NONRECOVERABLE;

```

```
commit work;
values(current timestamp);
```

```
LOAD FROM w:\1GB_qual_flatfiles\nation.tbl OF DEL
MODIFIED BY COLDEL| FASTPARSE
MESSAGES d:\tmpqual\nation.msg
REPLACE INTO TPCD.NATION
STATISTICS NO
NONRECOVERABLE;
commit work;
values(current timestamp);
```

```
load from
  orders.1,
  orders.2
  of DEL MODIFIED BY COLDEL| FASTPARSE
MESSAGES d:\tmpqual\orders.msg
REPLACE INTO TPCD.orders STATISTICS no NONRECOVERABLE
partitioned db config mode load_only
output_dbpartnums (0,1)
part_file_location w:\1GB_qual_flatfiles;
commit work;
```

```
values(current timestamp);
load from
  supplier.1,
  supplier.2
  of DEL MODIFIED BY COLDEL| FASTPARSE
MESSAGES d:\tmpqual\supplier.msg
REPLACE INTO TPCD.SUPPLIER STATISTICS no
NONRECOVERABLE
partitioned db config mode load_only
output_dbpartnums (0,1)
part_file_location w:\1GB_qual_flatfiles;
commit work;
```

```
values(current timestamp);
load from
  customer.1,
  customer.2
  of DEL MODIFIED BY COLDEL| FASTPARSE
MESSAGES d:\tmpqual\customer.msg
REPLACE INTO TPCD.customer STATISTICS no NONRECOVERABLE
partitioned db config mode load_only
output_dbpartnums (0,1)
part_file_location w:\1GB_qual_flatfiles;
commit work;
```

```
values(current timestamp);
load from
  part.1,
  part.2
  of DEL MODIFIED BY COLDEL| FASTPARSE
MESSAGES d:\tmpqual\part.msg
REPLACE INTO TPCD.part STATISTICS no NONRECOVERABLE
partitioned db config mode load_only
output_dbpartnums (0,1)
part_file_location w:\1GB_qual_flatfiles;
commit work;
```

```
values(current timestamp);
load from
  partsupp.1,
  partsupp.2
  of DEL MODIFIED BY COLDEL| FASTPARSE
MESSAGES d:\tmpqual\partsupp.msg
REPLACE INTO TPCD.partsupp STATISTICS no NONRECOVERABLE
partitioned db config mode load_only
output_dbpartnums (0,1)
part_file_location w:\1GB_qual_flatfiles;
commit work;
```

```
values(current timestamp);
load from
```

```
lineitem.1,
lineitem.2
of DEL MODIFIED BY COLDEL| FASTPARSE
MESSAGES d:\tmpqual\lineitem.msg
REPLACE INTO TPCD.lineitem STATISTICS no NONRECOVERABLE
partitioned db config mode load_only
output_dbpartnums (0,1)
part_file_location w:\1GB_qual_flatfiles;
commit work;
```

```
values(current timestamp);
```

Affinity_2mIn.bat

```
rem Set affinities for LN0 -> LN7 for 8 processor system with hyperthreading.
db2set db2processors=0,1,2,3,8,9,10,11 -i QUAL 0
db2set db2processors=4,5,6,7,12,13,14,15 -i QUAL 1
```

Bkupqual2.bat

```
time < xxx
rem Start of backup1 node 0
db2start
set db2node=0
rd o:\backupqual /s /q
md o:\backupqual
db2 backup database tpced to o:\backupqual WITH 16 BUFFERS
PARALLELISM 8 without prompting
rem End of backup1 node 0
set db2node=1
rem Start of backup1 node 1
db2 backup database tpced to o:\backupqual WITH 16 BUFFERS
PARALLELISM 8 without prompting
time < xxx
rem End of backup1 node 1
time < xxx
```

Create_mIn_instance_qual.bat

```
REM set db2instance=%1 in all db2cmd windows...
db2icrt QUAL /s ese /u:tpch,tpch1tpch
rem edit services file
pause
set db2instance=qual
db2nrcrt /n:1 /u:tpch,tpch1tpch /i:QUAL /p:1 /o:vigil2
db2nlist
db2ilist
```

Create_tablespaces_2mIn_qual

```
create regular tablespace small_tables
in nodegroup catalog_node
managed by system
using ('d:\small_tables_qual')
on node (0)
overhead 24.0
transferrate 0.22;

create regular tablespace LINEITEM_TABLE
pagesize 16K
managed by database
using ( device 'd:\QMP\li_data_D8' 990M,
        device 'd:\QMP\li_data_D11' 990M) on node(0)
using ( device 'd:\QMP\li_data_D9' 990M,
        device 'd:\QMP\li_data_D12' 990M) on node(1)
bufferpool BP16K
extentsize 24
prefetchsize 48
overhead 24.0
transferrate 0.22;
```

```
create regular tablespace LINEITEM_INDEXES
```

```
pagesize 16K
managed by database
using ( device 'd:\QMP\LI_INDEX_D8'      200M,
       device 'd:\QMP\LI_INDEX_D11'     200M) on node(0)
using ( device 'd:\QMP\LI_INDEX_D9'      200M,
       device 'd:\QMP\LI_INDEX_D12'     200M) on node(1)
bufferpool BP16K
extentsize 24
prefetchsize 48
overhead 24.0
transferrate 0.22;
```

```
create regular tablespace OTHER_STUFF
```

```
pagesize 16K
managed by database
using ( device 'd:\QMP\OTHER_TABLES_D8'  780M,
       device 'd:\QMP\OTHER_TABLES_D11' 780M) on node(0)
using ( device 'd:\QMP\OTHER_TABLES_D9'  780M,
       device 'd:\QMP\OTHER_TABLES_D12' 780M) on node(1)
bufferpool BP16K
extentsize 24
prefetchsize 48
overhead 24.0
transferrate 0.22;
```

```
create regular tablespace OTHER_INDEX
```

```
pagesize 16K
managed by database
using ( device 'd:\QMP\OTHER_INDEX_D8'   200M,
       device 'd:\QMP\OTHER_INDEX_D11' 200M) on node(0)
using ( device 'd:\QMP\OTHER_INDEX_D9'   200M,
       device 'd:\QMP\OTHER_INDEX_D12' 200M) on node(1)
bufferpool BP16K
extentsize 24
prefetchsize 48
overhead 24.0
transferrate 0.22;
```

```
create temporary tablespace TEMP_TABLES
```

```
pagesize 16K
managed by database
using ( device 'd:\QMP\temp_D8'          1500M,
       device 'd:\QMP\temp_D11'         1500M) on node(0)
using ( device 'd:\QMP\temp_D9'          1500M,
       device 'd:\QMP\temp_D12'         1500M) on node(1)
bufferpool BP16K
extentsize 24
prefetchsize 48
overhead 24.0
transferrate 0.22;
```

```
commit work;
```

Go_qual.bat

```
db2stop
rah killdb2
```

```
set db2instance=QUAL
```

```
REM Cleanup and rebuild the qualification DB. (30 Mins)
```

```
call d:\tpch_qual\ddl\clrqlogs.bat
db2start
db2 drop db tpcd
db2stop
cd d:\tpch_qual\tools
perl setupdir
perl buildtpcd QUAL 2>&1 |tee buildqual.log
perl buildtpcdbatch
db2stop
db2start
```

```
REM Database is build start the run of the qualification queries.
```

```
perl runqual
db2stop
db2start
cd \tpch_qual\auditexe\acid
```

```
REM compile and run the acid tests.
```

```
db2start
perl setup.pl
db2stop
db2start
db2 connect to tpcd
call nt_compile TPCD
db2 connect reset
db2stop
perl runaci.pl 2>&1 |tee runaci.log
```

Load_2mln_qual.bat

```
cd \tpch_qual\ddl
db2 connect to tpcd
db2 -tvf 2mln_qual_load.sql
db2 connect reset
cd \tpch_qual\tools
```

Load_dbcfg_qual

```
update database configuration for tpcd using
```

```
NUM_FREQVALUES 0
NUM_QUANTILES 300
buffpage 40000
catalogcache_sz 386
chnpgps_thresh 50
dbheap 6654
locklist 16384
logbufsz 1048
logfilsiz 8192
logprimary 20
logsecond 2
newlogpath i:\quallogs
maxappls 40
maxlocks 20
mincommit 1
num_iocleaners 4
num_ioservers 4
pckcachesz 320
softmax 1800
sortheap 50000
stat_heap_sz 16000
stmtheap 4096
util_heap_sz 240000
applheapsz 768
app_ctl_heap_sz 1024
dft_queryopt 7
dft_degree 1;
```

```
get database configuration for tpcd;
```

```
--connect reset;
```

Load_qual.bat

```
cd \tpch_qual\ddl
db2 connect to tpcd
db2 -tvf 2mln_qual_load.sql
db2 connect reset
cd \tpch_qual\tools
```

Run.dbcfg_qual

```

update database configuration for tpcd using
buffpage 10000
catalogcache_sz 386
dbheap 20000
locklist 16384
maxlocks 5
maxappls 40
mincommit 1
num_iocleaners 4
num_ioservers 2
DLCHKTIME 5000
pckcachesz 640
softmax 600
sortheap 8000
stat_heap_sz 10000
stmtheap 10000
util_heap_sz 40000
applheapsz 16000
logbufsz 2048
app_ctl_heap_sz 2048
dft_degree 1
dft_queryopt 7
maxfilop 1024
chnngpgs_thresh 80;

```

get database configuration for tpcd;

--connect reset;

Run.dbmcfg_qual

```

update database manager configuration using
cpuspeed 7.951129e-7
comm_bandwidth 7
min_priv_mem 32
priv_mem_thresh 20000
sheapthres 250000
agent_stack_sz 16
aslheapsz 15
rqrioblk 32767
intra_parallel no
max_querydegree -1
maxagents 3600
num_poolagents 64
num_initagents 4
fcm_num_buffers 30000
numdb 1
svcname DB2_TPCD_END
diaglevel 0;
get database manager configuration;

```

Setlogs_qual.bat

```

set db2node=0
db2start
db2 update db cfg for tpcd using newlogpath i:\quallogs
db2stop
set db2node=1
db2start
db2 update db cfg for tpcd using newlogpath j:\quallogs
db2stop
set db2node=0
db2start

```

tpcd.setup

```

# NOTE: ALL variable defitions must have a comment at the end.
TPCD_PLATFORM=nt          # aix, nt, sun ....
TPCD_VERSION=2            # 1 or 2 (Version of tpcd). Default 1
TPCD_DBNAME=TPCD         # name to create database under
TPCD_WORKLOAD=H          # TPC version (R for TPCR, H for TPCD)

```

```

TPCD_AUDIT_DIR=d:\tpch_qual # top level directory of tar file for
                             # all the tpcd scripts
TPCD_PRODUCT=v5             # v5 or pe
                             # Use pe if you really are using pe v1.2!
                             # but I won't guarantee that it will work!
TPCD_MODE=mln               # uni/smp/mln/mpp
TPCD_PHYS_NODE=1            # number of physical nodes
TPCD_LN_PER_PN=2           # number of logical nodes per physical node
TPCD_SF=1                   # size of the database (1=1GB,...) to
                             # get test size databases use:
                             # 0.012 = 12MB
                             # 0.1 = 100MB
TPCD_BUILD_STAGE=ALL        # where to start the build - currently the
                             # following is possible:
                             # ALL - do everything (create,load,
                             # index,stats,config) (Default)
                             # CRTTBSP - start after create db and
                             # config setting. Start righ at
                             # create tbsp
                             # LOAD - start from the load of the tables
                             # INDEX - start from the index creation
                             # (NOTE if earlyindex is specified,
                             # then this will do the create index
                             # followed by the load...)
                             # RUNSTATS - start from the runstats
                             # (NOTE Do not use this option if
                             # distribution stats are gathered
                             # as part of the load, this will
                             # start after the load and indices
                             # have been created.
                             # CONFIG - start from the setting up of
                             # the benchmark runs config setup
                             #
TPCD_DBPATH=P:              # path for database (defaults to home)
TPCD_DDLPATH=d:\tpch_qual\ddl # path for all ddl files and customized
                             # scripts (load script), config files,etc
TPCD_BUFFERPOOL_DEF=create_bufferpools # name of file with bufferpool
definitions
                             # and sizes
TPCD_NODEGROUP_DEF=create_nodegroups # name of file in ddlpath with
nodegroup
                             # definitions
TPCD_EXPLAIN_DDL=NULL       # file with DDL for explains statments
                             # if this is NULL then uses the default
                             # and puts it in USERSPACE1 across all
                             # nodes...nt 1TB found it was faster if
                             # just in a single node nodegroup
TPCD_TBSP_DDL=create_tablespaces_2mln_qual # ddl file for tablespaces
TPCD_DDL=create_tables      # ddl file for tables
TPCD_QUAL_TBSP_DDL=create_tablespaces_2mln_qual # ddl file for
tablespaces for
TPCD_QUAL_DDL=create_tables # ddl file for qualification database
                             # tablespaces and tables should be identical
                             # to regular ddl except container names
TPCD_INDEXDDL=create_indexes # ddl file for indexes
TPCD_EXTRAINDEX=no          # no = no extra indexes
                             # filename = If you want to create some
                             # indices before
                             # the load, and some indices after, then
                             # use this additional file to specify the
TPCD_ADD_RI=NULL            # file name that contains any RI
                             # constraints to add after index creation
                             # set to NULL (default) if unused
                             # indices to create after the load.
TPCD_AST=NULL               # file name that contains complete AST
                             # definition including connection to
                             # the database, summary table creation,
                             # population, indexing and runstats.
TPCD_RUNSTATS=dss.runstats # ddl file for runstats. If you have
                             # created indices before the load (ie
                             # TPCD_EARLYINDEX=yes), have specified to
                             # gather stats on the load command (either
                             # through your own load script or by using
                             # TPCD_LOADSTATS=yes, AND you have

```

```

# specified a file for TPCD_EXTRAINDEX
# then this runstats file should include
# the runstats commands specifically for
# the extra indices.
TPCD_RUNSTATSHORT=NULL          # NOTE!! THIS IS BUGGY....I
can't get it to

```

```

# work on UNI successfully
# ddl file for short runstats that are
# run in the background while the
# TPCD_RUNSTATS are run in the foreground
# of the build. If this is used, then
# TPCD_RUNSTATS should have the runstats
# command for lineitem and
# TPCD_RUNSTATSHORT should have runstats
# commands for all other tables.
TPCD_DBGEN=\tpch_qual\appendix.v2\dbgen # path name to data generation
code

```

```

# Parameters used to specify source of
# data for load scripts
TPCD_INPUT=100GB_8mln_flatfiles    # NULL - use dbgen generated data
OR

```

```

# path name - to the pre-generated
# flat files
# /gw1/dss/12MB - path for pregenerated 12MB
# /gw1/dss/100MB - path for pregen'd 100MB
#
TPCD_QUAL_INPUT=\1GB_QUAL_FLATFILES # NULL - use dbgen
generated data OR

```

```

# path name - to the pre-generated
# flat files

```

```

TPCD_TAILOR_DIR=D:\tailor          # path name for the directory used to
# generate split specific config files
# only used for partitioned environment

```

```

TPCD_EARLYINDEX=no                 # create indexes before the load

```

```

# LOAD specific parameters follow:
TPCD_LOAD_DB2SET_SCRIPT=load.db2set_8mln.bat # Script that contains
the db2set commands

```

```

# for the load process Use NULL if not
# specified
TPCD_LOAD_CONFIGFILE=load.dbcfg_8mln # config file with specific
database config

```

```

# parms for the load/index/runstats part
# of the build.
# set to NULL if use defaults
TPCD_LOAD_DBM_CONFIGFILE=load.dbmcfg_8mln # config file with
specific

```

```

# database manager config parts for the
# load/index/runstats part of the build.
# set to NULL if use defaults
TPCD_LOAD_QUALCONFIGFILE=load_dbcfg_qual # config file with specific
database config

```

```

# parms for the load/index/runstats part
# of the build for qualification db.
# set to NULL if use defaults
TPCD_LOAD_DBM_QUALCONFIGFILE=load.dbmcfg_8mln # config file with
specific

```

```

# database manager config parts for the
# load/index/runstats part of the build.
# set to NULL if use defaults
TPCD_LOADSTATS=NO                  # gather statistics during load
# ignored if EARLYINDEX is not set
# due to runstats limitation

```

```

TPCD_TEMP=d:\tmp                   # path for LOAD temp files
# defaults to /u/<instance>/sqlib/tmp
# used in load script only

```

```

TPCD_SORTBUF=4096                  # sortbuf size for LOAD
# used in load script only

```

```

TPCD_LOAD_PARALLELISM=0            # degree of parallelism to use on
load

```

```

# 0 = use the "intelligent default" that

```

```

# the load will chose at run time
# used in load script only
TPCD_COPY_DIR=NULL                 # directory where copy image is created
# on load command CURRENTLY UNUSED
# used in load script only
TPCD_FASTPARSE=yes                 # use fastparse on load
# used in load script only

```

```

# Backup and logfile specific parameters follow:
TPCD_BACKUP_DIR=o:\backupqual      # directory where backup files are
placed
TPCD_LOGPRIMARY=NULL               # NULL/value = how many primary
log files

```

```

# to configure. If NULL is specified then
# the default is not changed.
TPCD_LOGFILSIZ=NULL               # NULL/value = how 4KB pages to use
for

```

```

# logfilsiz db cfg parameter. If NULL is
# specified then the default is not changed
TPCD_LOGSECOND=NULL               # NULL/value = how many secondary
log files

```

```

# to configure. If NULL is specified then
# the default is not changed.
TPCD_LOG_DIR=d:\logs              # directory where log files stored..
# NULL leaves them in the dbpath
TPCD_LOG_QUAL_DIR=NULL            # directory where qual log files
stored

```

```

# NULL leaves them in the dbpath
TPCD_LOG=YES                       # yes/no - whether to turn LOG_RETAIN on
# i.e. are backups needed to be taken

```

```

# CONFIG specific parameters
TPCD_DB2SET_SCRIPT=run.db2set.qual # Script that contains the db2set
commands

```

```

# for the benchmark run. Use NULL if not
# specified
TPCD_CONFIGFILE=run.dbcfg_8mln    # name of configuration file in ddl
path

```

```

# that will be used for the benchmark run
TPCD_DBM_CONFIG=run.dbmcfg_8mln   # name of config file for database
manager

```

```

# cfg parms
TPCD_QUALCONFIGFILE=run.dbcfg_qual # name of database cfg file in ddl
path

```

```

# for qualification database
TPCD_DBM_QUALCONFIG=run.dbmcfg_qual # name of config file for
database

```

```

# manager cfg parms
TPCD_MACHINE=NULL                  # set to NULL if using load config file
# big/medium/small size of machine used to
# determine buffpage, sortheap, sheapthres
# and ioservers parms for load, create
# index and runstats
# NOTE that this parameter is ignored if
# a TPCD_LOAD_CONFIGFILE

```

```

TPCD_SMPDEGREE=1                  # 1...# of degrees of parallelism to run
# with

```

```

TPCD_AGENTPRI=NULL                 # set agentpri to this value (default
# is SYSTEM)

```

```

TPCD_ACTIVATE=yes                  # activate the database upon build
# completion
# run specific parameters

```

```

TPCD_AUDIT=yes                     # no/yes
# no - don't set up qualification db stuff
# yes - set up qualification db queries
# - build the update function tables
# and data before we get into the
# timing of the creation of the
# tables and the load.

```

```

TPCD_TMP_DIR=d:\tmp               # place to put temp working files

```

```

TPCD_SHARED_TEMP_FULL_PATHNAME=c:\sqllib\tmp # just added
TPCD_QUERY_TEMPLATE_DIR=standard.V2 # subdirectory in
AUDIT_DIR/queries
    # to use as the source of the query
    # templates. Currently there are
    # v2 ones and pe ones. You can make
    # your own directory following the same
    # form as in the v2 directory using
    # any variant you wish
TPCD_QUAL_DBNAME=TPCD # name of qualification database
TPCD_NUMSTREAM=6 # number of streams for the throughput
test
TPCD_FLATFILES=1GB_qual_flatfiles # where to generate flat files
    # for update functions
TPCD_STAGING_TABLE_DDL=NULL # script that contains the ddl for
creating
    # the staging tables if they are used for
    # the update functions. Set to NULL for Qual DB.
TPCD_PRELOAD_STAGING_TABLE_SCRIPT=LoadSampleUFData # File
containing
    # the sql for preloading
    # and gathering stats on sample UF data
    # Note that the data used is sample data
    # and is not data from any of the applied
    # update pairs
TPCD_DELETE_STAGING_TABLE_SQL=DELETEDUMMYUFDATA.SQL #
file that contains the sql for deleting
    # the preloaded data from the staging
    # tables
TPCD_UPDATE_IMPORT=false # true = use import for the staging
tables
    # for UNI/SMP mode only (code change in
    # tpcdbatch) (if not uni mode then must
    # change load_update)
    # false = use load for staging tables
    # The default is false if not set.
    # NOTE that this parm is only for UNI/SMP
    # it is not for multi node invocation

TPCD_SPLIT_UPDATES=32 # number of chunks to split the update
    # function into.
TPCD_CONCURRENT_INSERTS=16 # number of insert chunks that are
run
    # concurrently. TPCD_SPLIT_UPDATES
    # should be evenly divisible by this number
TPCD_CONCURRENT_INSERTS_LOAD=4 # number of insert chunks
that are loaded
    # concurrently. TPCD_SPLIT_UPDATES should
    # be evenly divisible by this number.
    # this controls the load portion of the
    # insert routine for partitioned databases
TPCD_SPLIT_DELETES=32 # number of portions to split the delete
    # function into.
    # this variable is only valid in UNI/SMP
    # mode.
TPCD_CONCURRENT_DELETES=16 # number of DELETE chunks
that are run
    # concurrently. TPCD_SPLIT_UPDATES
    # should be evenly divisible by this number
TPCD_GEN_UPDATEPAIRS=30 # number of pairs of update function
data
    # to generate
    # if 0 the update data generation and
    # setup will not be done. use this if
    # you don't want to run the update
    # functions (Update functions not
    # fully tested in new env't yet)
TPCD_GENERATE_SEED_FILE=yes # yes/no These are the seed files
for
    # generating the query substitution values
    # yes - generate a seed file base on
    # year/month/day (for audited runs)

```

```

    # no - use qgen's default seeds
TPCD_RUN_ON_MULTIPLE_NODES=NO # pe V1.2 only - will we be
running each
    # query stream of throughput starting at
    # different nodes or from same node
TPCD_STATS_INTERVAL=5 # timing interval for vmstats/iostats
TPCD_STATS_THRU_INT=300 # timing interval for vmstats/iostats
for
    # throughput run
TPCD_GATHER_STATS=off # on/off - only implement for AIX yet
    # on = gather statistics around power
    # test run (vmstat,iostat,netstat)
    # off = no stats gathered during power run

TPCD_UFTEMP=UFTEMP # base name of tablespace(s) where the
    # staging tables for the update functions
    # are created
    # this name will be used as the
    # basename for the tablespaces...eg
    # UFTEMP1 UFTEMP2 ....
TPCD_HAVECOMPILER=yes # rebuild tpcdbatch executable
    # yes/no
TPCD_SLEEP=5 # ?
TPCD_INLISTMAX=default # max num of keys to delete at a time
    # for UF2, use "default" for default.
TPCD_LOAD_SCRIPT=load_8mln.bat # script to run for loading tables
    # in TPCD_DDLPATH directory under mln/mpp
    # leave as NULL if using default genloaduni
TPCD_LOAD_SCRIPT_QUAL=LOAD_QUAL.BAT # script to run for
loading tables in
    # TPCD_DDLPATH directory under mln/mpp
    # for QUAL db
TPCD_ROOTPRIV=no # do you have root privileges to be able
    # get values of things like schedtune
    # and vmtune (currently on AIX only)
    # acid test specific information
TPCD_DB2LOG=d:\sqllib\qual # directory where the db2diag.log can
    # be found for the durability tests
TPCD_APPEND_ON=no # set to no if the cluster indexes are used

```

Appendix C: Qualification Query Output

Qualification Queries

Query 1

Start timestamp 02/22/04 04:59:13.812
Seed used = 222031943

-- Query 01 - Var_0 Rev_01 - Pricing Summary Report Query

Tag: Q1 Stream: 0 Sequence number: 17

```
select
l_returnflag,
l_linestatus,
sum(l_quantity) as sum_qty,
sum(l_extendedprice) as sum_base_price,
sum(l_extendedprice * (1 - l_discount)) as sum_disc_price,
sum(l_extendedprice * (1 - l_discount) * (1 + l_tax)) as sum_charge,
avg(l_quantity) as avg_qty,
avg(l_extendedprice) as avg_price,
avg(l_discount) as avg_disc,
count(*) as count_order
from
tpcd.lineitem
where
l_shipdate <= date ('1998-12-01') - 101 day
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	11337845083.000	17000862014793.846						
16150800684279.885		16796827246329.172	25.500			38236.504			
	0.050	444623865							
N	F	295853121.000	443675765805.595						
421488949399.184		438347780246.234	25.500			38241.548			
	0.050	11601930							
N	O	22161147136.000	33230675801155.914						
31569139551184.746		32831913623366.320	25.500			38237.410			
	0.050	869061893							
R	F	11338002968.000	17001020502899.652						
16150952557080.182		16796990116580.854	25.500			38236.924			
	0.050	444623127							

Number of rows retrieved is: 4

Stop timestamp 02/22/04 05:03:43.703
Query Time = 269.9 secs

Query 2

Start timestamp 02/22/04 03:57:35.390
Seed used = 222031943

-- Query 02 - Var_0 Rev_02 - Minimum Cost Supplier Query

Tag: Q2 Stream: 0 Sequence number: 2

```
select
s_acctbal,
s_name,
n_name,
p_partkey,
p_mfgr,
s_address,
s_phone,
s_comment
from
tpcd.part,
tpcd.supplier,
tpcd.partsupp,
tpcd.nation,
tpcd.region
where
p_partkey = ps_partkey
and s_suppkey = ps_suppkey
and p_size = 42
and p_type like '%BRASS'
and s_nationkey = n_nationkey
and n_regionkey = r_regionkey
and r_name = 'MIDDLE EAST'
and ps_supplycost = (
select
min(ps_supplycost)
from
tpcd.partsupp,
tpcd.supplier,
tpcd.nation,
tpcd.region
where
p_partkey = ps_partkey
and s_suppkey = ps_suppkey
and s_nationkey = n_nationkey
and n_regionkey = r_regionkey
and r_name = 'MIDDLE EAST'
)
order by
s_acctbal desc,
n_name,
s_name,
p_partkey
fetch first 100 rows only
```

S_ACCTBAL	S_NAME	N_NAME	P_PARTKEY	P_MFGR	S_ADDRESS	S_PHONE	S_COMMENT
-----------	--------	--------	-----------	--------	-----------	---------	-----------

9999.950 Supplier#000391983 IRAN 59641963
Manufacturer#1 jdsJsVH MCF1ctbwd31uv5bNAPma
20-217-934-6078 ironic, final accounts maintain across the furiously special request

9999.710 Supplier#001696285 IRAQ 3946283
 Manufacturer#1 gr2tsyVZCd4cUV 21-495-805-6305
 carefully express instructions print ironically slyly express grouches. spe

9999.640 Supplier#001339483 JORDAN 10339482
 Manufacturer#4 OuMcUkIdmHIUVEXEKyE AX9zpn609vCZ4UPG
 23-479-730-5577 pending ideas after the blithely pending packages nag pending
 accounts. slyly silent accounts are s

9999.620 Supplier#002578164 EGYPT 22828156
 Manufacturer#1 L7gC4rKxVvIUR31GT65sxqbjlvfuqj8SL
 14-813-289-3438 quickly regular dolphins are quickly above the pending
 requests. fluf

9999.520 Supplier#000264342 IRAN 31764321
 Manufacturer#5 2wY3ZgEBb2WEohQYJDxDJx,fpf HOR,8tX15
 20-813-829-9077 regular, ironic accounts breach furiously fly fi

9999.500 Supplier#001066429 IRAN 52816377
 Manufacturer#4 p2CoS x OvUNDXv,kbYH12MEQp,7bGdglv
 20-121-344-7985 slyly express requests haggle carefully according to the
 carefully final deposits.

9999.330 Supplier#000153564 IRAQ 35403552
 Manufacturer#1 mOv,aFEyTDbADjoiqT5cb,UwsVoWr5dK79E
 21-460-773-6432 slyly final excuses play fluffily ironic deposits. somet

9999.330 Supplier#002317675 JORDAN 25567666
 Manufacturer#1 FicUmZWoa5Nq5dqXNV9y2FjKqNB1jYDbI
 23-769-214-7998 ideas sleep slyly after the fluffily reg

9999.230 Supplier#001527328 JORDAN 36777315
 Manufacturer#5 iLEu db3CldtNNE4ggwoqUD
 23-731-329-1956 final platelets along the fluffily final accounts lose against the
 carefully fluffy frays. regular

9999.160 Supplier#000711444 EGYPT 58461386
 Manufacturer#5 BBPVI4w2cN7uM 14-766-379-2554
 express ideas cajole. pinto bean

9999.150 Supplier#001479834 EGYPT 53229782
 Manufacturer#1 r4,YxzdvYs9nrfnTDokqliXsDWeltYV84OmbK
 14-210-588-9798 fluffily ironic deposits use foxes. bold theodolites wake
 bravely. slyly final packages sleep boldl

9998.880 Supplier#002127553 SAUDI ARABIA 627552
 Manufacturer#4 atyS8HTiULy8yemJ,FA23b1ZNOyUAXOPuF430
 30-896-468-8907 ironic deposits cajole. packages cajole final, close frays.
 furiously pending requests are foxes.

9998.840 Supplier#000558492 SAUDI ARABIA
 Manufacturer#4 7w5z8wsMUQO2
 33558491 30-851-981-7602 slyly regular requests serve slyly furiously unusual deposits.
 fluff

9998.790 Supplier#000220352 IRAQ 26470343
 Manufacturer#5 e cGoz4TLLsNMk4EsNuHECXh9Kfc68F9PUhJ
 21-137-440-4465 furiously ironic instructions wake slyly. silent, regular deposits
 along the

9998.790 Supplier#000220352 IRAQ 38470339
 Manufacturer#4 e cGoz4TLLsNMk4EsNuHECXh9Kfc68F9PUhJ
 21-137-440-4465 furiously ironic instructions wake slyly. silent, regular deposits
 along the

9998.780 Supplier#002224701 IRAN 6724696
 Manufacturer#1 9XvpPH7Fik9q7OKggxuoG8MJRUYPeO
 20-373-100-2820 bold, express pinto beans are across the final, pending
 packages. regular pinto beans sn

9998.770 Supplier#000906071 IRAQ 42906070
 Manufacturer#3 sPN3u8sAmR6AX1A2gJbyLXLuP
 21-318-508-2799 fluffily brave platelets haggle. final, regular decoys among the
 blithely pending

9998.720 Supplier#001387252 SAUDI ARABIA
 Manufacturer#1 urqN5SGxVUKD2 T6Xkl0
 35137218 30-328-823-4644 special, special tithes haggle about the regular ideas. special,
 special packages

9998.640 Supplier#001801070 EGYPT 4051068
 Manufacturer#4 Ij5Lq12T19ywlxb4lgnvc781kN2kUOmXzZfAft
 14-758-482-8785 blithely pending pinto beans along the blithe deposits nod
 accounts! furiously exp

9998.560 Supplier#001097607 IRAN 43097606
 Manufacturer#5 QCrixjgSjK38mj9konn 20-449-979-4666
 blithely pending deposits kindle

9998.520 Supplier#002079270 SAUDI ARABIA
 Manufacturer#5 5GNkv1Gd7deGpnxpCxn8OwGXp1z
 11829260 30-469-360-1966 regular, final accounts cajole slyly.

9998.520 Supplier#002079270 SAUDI ARABIA
 Manufacturer#5 5GNkv1Gd7deGpnxpCxn8OwGXp1z
 14079269 30-469-360-1966 regular, final accounts cajole slyly.

9998.410 Supplier#001567551 IRAN 51067516
 Manufacturer#5 1BS0ihNu7y4h 20-694-183-4131 even
 theodolites wake fluffily

9998.330 Supplier#000344168 IRAQ 46094122
 Manufacturer#3 gDehk2DFoTCIRxllqx4HWn8ynELZ44
 21-320-978-2609 instructions wake carefully across the foxes. furiously regular
 orbits are across the req

9998.310 Supplier#001468436 EGYPT 3718434
 Manufacturer#2 ez5P1YMxtlVN3iYukGyhZNauE 9eAMnKLBATa
 14-841-841-2000 finally pending accounts nag car

9998.240 Supplier#002984249 IRAQ 33734215
 Manufacturer#2 q TMJx4wZI9h1oTz,UPGEjsEiYmD81VDvu
 21-137-239-6149 regular, bold requests nag slyly final accounts. final requests
 wake

9998.200 Supplier#000543036 EGYPT 15543035
 Manufacturer#5 a0tk3j2gcLaGa7xrc84x07Q33GgYKYdg 0w,0oLP
 14-543-718-9955 carefully special theodolites use among the slyly express
 requests-- slyly unusual packa

9998.200 Supplier#000543036 EGYPT 35793024
 Manufacturer#1 a0tk3j2gcLaGa7xrc84x07Q33GgYKYdg 0w,0oLP
 14-543-718-9955 carefully special theodolites use among the slyly express
 requests-- slyly unusual packa

9998.160 Supplier#001431735 IRAN 9681731
 Manufacturer#2 okVAXgHWQF3KueUEGiE9bEZDVqUGqv0
 20-943-762-6206 pending, unusual packages above the special accounts haggle
 quickly attainments. ironic, regular

9998.160 Supplier#001431735 IRAN 44931706
 Manufacturer#2 okVAXgHWQF3KueUEGiE9bEZDVqUGqv0
 20-943-762-6206 pending, unusual packages above the special accounts haggle
 quickly attainments. ironic, regular

9997.950 Supplier#001635713 SAUDI ARABIA
 Manufacturer#1 12885708 1QBr1gpFMTDBaPUH5AcNw9Tv5vV4iRFBo85Q 30-159-400-1780
 furiously regular deposits haggle slyly. fluffily special acc

9997.950 Supplier#001635713 SAUDI ARABIA
 Manufacturer#2 13635712 1QBr1gpFMTDBaPUH5AcNw9Tv5vV4iRFBo85Q 30-159-400-1780
 furiously regular deposits haggle slyly. fluffily special acc

9997.840 Supplier#001683984 EGYPT 12183975
 Manufacturer#1 IRj,HkmbPAbAdgEKUpwz 7 guPW1YUDd47XrG
 14-269-601-5814 slyly ironic instructions around the furiously bold ac

9997.740 Supplier#002353931 IRAN 42103888
 Manufacturer#5 hGSKK2s2641jbFd14IXZE bvSy
 20-107-301-4125 furiously bold pinto beans haggle slyly against the furiously
 regul

9997.690 Supplier#001344187 IRAQ 26094162
 Manufacturer#1 O,NsUEsfkU 21-454-983-1909
 unusual theodolites eat slyly. blithely unusual packages integrate furiously across
 the

9997.670 Supplier#001775509 IRAQ 43775508
 Manufacturer#4 KD,YImBviO1leDYXHZUcLn91eqKT3fj
 21-950-919-9158 requests cajole blithely. blithely express ideas according to the regular d

9997.550 Supplier#000170117 IRAN 54920062
 Manufacturer#1 SD,Qs6T,qCXUwXyFXbA1zUz cxEpflp
 20-465-566-7536 blithely silent requests haggle furiously across the excuses. slyly final accounts bre

9997.510 Supplier#001586049 JORDAN 53335997
 Manufacturer#4 dFMq0vU,BSocemyOi5oWj
 23-601-129-2031 ironic pinto beans sleep permanently. ironic theodolites haggle. slyly pending deposits

9997.450 Supplier#001711987 JORDAN 43711986
 Manufacturer#2 bfgG53qZPxXbELu4NVfTzDLIsT
 23-467-276-4748 deposits cajole slyly. furiously sp

9997.420 Supplier#002807353 IRAN 39557313
 Manufacturer#5 jowpmXc964nywqEHnumLq0slu9B1xbRpUc
 20-783-990-3697 quickly special excuses sleep ar

9997.360 Supplier#001631808 JORDAN 42881793
 Manufacturer#2 f1U6hXEMCDcrWwA8AcnFvG
 23-173-369-4220 permanently regular theodolites haggle blithely foxes. carefully express packages according to the

9997.350 Supplier#000031340 IRAN 51031339
 Manufacturer#1 OXcLaF,Lo1J HDq 20-432-827-9234
 carefully regular asymptotes about the carefully final accounts bo

9997.300 Supplier#002641026 JORDAN 53641025
 Manufacturer#5 8,nJhXJ0tEkWAG1m 66tw2KB1uTRaneSz
 23-733-549-7969 requests thrash slyly above the thinly brave ideas. bold t

9997.270 Supplier#001881799 JORDAN 23631777
 Manufacturer#3 bAb0gf9dxvx,N294,1tYWFIPiYb
 23-809-597-2503 express requests across the carefully even packages sleep slyly furiously unusual account

9997.110 Supplier#000943131 IRAQ 27943130
 Manufacturer#3 LjISp1kPXh9PNdVkoorXS ovVesS
 21-357-276-1041 slyly pending pinto beans against the fu

9997.100 Supplier#001808543 IRAN 18308530
 Manufacturer#4 odkef Q2tTaJ 20-183-259-3345 slyly
 regular instructions detect f

9997.020 Supplier#002557400 IRAN 49807383
 Manufacturer#3 zEQ8FvUL0SaB5EEWq X t4p0uXlv
 20-214-994-8663 blithely regular packages use re

9997.010 Supplier#000190620 IRAN 19690607
 Manufacturer#1 Vne9V2MAtcvqIDJiv5J43OlzysrFM
 20-952-780-7347 slyly unusual packages sleep furiously. bold, final d

9996.980 Supplier#000802471 EGYPT 38302446
 Manufacturer#1 qs5VeQ7zGSXqqkdi 14-172-778-3594
 final ideas sleep slyly regular, reg

9996.980 Supplier#001008163 EGYPT 55758108
 Manufacturer#2 liaau40giZYM0fMUebCrNcLRczQFGZI
 14-985-430-9666 final deposits cajole across the platelets. silent decoys are carefully. slyly r

9996.970 Supplier#001395233 JORDAN 49395232
 Manufacturer#5 u6BP1rID1rjZHEa92qxdDu W,Xm D
 23-197-107-6542 quickly final foxes grow fu

9996.950 Supplier#000177647 IRAN 58677608
 Manufacturer#2 whVD1hC5vujp 20-784-718-1638
 ironic platelets cajole fluffily across the final requests. final packages ca

9996.770 Supplier#002306205 SAUDI ARABIA
 43556190 Manufacturer#2 PxXx4oxfuJG15Z7

30-949-824-8851 furiously final theodolites use carefully final requests. carefully special deposits nag caref

9996.730 Supplier#001392738 JORDAN 2892737
 Manufacturer#3 LJG0acdZrUzURHw8m15 jim yUWroS4
 23-698-732-8432 carefully special frets can cajole carefully blithely express pinto beans. slyly unus

9996.690 Supplier#002201602 IRAN 56951547
 Manufacturer#1 Qa4gbNPORCE1CzFH6t 20-387-189-8211
 quickly express deposits affi

9996.620 Supplier#000248827 SAUDI ARABIA
 37748802 Manufacturer#4 9rxfpZ8tiW88uyGB,
 30-514-213-4281 ironic, regular deposits cajole fluffily. furiously bold accounts wak

9996.600 Supplier#000846694 JORDAN 39096680
 Manufacturer#4 Ju1JtrTqEl zliLlyIq 23-289-606-4706 slyly
 special instructions wake slyly. de

9996.370 Supplier#001937724 EGYPT 34187712
 Manufacturer#5 edLEIF0uN7iyXBmLcbzdLE,hgnqGyAskk
 14-871-787-9735 special pinto beans nag quickly. theodolites detect slyly. furiously

9996.240 Supplier#002590473 IRAN 34090450
 Manufacturer#5 W3ObS A8eW970M 20-268-827-6572
 quickly ironic theodolites use quickly bravely final instructions

9996.240 Supplier#002590473 IRAN 37840460
 Manufacturer#2 W3ObS A8eW970M 20-268-827-6572
 quickly ironic theodolites use quickly bravely final instructions

9995.730 Supplier#002122236 SAUDI ARABIA
 5872232 Manufacturer#5
 Cd,KUEHc1ERju1UIUFNkN,lw6xluLnzy1hXG 30-291-505-4631 furiously even foxes cajole throughout th

9995.710 Supplier#000139596 IRAQ 15139595
 Manufacturer#3 EfJyVv9buPgkC1wSLOW7
 21-798-158-9528 furiously express foxes nag furi

9995.690 Supplier#002193633 IRAQ 41943593
 Manufacturer#4 jTC7ddtKUcOkqtfcR7HP7NB0KrEL88zW9vPq9
 21-176-724-9983 even platelets wake blithely quickly regular pearls. blithely regul

9995.530 Supplier#002064779 IRAQ 31314768
 Manufacturer#1 d4UxHG6XgTmRWnDEnUAAxmH
 21-327-254-1596 dependencies nag furiously. final, ironic excuses wake furiously regular platel

9995.510 Supplier#001525106 IRAQ 2275105
 Manufacturer#3 8KePGuPT9x0OpDG 21-441-336-8579
 quickly ironic Tiresias about the furiously regular es

9995.410 Supplier#001802204 IRAN 20552185
 Manufacturer#1 ByRSTfnPijt80sUeFGBDffpj6NQI8fwQ2ZUi9
 20-631-312-3329 even accounts cajole quickly. slyly regular excuses haggle blithel

9995.370 Supplier#000691805 IRAQ 14191796
 Manufacturer#1 ho,1DCDXu5ru85282E 21-780-564-6101
 slyly final accounts are carefully above the alw

9995.100 Supplier#002037504 EGYPT 38037503
 Manufacturer#4 E7NMoxfOwUPIKLkHJ5wbPQz0oml54
 14-565-917-5883 slyly final foxes impress beyond the furiously ex

9995.050 Supplier#000077755 EGYPT 13577746
 Manufacturer#5 3TjudTLvQibyoDu 14-493-852-4671
 blithely final ideas across the final deposits dazzle about

9995.050 Supplier#000077755 EGYPT 29327745
 Manufacturer#5 3TjudTLvQibyoDu 14-493-852-4671
 blithely final ideas across the final deposits dazzle about

9995.050 Supplier#000077755 EGYPT 57077754
 Manufacturer#1 3TjudTLvQibyoDu 14-493-852-4671
 blithely final ideas across the final deposits dazzle about

9995.020 Supplier#002851886 IRAQ 21601864
 Manufacturer#2 7RNHlvhusBuK0i,xFK0jxw2ADM6BQm7m
 21-333-286-7628 quickly final requests sleep slyly against the slyly bold
 packages; slyly even inst

9994.820 Supplier#002565284 IRAQ 10815280
 Manufacturer#4 ,tAJkkKxMI mej1k75uvaf0hk4J8IY
 21-223-918-3191 fluffily unusual theodolites are

9994.760 Supplier#002513348 IRAQ 13763343
 Manufacturer#1 s200d8rX9W 21-190-501-9695
 carefully final accounts unwind. deposits cajole carefully brave deposits. carefully
 unu

9994.760 Supplier#002513348 IRAQ 25763339
 Manufacturer#3 s200d8rX9W 21-190-501-9695
 carefully final accounts unwind. deposits cajole carefully brave deposits. carefully
 unu

9994.760 Supplier#002513348 IRAQ 42263305
 Manufacturer#5 s200d8rX9W 21-190-501-9695
 carefully final accounts unwind. deposits cajole carefully brave deposits. carefully
 unu

9994.750 Supplier#000466253 EGYPT 28966234
 Manufacturer#5 BzLGz4misTX vlcAurnwm2TLDKKJbWMIUw5TZ0N1
 14-906-968-6974 quickly even dependencies nag carefully

9994.750 Supplier#000466253 EGYPT 37966228
 Manufacturer#4 BzLGz4misTX vlcAurnwm2TLDKKJbWMIUw5TZ0N1
 14-906-968-6974 quickly even dependencies nag carefully

9994.650 Supplier#001004643 IRAQ 12254638
 Manufacturer#1 sPkN5EIkUyZfQJW1S9uqDqd
 21-427-222-4426 carefully even accounts sleep slyly

9994.440 Supplier#001347011 IRAQ 19347010
 Manufacturer#2 TpQiaYis6o1XML32K5a,cM,CNT
 21-225-629-2259 furiously even deposits according to the deposits haggle e

9994.410 Supplier#000272566 EGYPT 5522564
 Manufacturer#2 JyLBUCdGIMHu270oq8sY5c
 14-827-507-3883 quickly ironic accounts unwind even ideas. blithely special

9994.410 Supplier#000272566 EGYPT 34772543
 Manufacturer#2 JyLBUCdGIMHu270oq8sY5c
 14-827-507-3883 quickly ironic accounts unwind even ideas. blithely special

9994.370 Supplier#002323339 JORDAN 45073293
 Manufacturer#1 02W7yJg9veaS1Ukn 23-761-527-4148
 blithely regular packages nag about the unusual, pending Tiresias. f

9994.340 Supplier#001138140 JORDAN 16138139
 Manufacturer#2 eW59Pd12O,xX9nNQuLPufHJCLBSxmh
 23-799-975-4321 regular, regular deposits use after the furiously unu

9994.310 Supplier#000382658 EGYPT 6382657
 Manufacturer#4 X45wH 0jlsM SNESm 14-406-827-9913
 slyly regular dependencies wake slyly alongside of the blithely bold excuses.

9994.100 Supplier#000047385 SAUDI ARABIA
 42047384 Manufacturer#3 pbRKuJaBXBI,5bOv9UhB8SDR cuz 8
 30-427-545-5707 quickly express ideas integrate quickly ir

9994.040 Supplier#001594568 SAUDI ARABIA
 3844566 Manufacturer#3 WLBBqX5RdgfFdTz9cbb,Odx
 30-109-853-1054 slyly ironic packages are? express packages are. furious, final
 packages

9993.960 Supplier#002815050 SAUDI ARABIA
 33565016 Manufacturer#5 prRqFZlibM5G4ZaYY8
 30-866-245-7981 slyly unusual packages use fluffily. packages impress furiously
 alongside of the fluffil

9993.940 Supplier#002084478 EGYPT 36584453
 Manufacturer#4 BINB67Q0I0K 14-179-361-4962
 even instructions mold carefully carefully re

9993.940 Supplier#002084478 EGYPT 41084477
 Manufacturer#3 BINB67Q0I0K 14-179-361-4962
 even instructions mold carefully carefully re

9993.750 Supplier#002857319 IRAN 16357308
 Manufacturer#1 87CteYsX920ljy1zKG1nhXh6WkaEhJyyggr20p
 20-551-166-1614 furiously bold requests boost about the silent, even deposits.
 carefully final i

9993.750 Supplier#002857319 IRAN 20107312
 Manufacturer#3 87CteYsX920ljy1zKG1nhXh6WkaEhJyyggr20p
 20-551-166-1614 furiously bold requests boost about the silent, even deposits.
 carefully final i

9993.570 Supplier#001655799 IRAN 45905783
 Manufacturer#4 zN5GqtQpYEayxb 20-340-838-3239
 quickly express packages cajole. regular, express deposits use. slyly ironic
 accounts sleep? un

9993.570 Supplier#001989069 IRAQ 3489066
 Manufacturer#4 HKGz6GiPP4wtfgafgacKFLHoyRDsi
 21-259-795-2369 fluffily even foxes can affix carefully express, ironic

9993.520 Supplier#000507219 JORDAN 26757210
 Manufacturer#4 RFsGJoCRQj2Qspzz 23-852-899-5362
 final, unusual foxes detect quickly d

9993.330 Supplier#001262982 SAUDI ARABIA
 29012954 Manufacturer#2 hVcjGUroz,Qk4B NJRU89oOjhp
 30-869-706-7285 busily pending requests boost carefully ironic requests. idly
 special a

9993.270 Supplier#000266055 JORDAN 49766022
 Manufacturer#3 D6wmhofD8HAWq,dF7gU9jP6Tp4oc6tRV
 23-166-588-8433 carefully regular pinto beans are silent accounts. unusual
 requests boost

9993.080 Supplier#002380348 IRAN 39880321
 Manufacturer#1 XtYrEZ5ZFicSgoKWa 20-176-446-6024
 carefully special theodolites along the quickly final deposits e

9993.080 Supplier#002380348 IRAN 50380347
 Manufacturer#1 XtYrEZ5ZFicSgoKWa 20-176-446-6024
 carefully special theodolites along the quickly final deposits e

9992.980 Supplier#001389412 SAUDI ARABIA
 20889399 Manufacturer#1 9q2ytuCrBljwouvSq
 30-292-322-5800 even accounts use fluffily. silent deposits detect slyly around
 the foxes

Number of rows retrieved is: 100

Stop timestamp 02/22/04 03:58:29.812
 Query Time = 54.4 secs

Query 3

Start timestamp 02/22/04 04:52:33.781
 Seed used = 222031943

-- Query 03 - Var_0 Rev_01 - Shipping Priority Query

Tag: Q3 Stream: 0 Sequence number: 11

```

select
l_orderkey,
sum(l_extendedprice * (1 - l_discount)) as revenue,
o_orderdate,
o_shippriority
from
tpcd.customer,
tpcd.orders,
tpcd.lineitem
where
c_mktsegment = 'MACHINERY'
and c_custkey = o_custkey
and l_orderkey = o_orderkey
and o_orderdate < date ('1995-03-28')
and l_shipdate > date ('1995-03-28')
group by
l_orderkey,
o_orderdate,
o_shippriority
order by
revenue desc,
o_orderdate
fetch first 10 rows only

```

L_ORDERKEY	REVENUE	O_ORDERDATE	O_SHIPRIORITY
1027705057	502300.852	1995-03-09	0
445984135	473855.494	1995-03-24	0
1308093926	470499.863	1995-03-21	0
157320387	469583.796	1995-03-23	0
863577702	466466.198	1995-02-23	0
185055904	466002.912	1995-03-16	0
761739392	465991.765	1995-03-27	0
658500359	465936.787	1995-03-21	0
646237473	465456.472	1995-03-04	0
1022598051	465317.664	1995-03-14	0

Number of rows retrieved is: 10

Stop timestamp 02/22/04 04:53:29.125
Query Time = 55.3 secs

Query 4

Start timestamp 02/22/04 04:56:47.046
Seed used = 222031943

-- Query 04 - Var_0 Rev_01 - Order Priority Checking Query

Tag: Q4 Stream: 0 Sequence number: 14

```

select
o_orderpriority,
count(*) as order_count
from
tpcd.orders
where
o_orderdate >= date ('1997-05-01')
and o_orderdate < date ('1997-05-01') + 3 month
and exists (
select

```

```

*
from
tpcd.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	3159606
2-HIGH	3157707
3-MEDIUM	3158982
4-NOT SPECIFIED	3160666
5-LOW	3158634

Number of rows retrieved is: 5

Stop timestamp 02/22/04 04:57:24.125
Query Time = 37.1 secs

Query 5

Start timestamp 02/22/04 05:10:24.203
Seed used = 222031943

-- Query 05 - Var_0 Rev_02 Local Supplier Volume Query

Tag: Q5 Stream: 0 Sequence number: 20

```

select
n_name,
sum(l_extendedprice * (1 - l_discount)) as revenue
from
tpcd.customer,
tpcd.orders,
tpcd.lineitem,
tpcd.supplier,
tpcd.nation,
tpcd.region
where
c_custkey = o_custkey
and o_orderkey = l_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 >= date ('1995-01-01')
and o_orderdate < date ('1995-01-01') + 1 year
group by
n_name
order by
revenue desc

```

N_NAME	REVENUE
VIETNAM	15920987871.359

INDONESIA	15884394006.786
CHINA	15869585300.193
INDIA	15864677045.481
JAPAN	15811062769.323

Number of rows retrieved is: 5

Stop timestamp 02/22/04 05:12:54.828
Query Time = 150.6 secs

Query 6

Start timestamp 02/22/04 04:09:51.125
Seed used = 222031943

-- Query 06 - Var_0 Rev_01 - Forecasting Revenue Change Query

Tag: Q6 Stream: 0 Sequence number: 5

```
select
sum(l_extendedprice * l_discount) as revenue
from
tpcd.lineitem
where
l_shipdate >= date ('1995-01-01')
and l_shipdate < date ('1995-01-01') + 1 year
and l_discount between 0.02 - 0.01 and 0.02 + 0.01
and l_quantity < 25
```

REVENUE
13406139963.795

Number of rows retrieved is: 1

Stop timestamp 02/22/04 04:10:25.234
Query Time = 34.1 secs

Query 7

Start timestamp 02/22/04 05:12:54.828
Seed used = 222031943

-- Query 07 - Var_0 Rev_01 - Volume Shipping Query

Tag: Q7 Stream: 0 Sequence number: 21

```
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,
year (l_shipdate) as l_year,
l_extendedprice * (1 - l_discount) as volume
from
tpcd.supplier,
tpcd.lineitem,
tpcd.orders,
tpcd.customer,
tpcd.nation n1,
tpcd.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 = 'CANADA' and n2.n_name = 'VIETNAM')
or (n1.n_name = 'VIETNAM' and n2.n_name = 'CANADA')
)
and l_shipdate between date('1995-01-01') and date('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
CANADA	VIETNAM	1995	15889982880.178
CANADA	VIETNAM	1996	15953826190.972
VIETNAM	CANADA	1995	15937810024.129
VIETNAM	CANADA	1996	15999070281.228

Number of rows retrieved is: 4

Stop timestamp 02/22/04 05:17:04.359
Query Time = 249.5 secs

Query 8

Start timestamp 02/22/04 04:29:29.703
Seed used = 222031943

-- Query 08 - Var_0 Rev_01 - National Market Share Query

Tag: Q8 Stream: 0 Sequence number: 8

```
select
o_year,
sum(case
when nation = 'VIETNAM' then volume
else 0
end) / sum(volume) as mkt_share
from
(
select
```

```

year(o_orderdate) as o_year,
l_extendedprice * (1 - l_discount) as volume,
n2.n_name as nation
from
tpcd.part,
tpcd.supplier,
tpcd.lineitem,
tpcd.orders,
tpcd.customer,
tpcd.nation n1,
tpcd.nation n2,
tpcd.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 = 'ASIA'
and s_nationkey = n2.n_nationkey
and o_orderdate between date('1995-01-01') and date('1996-12-31')
and p_type = 'ECONOMY POLISHED COPPER'
) as all_nations
group by
o_year
order by
o_year

```

O_YEAR	MKT_SHARE
1995	0.040
1996	0.040

Number of rows retrieved is: 2

Stop timestamp 02/22/04 04:31:51.171
Query Time = 141.5 secs

Query 9

Start timestamp 02/22/04 03:58:29.812
Seed used = 222031943

-- Query 09 - Var_0 Rev_01 - Product Type Profit Measure Query

Tag: Q9 Stream: 0 Sequence number: 3

```

select
nation,
o_year,
sum(amount) as sum_profit
from
(
select
n_name as nation,
year(o_orderdate) as o_year,
l_extendedprice * (1 - l_discount) - ps_supplycost * l_quantity as amount
from
tpcd.part,
tpcd.supplier,
tpcd.lineitem,
tpcd.partsupp,
tpcd.orders,
tpcd.nation
where
s_suppkey = l_suppkey
and ps_suppkey = l_suppkey
and ps_partkey = l_partkey
and p_partkey = l_partkey
and o_orderkey = l_orderkey
and s_nationkey = n_nationkey
and p_name like '%saddle%'
) as profit
group by
nation,
o_year
order by
o_year desc

```

NATION	O_YEAR	SUM_PROFIT
ALGERIA	1998	6810342222.416
ALGERIA	1997	11637753311.641
ALGERIA	1996	11692562406.203
ALGERIA	1995	11589535248.464
ALGERIA	1994	11581142841.943
ALGERIA	1993	11594850437.547
ALGERIA	1992	11642101064.145
ARGENTINA	1998	6790381319.540
ARGENTINA	1997	11552575340.223
ARGENTINA	1996	11578018351.030
ARGENTINA	1995	11535886823.960
ARGENTINA	1994	11534159677.056
ARGENTINA	1993	11536000784.865
ARGENTINA	1992	11555062450.225
BRAZIL	1998	6805561306.273
BRAZIL	1997	11591975062.650
BRAZIL	1996	11614476964.289
BRAZIL	1995	11604987163.716
BRAZIL	1994	11657527067.764
BRAZIL	1993	11585525974.787
BRAZIL	1992	11632215127.326
CANADA	1998	6806456462.639
CANADA	1997	11600328883.857
CANADA	1996	11619358454.155
CANADA	1995	11580833857.817
CANADA	1994	11569965261.305
CANADA	1993	11589977655.972
CANADA	1992	11648280652.300
CHINA	1998	6799276833.121
CHINA	1997	11593209963.715
CHINA	1996	11669883014.668
CHINA	1995	11611593492.774
CHINA	1994	11569527896.479
CHINA	1993	11604483836.327
CHINA	1992	11644458404.211
EGYPT	1998	6841294927.266
EGYPT	1997	11679397060.998
EGYPT	1996	11722992591.086
EGYPT	1995	11651350223.804
EGYPT	1994	11714466074.970
EGYPT	1993	11674990693.395
EGYPT	1992	11719342831.929
ETHIOPIA	1998	6804046779.055
ETHIOPIA	1997	11646125477.700
ETHIOPIA	1996	11653940022.948
ETHIOPIA	1995	11609471558.087
ETHIOPIA	1994	11641862092.996

ETHIOPIA	1993	11624284364.354
ETHIOPIA	1992	11600524046.043
FRANCE	1998	6859286413.680
FRANCE	1997	11654034465.887
FRANCE	1996	11684194898.934
FRANCE	1995	11648812636.715
FRANCE	1994	11636886621.028
FRANCE	1993	11632751482.244
FRANCE	1992	11699715362.622
GERMANY	1998	6794316149.066
GERMANY	1997	11604877907.215
GERMANY	1996	11654323547.540
GERMANY	1995	11591175584.369
GERMANY	1994	11622479135.361
GERMANY	1993	11593692661.323
GERMANY	1992	11613768361.918
INDIA	1998	6793085340.320
INDIA	1997	11610642470.737
INDIA	1996	11667799752.610
INDIA	1995	11625932930.868
INDIA	1994	11630952085.926
INDIA	1993	11626569451.326
INDIA	1992	11649031657.739
INDONESIA	1998	6762701146.077
INDONESIA	1997	11556608207.581
INDONESIA	1996	11571746797.139
INDONESIA	1995	11540200935.113
INDONESIA	1994	11556049422.474
INDONESIA	1993	11554179665.710
INDONESIA	1992	11551429432.042
IRAN	1998	6828253357.863
IRAN	1997	11649194328.638
IRAN	1996	11632658628.051
IRAN	1995	11599531775.497
IRAN	1994	11592851145.451
IRAN	1993	11605300607.044
IRAN	1992	11652609185.178
IRAQ	1998	6819507373.358
IRAQ	1997	11552790418.800
IRAQ	1996	11563717169.798
IRAQ	1995	11521276288.436
IRAQ	1994	11587828524.257
IRAQ	1993	11553644350.615
IRAQ	1992	11594206248.224
JAPAN	1998	6748829165.818
JAPAN	1997	11514552027.611
JAPAN	1996	11561893031.725
JAPAN	1995	11509655951.856
JAPAN	1994	11518958767.050
JAPAN	1993	11499777945.897
JAPAN	1992	11547811584.154
JORDAN	1998	6710431317.290
JORDAN	1997	11527883528.123
JORDAN	1996	11538610393.199
JORDAN	1995	11510245776.135
JORDAN	1994	11468452516.993
JORDAN	1993	11475710005.970
JORDAN	1992	11501306350.783
KENYA	1998	6792194541.120
KENYA	1997	11579473318.608
KENYA	1996	11590799948.072
KENYA	1995	11545240912.298
KENYA	1994	11584129936.895
KENYA	1993	11551571485.935
KENYA	1992	11587561482.925
MOROCCO	1998	6832526444.800
MOROCCO	1997	11634866949.155
MOROCCO	1996	11692594604.206

MOROCCO	1995	11657376654.455
MOROCCO	1994	11671256213.688
MOROCCO	1993	11655956758.327
MOROCCO	1992	11642938337.701
MOZAMBIQUE	1998	6814599336.689
MOZAMBIQUE	1997	11626438837.193
MOZAMBIQUE	1996	11620721468.058
MOZAMBIQUE	1995	11587711981.040
MOZAMBIQUE	1994	11625770621.042
MOZAMBIQUE	1993	11611644434.503
MOZAMBIQUE	1992	11654404796.280
PERU	1998	6780174813.297
PERU	1997	11538204523.061
PERU	1996	11596737034.651
PERU	1995	11524920492.256
PERU	1994	11539057156.835
PERU	1993	11520411404.926
PERU	1992	11564044868.687
ROMANIA	1998	6794922353.526
ROMANIA	1997	11550395609.179
ROMANIA	1996	11591418456.554
ROMANIA	1995	11607831513.765
ROMANIA	1994	11577627888.722
ROMANIA	1993	11542357631.097
ROMANIA	1992	11648898371.341
RUSSIA	1998	6789813474.983
RUSSIA	1997	11585997577.284
RUSSIA	1996	11624883032.405
RUSSIA	1995	11542305995.380
RUSSIA	1994	11555469126.334
RUSSIA	1993	11582954645.378
RUSSIA	1992	11599955825.902
SAUDI ARABIA	1998	6820986174.004
SAUDI ARABIA	1997	11592841623.283
SAUDI ARABIA	1996	11657337772.951
SAUDI ARABIA	1995	11660573283.469
SAUDI ARABIA	1994	11613053208.382
SAUDI ARABIA	1993	11654050421.495
SAUDI ARABIA	1992	11662607379.328
UNITED KINGDOM	1998	6875858400.289
UNITED KINGDOM	1997	11707160605.193
UNITED KINGDOM	1996	11712263921.760
UNITED KINGDOM	1995	11688052300.675
UNITED KINGDOM	1994	11707013472.486
UNITED KINGDOM	1993	11673782102.951
UNITED KINGDOM	1992	11705027280.164
UNITED STATES	1998	6787460707.440
UNITED STATES	1997	11546742113.784
UNITED STATES	1996	11598578217.039
UNITED STATES	1995	11545031693.627
UNITED STATES	1994	11593704676.685
UNITED STATES	1993	11567820700.966
UNITED STATES	1992	11603252975.512
VIETNAM	1998	6793281379.242
VIETNAM	1997	11660186659.456
VIETNAM	1996	11598237090.030
VIETNAM	1995	11602786657.762
VIETNAM	1994	11590164259.986
VIETNAM	1993	11579105722.569
VIETNAM	1992	11634269560.032

Number of rows retrieved is: 175

Stop timestamp 02/22/04 04:08:24.328
Query Time = 594.5 secs

Query 10

Start timestamp 02/22/04 05:03:43.703

Seed used = 222031943

-- Query 10 - Var_0 Rev_01 - Returned Item Reporting Query

Tag: Q10 Stream: 0 Sequence number: 18

```
select
c_custkey,
c_name,
sum(l_extendedprice * (1 - l_discount)) as revenue,
c_acctbal,
n_name,
c_address,
c_phone,
c_comment
from
tpcd.customer,
tpcd.orders,
tpcd.lineitem,
tpcd.nation
where
c_custkey = o_custkey
and l_orderkey = o_orderkey
and o_orderdate >= date ('1993-11-01')
and o_orderdate < date ('1993-11-01') + 3 month
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
fetch first 20 rows only
```

C_CUSTKEY	C_NAME	REVENUE	C_ACCTBAL
N_NAME	C_ADDRESS	C_PHONE	
C_COMMENT			

5413324	Customer#005413324	820827.294	9826.610
KENYA	uUJSkOsPXSA4RM4LjDJYjqorwwKuCRgEbV		
24-998-503-7459	slyly silent excuses was slyly. regular, stealthy decoys s		

40271989	Customer#040271989	776308.850	7638.050
SAUDI ARABIA	xY5rVGptVwsG,ZnGL 4wqCBhhHUNO		
30-661-912-9195	carefully unusual excuses are regular, special accounts		

42702730	Customer#042702730	754366.677	386.250
INDONESIA	eiMn18aGZBT	19-601-309-8632	
pending packages sleep above the carefully pending instructions. even, final packages are carefully			

10374739	Customer#010374739	750273.406	5240.440
IRAN	5NPPKTahpnaDjFxMSn8,uFSP rJQ5		
20-627-812-7960	final packages sleep slyly. regular accounts impress slyly		

18753154	Customer#018753154	749702.650	-773.630
BRAZIL	QjcbYp2DdEEO	12-722-622-6025	bold
warhorses except the pending package			

36335737	Customer#036335737	747621.504	4807.580
JORDAN	PKr0SXFBRiYlkA1P2d1KS2t8		
23-693-959-7257	slyly even platelets are. slyly silent packages unwind slyly final, express t		

24627703	Customer#024627703	744284.667	7482.420
RUSSIA	j,EF6FtETG2kDgEhCxae8Wc1JH9TDY		
32-930-385-3196	slyly ironic ideas are slyly. furio		

11169961	Customer#011169961	741361.091	-130.850
FRANCE	3ufRPFbpogBt0YQzhr4Dfdsmymx90QL5U		
16-513-948-2671	express waters haggle silent, s		

3200038	Customer#003200038	734343.691	378.440
BRAZIL	leJOh2eOKAnUDOGbJT5XJrMOBN0F		
12-518-654-4240	quickly unusual deposits may are. quickly regular theodolites cajole. carefully regular the		

40051828	Customer#040051828	733365.667	4025.680
GERMANY	LkSYts3EbxyG2aTtEtQ5	17-727-604-1369	
blithely pending accounts about the stealthily			

43490320	Customer#043490320	721260.149	5991.870
CHINA	j2QrfYCH4IPDH4qNdTOGIIHKMIPoJ		
28-166-846-7530	foxes use among the carefully even somas. daringly ironic hockey players serve quic		

42407743	Customer#042407743	719881.915	7231.910
INDIA	P0smnj4om5gxeaSDuYFuliNRzpF		
18-787-664-4249	sometimes even foxes run always along the		

9855790	Customer#009855790	718698.819	6573.810
EGYPT	gpih7ZaCQF7VM1YBJI	14-518-917-6479	
special deposits cajole among the			

10364677	Customer#010364677	713514.294	527.680
PERU	GylXnJP0YABBjzUX	27-740-262-2752	
slyly even requests haggle. carefully final req			

12043234	Customer#012043234	713345.250	5040.500
JAPAN	XPthuoOSKXFpiC,wwdhBJZgNMA1497BzR		
22-665-970-2868	fluffily final ideas wake blithely carefully final courts. slyly final courts boost slyly. pending instructions wa		

35671159	Customer#035671159	712407.307	9553.000
ALGERIA	r3CTYPvMntF9o7e	10-280-938-8102	
carefully even warhorses are furiously regular theodolites. regular pinto beans are quickly exp			

37931875	Customer#037931875	710001.242	1876.210
UNITED KINGDOM	bkXF0vfh5d8FQNYZu8EkyfUNYVx		
33-331-791-5331	packages haggle. slyly ironic requests are quickly f		

7368115	Customer#007368115	707524.873	5346.600
RUSSIA	3YuwBfCJws28ZLmDLIam 2WRniBqaogKUen		
32-820-367-4323	regular deposits about the blithely regula		

35935030	Customer#035935030	704490.189	894.070
MOZAMBIQUE	JBWXYRQP8cda Hx		
26-862-550-5790	carefully ironic packages sleep carefully final accounts. furio		

23626387	Customer#023626387	704226.960	4047.440
SAUDI ARABIA	RfZn6HSLr1t3JZx6SbLt6,		
30-950-648-1181	quickly silent requests haggle. slyly special dolphins use. quickly special ideas		

Number of rows retrieved is: 20

Stop timestamp 02/22/04 05:06:17.781
Query Time = 154.1 secs

Query 11

Start timestamp 02/22/04 04:57:24.125
Seed used = 222031943

-- Query 11 - Var_0 Rev_01 - Important Stock Identification Query

Tag: Q11 Stream: 0 Sequence number: 15

```
select
ps_partkey,
sum(ps_supplycost * ps_availqty) as value
from
tpcd.partsupp,
tpcd.supplier,
tpcd.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) * 0.0000003333
from
tpcd.partsupp,
tpcd.supplier,
tpcd.nation
where
ps_suppkey = s_suppkey
and s_nationkey = n_nationkey
and n_name = 'GERMANY'
)
order by
value desc
```

PS_PARTKEY VALUE

58263081 24645211.910
4072068 24258247.760
14286633 23172672.600
29219913 22823200.480
27630856 22413180.520
12182660 22264167.150
54229062 22238445.990
8929711 22009461.870
45556856 21961161.050
52145585 21941436.540
2702192 21924008.910
37019191 21830303.690
17730568 21779712.910
44720078 21708531.930

.... lines Deleted

18978459 8008067.260
57037199 8008066.380
38493214 8008055.440

1631424 8008051.800
4452176 8008051.230
42369189 8008045.670
56333870 8008038.360
15489616 8008035.930
51220662 8008030.360
4285040 8008029.940
51822305 8008025.490
17957579 8008022.400
26563615 8008020.270
48893745 8008019.490
36255666 8008016.760
11256691 8008013.910
932271 8008012.650
37045603 8008008.840

Number of rows retrieved is: 280725

Stop timestamp 02/22/04 04:58:05.250
Query Time = 41.1 secs

Query 12

Start timestamp 02/22/04 05:17:04.359
Seed used = 222031943

-- Query 12 - Var_0 Rev_02 - Shipping Modes and Order Priority Query

Tag: Q12 Stream: 0 Sequence number: 22

```
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
tpcd.orders,
tpcd.lineitem
where
o_orderkey = l_orderkey
and l_shipmode in ('RAIL', 'SHIP')
and l_commitdate < l_receiptdate
and l_shipdate < l_commitdate
and l_receiptdate >= date ('1996-01-01')
and l_receiptdate < date ('1996-01-01') + 1 year
group by
l_shipmode
order by
l_shipmode
```

L_SHIPMODE HIGH_LINE_COUNT LOW_LINE_COUNT

RAIL 1878674 2816239

SHIP 1876561 2814912

Number of rows retrieved is: 2

Stop timestamp 02/22/04 05:18:03.718

Query Time = 59.4 secs

Query 13

Start timestamp 02/22/04 04:46:04.000

Seed used = 222031943

-- Query 13 - Var_0 Rev_01 - Customer Distribution Query

Tag: Q13 Stream: 0 Sequence number: 10

```
select
c_count,
count(*) as custdist
from
(
select
c_custkey,
count(o_orderkey)
from
tpcd.customer left outer join tpcd.orders on
c_custkey = o_custkey
and o_comment not like '%express%accounts%'
group by
c_custkey
) as c_orders (c_custkey, c_count)
group by
c_count
order by
custdist desc,
c_count desc
```

C_COUNT CUSTDIST

0	15000234
10	2164014
9	2110912
11	1999422
8	1819972
12	1718189
19	1518370
20	1503030
18	1458433
13	1435616
21	1405096
7	1368827
17	1347321
14	1246267
22	1238976
16	1237362
15	1184267
23	1032165
6	876082
24	811892
25	605765
5	472590
26	428056

27	287276
4	207721
28	183387
29	110652
3	71375
30	64518
31	35467
32	18517
2	17787
33	9536
34	4469
1	2918
35	1956
36	935
37	389
38	145
39	65
40	19
41	7
44	2
42	1

Number of rows retrieved is: 44

Stop timestamp 02/22/04 04:52:33.781

Query Time = 389.8 secs

Query 14

Start timestamp 02/22/04 03:56:55.812

Seed used = 222031943

--#SET ROWS_OUT -1 ROWS_FETCH -1

-- Query 14 - Var_0 Rev_01 - Promotion Effect Query

Tag: Q14 Stream: 0 Sequence number: 1

```
select
100.00 * sum(case
when p_type like 'PROMO%'
then l_extendedprice * (1 - l_discount)
else 0
end) / sum(l_extendedprice * (1 - l_discount)) as promo_revenue
from
tpcd.lineitem,
tpcd.part
where
l_partkey = p_partkey
and l_shipdate >= date ('1996-08-01')
and l_shipdate < date ('1996-08-01') + 1 month
```

PROMO_REVENUE

16.662

Number of rows retrieved is: 1

Stop timestamp 02/22/04 03:57:35.390

Query Time = 39.6 secs

Query 15a

Start timestamp 02/22/04 04:58:05.250
Seed used = 222031943

-- Query 15 - Var_a Rev_01 - Top Supplier Query

Tag: Q15a Stream: 0 Sequence number: 16

```
with revenue (supplier_no, total_revenue) as (
select
l_suppkey,
sum(l_extendedprice * (1-l_discount))
from
tpcd.lineitem
where
l_shipdate >= date ('1993-09-01')
and l_shipdate < date ('1993-09-01') + 3 month
group by
l_suppkey
)
select
s_suppkey,
s_name,
s_address,
s_phone,
total_revenue
from
tpcd.supplier,
revenue
where
s_suppkey = supplier_no
and total_revenue = (
select
max(total_revenue)
from
revenue
)
order by
s_suppkey
```

S_SUPPKEY	S_NAME	S_ADDRESS	S_PHONE	TOTAL_REVENUE
-----------	--------	-----------	---------	---------------

2227880	Supplier#002227880	WSSvufyY944jAZj8AKPnt	26-859-217-7143	2520507.336
---------	--------------------	-----------------------	-----------------	-------------

Number of rows retrieved is: 1

Stop timestamp 02/22/04 04:59:13.812
Query Time = 68.6 secs

Query 16

Start timestamp 02/22/04 04:55:26.421
Seed used = 222031943

-- Query 16 - Var_0 Rev_01 - Parts/Supplier Relationship Query

Tag: Q16 Stream: 0 Sequence number: 13

```
select
p_brand,
p_type,
p_size,
count(distinct ps_suppkey) as supplier_cnt
from
tpcd.partsupp,
tpcd.part
where
p_partkey = ps_partkey
and p_brand <> 'Brand#42'
and p_type not like 'PROMO PLATED%'
and p_size in (33, 5, 48, 20, 11, 41, 14, 18)
and ps_suppkey not in (
select
s_suppkey
from
tpcd.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#11	PROMO POLISHED NICKEL	11	1572
Brand#53	ECONOMY BRUSHED STEEL	41	1552
Brand#51	MEDIUM BRUSHED COPPER	11	1547
Brand#11	LARGE BRUSHED TIN	14	1542
Brand#11	MEDIUM POLISHED STEEL	20	1542
Brand#43	ECONOMY BRUSHED COPPER	48	1537
Brand#35	STANDARD PLATED BRASS	5	1536
Brand#21	SMALL BRUSHED COPPER	18	1535
Brand#32	STANDARD PLATED STEEL	20	1531
Brand#52	SMALL PLATED COPPER	18	1531
Brand#15	LARGE POLISHED COPPER	14	1528
Brand#13	MEDIUM ANODIZED TIN	5	1526
Brand#14	SMALL PLATED NICKEL	41	1526
Brand#31	STANDARD ANODIZED STEEL	5	1522
Brand#41	ECONOMY PLATED BRASS	5	1522
Brand#14	ECONOMY PLATED STEEL	14	1520
Brand#35	LARGE PLATED BRASS	48	1520

... lines deleted

Brand#35	MEDIUM POLISHED TIN	41	1056
Brand#54	SMALL BRUSHED STEEL	5	1056
Brand#13	LARGE POLISHED NICKEL	33	1055
Brand#25	ECONOMY BRUSHED COPPER	18	1055
Brand#25	ECONOMY POLISHED STEEL	41	1054
Brand#34	STANDARD ANODIZED NICKEL	33	1052
Brand#22	PROMO BURNISHED COPPER	20	1048
Brand#33	SMALL PLATED TIN	20	1029
Brand#21	ECONOMY BRUSHED NICKEL	5	1027
Brand#32	LARGE BURNISHED BRASS	18	1027
Brand#41	MEDIUM BURNISHED BRASS	11	1024
Brand#24	ECONOMY ANODIZED NICKEL	18	1019

Brand#32	STANDARD BURNISHED TIN	20	1018
Brand#15	ECONOMY BRUSHED COPPER	48	1016
Brand#12	STANDARD BRUSHED COPPER	5	1011

Number of rows retrieved is: 27840

Stop timestamp 02/22/04 04:56:47.046
Query Time = 80.6 secs

Query 17

Start timestamp 02/22/04 04:10:25.234
Seed used = 222031943

-- Query 17 - Var_0 Rev_01 - Small-Quantity-Order Revenue Query

Tag: Q17 Stream: 0 Sequence number: 6

```

select
sum(l_extendedprice) / 7.0 as avg_yearly
from
tpcd.lineitem,
tpcd.part
where
p_partkey = l_partkey
and p_brand = 'Brand#25'
and p_container = 'WRAP BAG'
and l_quantity < (
select
0.2 * avg(l_quantity)
from
tpcd.lineitem
where
l_partkey = p_partkey
)

```

AVG_YEARLY

96933359.524

Number of rows retrieved is: 1

Stop timestamp 02/22/04 04:14:15.812
Query Time = 230.6 secs

Query 18

Start timestamp 02/22/04 04:14:15.812
Seed used = 222031943

-- Query 18 - Var_0 Rev_01 - Large Volume Customer Query

Tag: Q18 Stream: 0 Sequence number: 7

select

```

c_name,
c_custkey,
o_orderkey,
o_orderdate,
o_totalprice,
sum(l_quantity)
from
tpcd.customer,
tpcd.orders,
tpcd.lineitem
where
o_orderkey in (
select
l_orderkey
from
tpcd.lineitem
group by
l_orderkey having
sum(l_quantity) > 315
)
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
fetch first 100 rows only

```

C_NAME	C_CUSTKEY	O_ORDERKEY	O_ORDERDATE
O_TOTALPRICE	6		

Customer#005825251	5825251	1211370950	1995-10-01
594669.530	330.000		
Customer#011659001	11659001	1607224230	1994-03-24
588524.150	334.000		
Customer#027622552	27622552	1009170407	1992-03-12
586192.250	325.000		
Customer#028281745	28281745	48881602	1993-09-19
580638.250	327.000		
Customer#038059174	38059174	4702759	1994-11-07
577235.600	320.000		
Customer#032203250	32203250	1741987878	1995-03-20
575999.500	318.000		
Customer#040181347	40181347	1503592230	1996-07-15
574034.320	318.000		
Customer#015487516	15487516	1495051173	1996-06-25
572746.900	325.000		
Customer#003887089	3887089	1223886787	1997-07-14
571927.850	328.000		
Customer#010296812	10296812	655397091	1993-03-28
571783.790	331.000		
Customer#023238544	23238544	1478668323	1997-04-24
571077.090	330.000		
Customer#035480257	35480257	1262608514	1994-09-25
569900.830	321.000		
Customer#017776618	17776618	446215044	1992-05-13
569588.510	318.000		
Customer#037078861	37078861	1316823334	1997-12-28
569428.180	323.000		
Customer#040855088	40855088	1372964198	1994-12-26
566486.910	329.000		

Customer#026610592	26610592	483202305	1997-07-28
566166.020	325.000		
Customer#016417063	16417063	1710335811	1998-01-10
566166.020	325.000		
Customer#039696581	39696581	1454064513	1995-02-03
565991.930	322.000		
Customer#031137956	31137956	1481249313	1997-04-18
562141.700	325.000		
Customer#001074763	1074763	396154496	1992-01-17
561968.220	317.000		
Customer#001373683	1373683	1312370144	1992-05-24
561247.850	324.000		
Customer#008554387	8554387	1216838209	1992-02-08
560132.510	324.000		
Customer#023048681	23048681	532736640	1993-07-22
559812.380	316.000		
Customer#008759305	8759305	556564384	1997-04-03
559031.980	329.000		
Customer#013745023	13745023	760708611	1992-12-06
558554.450	329.000		
Customer#009222934	9222934	674470592	1997-03-06
558090.890	316.000		
Customer#038608477	38608477	473790498	1994-10-02
557871.020	320.000		
Customer#042751399	42751399	1450440514	1995-06-27
555743.140	325.000		
Customer#001490698	1490698	824076807	1994-05-18
555197.670	323.000		
Customer#028333805	28333805	177770599	1992-01-28
554524.420	337.000		
Customer#040645235	40645235	1336919715	1996-10-05
553764.920	323.000		
Customer#042510910	42510910	381335908	1993-10-19
553594.970	318.000		
Customer#014140157	14140157	1081662689	1995-04-29
552648.360	318.000		
Customer#035391638	35391638	1427646753	1994-09-11
551901.030	321.000		
Customer#007486672	7486672	1328667653	1996-02-12
550984.090	325.000		
Customer#000675709	675709	335512837	1998-02-07
550964.120	322.000		
Customer#044738222	44738222	647210401	1995-12-22
550829.710	334.000		
Customer#018012314	18012314	689803588	1995-09-27
550720.800	322.000		
Customer#040384994	40384994	1395730656	1996-11-25
550397.730	316.000		
Customer#038180257	38180257	92511430	1995-03-06
550252.180	318.000		
Customer#008920151	8920151	1394410370	1995-05-21
549959.240	320.000		
Customer#038738056	38738056	622741799	1996-07-04
549713.850	329.000		
Customer#017553850	17553850	1051988039	1992-11-05
549331.710	324.000		
Customer#016569646	16569646	499594150	1997-12-30
548345.380	322.000		
Customer#032201426	32201426	1521932260	1992-11-11
548154.510	319.000		
Customer#042578594	42578594	625278498	1997-07-29
547655.550	317.000		
Customer#025034836	25034836	1696648902	1997-11-20
547175.580	318.000		
Customer#000486046	486046	632930308	1992-02-11
547109.400	316.000		
Customer#043215395	43215395	1006926883	1993-04-12
546753.110	329.000		

Customer#041208539	41208539	285541831	1994-01-09
546466.230	330.000		
Customer#033311431	33311431	1388270884	1995-01-15
546233.460	334.000		
Customer#024811402	24811402	82389922	1997-12-05
546072.280	326.000		
Customer#008403740	8403740	292428417	1992-11-05
545706.140	320.000		
Customer#012499000	12499000	790473890	1996-09-20
545318.070	316.000		
Customer#001580479	1580479	1186603365	1993-11-09
544841.890	317.000		
Customer#016101226	16101226	1008673634	1994-07-05
544427.280	333.000		
Customer#003825775	3825775	451874533	1996-05-10
544347.170	318.000		
Customer#031311742	31311742	1550590755	1996-06-29
544102.680	326.000		
Customer#036930983	36930983	1514582822	1997-03-15
543515.260	320.000		
Customer#020207758	20207758	154788836	1992-03-19
542971.620	322.000		
Customer#034424518	34424518	66813285	1993-09-10
542630.540	323.000		
Customer#013235329	13235329	1579583424	1992-10-02
541790.680	319.000		
Customer#040670284	40670284	1221005475	1996-07-09
541461.490	318.000		
Customer#002402318	2402318	1766106852	1992-07-24
540964.530	317.000		
Customer#012560146	12560146	538973346	1995-06-10
540964.530	317.000		
Customer#037909663	37909663	194078176	1995-02-10
540536.360	321.000		
Customer#032447611	32447611	1548226275	1995-07-20
540443.930	317.000		
Customer#033659489	33659489	156065860	1996-07-03
540136.660	325.000		
Customer#031955800	31955800	1581380386	1993-02-07
540122.150	316.000		
Customer#029703884	29703884	319331397	1997-06-25
539215.620	317.000		
Customer#044082155	44082155	1721695494	1996-05-31
538951.900	320.000		
Customer#015937037	15937037	1157649474	1994-08-13
538764.590	327.000		
Customer#021031948	21031948	587222276	1993-12-17
538518.500	329.000		
Customer#037246954	37246954	1327967778	1995-11-11
538407.850	320.000		
Customer#002821793	2821793	604923175	1998-03-23
538252.270	318.000		
Customer#033992698	33992698	580937539	1997-05-11
538201.930	316.000		
Customer#006455116	6455116	754789858	1998-04-17
538125.750	318.000		
Customer#006084787	6084787	1710888930	1993-11-08
538013.290	331.000		
Customer#023361214	23361214	448220770	1993-10-15
538010.490	334.000		
Customer#031781524	31781524	795736742	1992-09-12
537790.070	319.000		
Customer#027646664	27646664	1616418273	1996-11-08
536967.270	326.000		
Customer#031785611	31785611	489556257	1993-12-25
536709.330	320.000		
Customer#015825097	15825097	1129621922	1994-03-08
536620.100	316.000		

Customer#033579595	33579595	1382283137	1994-11-04
536544.230	324.000		
Customer#000892265	892265	905825731	1996-11-18
536152.400	318.000		
Customer#021268486	21268486	493774403	1992-12-25
535954.030	316.000		
Customer#040592539	40592539	416529441	1996-03-05
535921.410	323.000		
Customer#010210303	10210303	937026784	1992-09-23
535698.580	316.000		
Customer#004961306	4961306	783772005	1997-03-19
535687.630	329.000		
Customer#003294490	3294490	10408580	1994-09-03
535381.720	320.000		
Customer#007479656	7479656	648042530	1993-07-16
535252.900	319.000		
Customer#021924302	21924302	928604961	1994-03-04
534827.550	316.000		
Customer#025929247	25929247	84927619	1997-06-29
534802.020	316.000		
Customer#019184890	19184890	410876964	1994-11-15
534739.290	324.000		
Customer#039899956	39899956	1622003009	1997-02-06
534437.280	321.000		
Customer#023274065	23274065	1009666115	1998-03-06
533873.950	322.000		
Customer#005669002	5669002	979742369	1996-12-07
533814.350	317.000		
Customer#029443667	29443667	20971013	1997-08-12
533204.420	322.000		
Customer#010479067	10479067	182898470	1996-01-09
532934.970	318.000		
Customer#032871172	32871172	1312277635	1995-12-18
532734.960	316.000		

Number of rows retrieved is: 100

Stop timestamp 02/22/04 04:29:29.703
Query Time = 913.9 secs

Query 19

Start timestamp 02/22/04 05:06:17.781
Seed used = 222031943

-- Query 19 - Var_0 Rev_01 - Discounted Revenue Query

Tag: Q19 Stream: 0 Sequence number: 19

```

select
sum(l_extendedprice* (1 - l_discount)) as revenue
from
tpcd.lineitem,
tpcd.part
where
(
p_partkey = l_partkey
and p_brand = 'Brand#51'
and p_container in ('SM CASE', 'SM BOX', 'SM PACK', 'SM PKG')
and l_quantity >= 4 and l_quantity <= 4 + 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#42'
and p_container in ('MED BAG', 'MED BOX', 'MED PKG', 'MED PACK')
and l_quantity >= 14 and l_quantity <= 14 + 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#45'
and p_container in ('LG CASE', 'LG BOX', 'LG PACK', 'LG PKG')
and l_quantity >= 28 and l_quantity <= 28 + 10
and p_size between 1 and 15
and l_shipmode in ('AIR', 'AIR REG')
and l_shipinstruct = 'DELIVER IN PERSON'
)

```

REVENUE

1188144344.379

Number of rows retrieved is: 1

Stop timestamp 02/22/04 05:10:24.203
Query Time = 246.4 secs

Query 20

Start timestamp 02/22/04 04:08:24.328
Seed used = 222031943

-- Query 20 - Var_0 Rev_01 - Potential Part Promotion Query

Tag: Q20 Stream: 0 Sequence number: 4

```

select
s_name,
s_address
from
tpcd.supplier,
tpcd.nation
where
s_suppkey in (
select
ps_suppkey
from
tpcd.partsupp
where
ps_partkey in (
select
p_partkey
from
tpcd.part
where
p_name like 'blanched%'
)

```

```

and ps_availqty > (
select
0.5 * sum(l_quantity)
from
tpcd.lineitem
where
l_partkey = ps_partkey
and l_suppkey = ps_suppkey
and l_shipdate >= date ('1996-01-01')
and l_shipdate < date ('1996-01-01') + 1 year
)
)
and s_nationkey = n_nationkey
and n_name = 'INDONESIA'
order by
s_name

```

S_NAME	S_ADDRESS
Supplier#000000045	LcKnsa8XGtIO0WYSB7hkOrH rnzRg1
Supplier#000000050	rGobqSMMyz0ErrPhCGS
Supplier#000000153	qkCHAU1v9CtEBOGXhdFXjsx5L5gViVm5k,
Supplier#000000168	NNvNhn6dWzr80Igr
Supplier#000000219	f0siVrn1T,dOIJgYU
Supplier#000000250	JkzOvHRi1rEdkZ
Supplier#000000293	H2JnUWv1X3s0y17i2tY5Vd0kd4f0
Supplier#000000313	9xrpKrrwr9,Jgvm5q rGkZePkpsH5xEXZnuLJug
Supplier#000000364	OhfGUPn8U9oBx5
Supplier#000000394	5mGD3d,LeKycAyeYbVlrGMlzmT
Supplier#000000403	TTVlCrcFrglnhCffA1liw l6bZyyaI9xcRF
Supplier#000000507	af2w4JF8qV aaqApYqzTFtIXtKV57Na
Supplier#000000534	JBhF3gZcQiNWGxh8DuoAhmVi
Supplier#000000558	T9hNjrRRRQmkbZomdaeLKDOqmmUcJpAJzXOxq
Supplier#000000571	GMfmfVJba
Supplier#000000590	KhRtsL4Foycp2hUwg bEHkDusXAf
Supplier#000000592	tdYqh7rm0Zc7E0etRqHakcg.m34gQX
Supplier#000000639	WGqnQRU1xoC,UV9xDGjC48rC4Cow4
Supplier#000000676	USGIdhKusoe8dcvWdBbZWUfxnVxNnsgY mG

... lines deleted

Supplier#002999215	8mtA0NcrYH
Supplier#002999228	GNZpagcGTHzmtmnEF8RaE4Nte42t8Ky260lx
Supplier#002999353	Zdb5guN,4,pyub
Supplier#002999361	3G8XdQRs9GeF,TZYXAIEH8ExAdxAU
Supplier#002999376	R5V6PNUm1bQc
Supplier#002999416	FV1zbHXecs3VvEgH83V1rrsdOeQ fcc
Supplier#002999522	h9 LRqXXzb
Supplier#002999660	qeZXT6XRTjSIrzTXOA3x5iEZQ
Supplier#002999673	VlxZWOes8xtLJK
Supplier#002999768	C ,VGih chEFN8W1GrM1YjWpsRGMB
Supplier#002999770	IlcGmmTfzCYzivpSlS3DpIK7wRZS1ijQkkFOwQF,
Supplier#002999773	WUan0qNJL41dOepMJrDY11ma5BMwrvmKZWMgq0p
Supplier#002999814	sRz2EF0Fkv ih ECVuTOVZLZQOsnMQOX85Svv
Supplier#002999837	2LkFmr8gK4AIfQkH
Supplier#002999886	iFJSEAKwZE
Supplier#002999891	DGvu2anShmw
Supplier#002999926	2HgQJIqom h 93
Supplier#002999931	WEzFX8ZIUbGTET,Zzx,RksH6 FbX0qGPnXHPt6ky
Supplier#002999953	dgpjxjocFJBvo7UDc2H1KcSKi uS4nS l2,ciTFZY

Number of rows retrieved is: 62472

Stop timestamp 02/22/04 04:09:51.125

Query Time = 86.8 secs

Query 21

Start timestamp 02/22/04 04:31:51.171
Seed used = 222031943

-- Query 21 - Var_0 Rev_01 - Suppliers Who Kept Orders Waiting Query

Tag: Q21 Stream: 0 Sequence number: 9

```

select
s_name,
count(*) as numwait
from
tpcd.supplier,
tpcd.lineitem l1,
tpcd.orders,
tpcd.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
tpcd.lineitem l2
where
l2.l_orderkey = l1.l_orderkey
and l2.l_suppkey <> l1.l_suppkey
)
and not exists (
select
*
from
tpcd.lineitem l3
where
l3.l_orderkey = l1.l_orderkey
and l3.l_suppkey <> l1.l_suppkey
and l3.l_receiptdate > l3.l_commitdate
)
and s_nationkey = n_nationkey
and n_name = 'CHINA'
group by
s_name
order by
numwait desc,
s_name
fetch first 100 rows only

```

S_NAME	NUMWAIT
Supplier#001303799	27
Supplier#000144843	26
Supplier#000746660	25
Supplier#000965009	25
Supplier#001739356	25
Supplier#001796410	25
Supplier#000272355	24
Supplier#000300733	24
Supplier#000324845	24
Supplier#000360319	24
Supplier#000425293	24
Supplier#001202953	24

Supplier#001249392	24
Supplier#001464568	24
Supplier#001608481	24
Supplier#001659419	24
Supplier#001909171	24
Supplier#001960926	24
Supplier#002514570	24
Supplier#002581740	24
Supplier#002704252	24
Supplier#000163554	23
Supplier#000317270	23
Supplier#000406168	23
Supplier#000539445	23
Supplier#000630214	23
Supplier#000636613	23
Supplier#000962878	23
Supplier#001065485	23
Supplier#001260115	23
Supplier#001327675	23
Supplier#001327933	23
Supplier#001553340	23
Supplier#001641750	23
Supplier#001794574	23
Supplier#001994143	23
Supplier#002003475	23
Supplier#002010143	23
Supplier#002012181	23
Supplier#002163950	23
Supplier#002201827	23
Supplier#002229584	23
Supplier#002322592	23
Supplier#002339932	23
Supplier#002374047	23
Supplier#002533287	23
Supplier#002544070	23
Supplier#002602902	23
Supplier#002637265	23
Supplier#002805615	23
Supplier#002858528	23
Supplier#002920194	23
Supplier#000079024	22
Supplier#000149958	22
Supplier#000161316	22
Supplier#000210723	22
Supplier#000214420	22
Supplier#000255317	22
Supplier#000276552	22
Supplier#000323702	22
Supplier#000336037	22
Supplier#000353075	22
Supplier#000370311	22
Supplier#000371768	22
Supplier#000422932	22
Supplier#000574757	22
Supplier#000762694	22
Supplier#000834155	22
Supplier#000848164	22
Supplier#000909500	22
Supplier#000920477	22
Supplier#000934913	22
Supplier#000945744	22
Supplier#000946164	22
Supplier#000989038	22
Supplier#000996583	22
Supplier#001035517	22
Supplier#001059261	22
Supplier#001107112	22
Supplier#001216934	22

Supplier#001290877	22
Supplier#001334261	22
Supplier#001367539	22
Supplier#001367898	22
Supplier#001402164	22
Supplier#001417546	22
Supplier#001441948	22
Supplier#001449657	22
Supplier#001455206	22
Supplier#001464174	22
Supplier#001627209	22
Supplier#001639509	22
Supplier#001676457	22
Supplier#001733534	22
Supplier#001733854	22
Supplier#001765384	22
Supplier#001849390	22
Supplier#001887647	22
Supplier#001895582	22
Supplier#001919470	22

Number of rows retrieved is: 100

Stop timestamp 02/22/04 04:46:04.000
Query Time = 852.8 secs

Query 22

Start timestamp 02/22/04 04:53:29.125
Seed used = 222031943

-- Query 22 - Var_0 Rev_01 - Global Sales Opportunity Query

Tag: Q22 Stream: 0 Sequence number: 12

```

select
  cntrycode,
  count(*) as numcust,
  sum(c_acctbal) as totacctbal
from
  (
    select
      substr(c_phone, 1, 2) as cntrycode,
      c_acctbal
    from
      tpcd.customer
    where
      substr(c_phone, 1, 2) in
        ('19', '12', '13', '18', '10', '21', '22')
      and c_acctbal > (
        select
          avg(c_acctbal)
        from
          tpcd.customer
        where
          c_acctbal > 0.00
          and substr(c_phone, 1, 2) in
            ('19', '12', '13', '18', '10', '21', '22')
        )
    and not exists (
      select
        *
      from

```



```
tpcd.orders
where
o_custkey = c_custkey
)
) as custsale
group by
cntrycode
order by
cntrycode
```

CNTRYCODE NUMCUST TOTACCTBAL

```
-----
10      271898    2039074760.190
12      273078    2047790087.870
13      273299    2047874456.980
18      273569    2051966320.030
19      272190    2041347916.170
21      271520    2036705216.360
22      272792    2045687502.410
```

Number of rows retrieved is: 7

Stop timestamp 02/22/04 04:55:26.421
Query Time = 117.3 secs

First 10 Rows of the Database

SELECT * FROM TPCD.REGION FETCH FIRST 10 ROWS ONLY

R_REGIONKEY R_NAME R_COMMENT

```
-----
0 AFRICA      special Tiresias about the furiously even dolphins
are furi
1 AMERICA     even, ironic theodolites according to the bold
platelets wa
2 ASIA        silent, bold requests sleep slyly across the quickly sly
dependencies. furiously silent instructions alongside
3 EUROPE      special, bold deposits haggle foxes. platelet
4 MIDDLE EAST furiously unusual packages use carefully above
the unusual, exp
```

5 record(s) selected.

SELECT * FROM TPCD.NATION FETCH FIRST 10 ROWS ONLY

N_NATIONKEY N_NAME N_REGIONKEY N_COMMENT

```
-----
0 ALGERIA     0 final accounts wake quickly. special reques
5 ETHIOPIA    0 fluffily ruthless requests integrate fluffily.
pending ideas wake blithely acco
14 KENYA      0 ironic requests boost. quickly pending pinto
beans cajole slyly slyly even deposits. ironic packages
15 MOROCCO    0 ideas according to the fluffily final pinto
beans sleep furiously
16 MOZAMBIQUE 0 ironic courts wake fluffily even, bold
deposi
1 ARGENTINA   1 idly final instructions cajole stealthily.
regular instructions wake carefully blithely express accounts. fluffi
2 BRAZIL      1 always pending pinto beans sleep sil
```

3 CANADA 1 foxes among the bold requests
17 PERU 1 final, final accounts sleep slyly across the
requests.

24 UNITED STATES 1 blithely regular deposits serve
furiously blithely regular warthogs! slyly fi

10 record(s) selected.

SELECT * FROM TPCD.PART FETCH FIRST 10 ROWS ONLY

P_PARTKEY P_NAME P_SIZE P_MFGR
P_BRAND P_TYPE P_SIZE P_CONTAINER
P_RETAILPRICE P_COMMENT

```
-----
11 chocolate turquoise sandy snow misty Manufacturer#2
Brand#25 STANDARD BURNISHED NICKEL 43 WRAP BOX
+9.110100000000000E+002 furiouslyl
37 turquoise ivory orange sandy maroon Manufacturer#4
Brand#45 LARGE POLISHED TIN 48 JUMBO BOX
+9.370300000000000E+002 blithely regular
43 medium khaki chocolate rosy blush Manufacturer#4
Brand#44 PROMO POLISHED STEEL 5 WRAP CASE
+9.430400000000000E+002 carefully iro
47 sky firebrick red linen dim Manufacturer#4
Brand#45 LARGE BURNISHED BRASS 14 JUMBO PACK
+9.470400000000000E+002 bold, unusual a
50 yellow cornflower royal blush almond Manufacturer#3
Brand#33 LARGE ANODIZED TIN 25 WRAP PKG
+9.500500000000000E+002 regular dinos ar
55 antique cream pale tomato rose Manufacturer#2
Brand#23 ECONOMY BRUSHED COPPER 9 MED BAG
+9.550500000000000E+002 furiously
68 bisque frosted pale puff sandy Manufacturer#1
Brand#11 PROMO ANODIZED STEEL 10 WRAP BOX
+9.680600000000000E+002 carefully
76 bisque light yellow puff salmon Manufacturer#3
Brand#34 MEDIUM BRUSHED COPPER 9 SM PKG
+9.760700000000000E+002 final
87 pale khaki sandy antique black Manufacturer#4
Brand#41 LARGE PLATED STEEL 41 WRAP PACK
+9.870800000000000E+002 slyly even instruction
89 ghost khaki lawn pale dim Manufacturer#5
Brand#35 STANDARD BURNISHED STEEL 7 MED JAR
+9.890800000000000E+002 quickly ironi
```

10 record(s) selected.

SELECT * FROM TPCD.SUPPLIER FETCH FIRST 10 ROWS ONLY

S_SUPPKEY S_NAME S_ADDRESS
S_NATIONKEY S_PHONE S_ACCTBAL S_COMMENT

```
-----
--
1458 Supplier#000001458 3SmErYBeN9EFj 24
34-790-720-6395 -9.802100000000000E+002 even ideas boost quickly unusual,
bold theodolites. final, speci
1522 Supplier#000001522 W0C5TrNw89U 24
34-440-334-7894 +4.712380000000000E+003 blithely even foxes should have to
nag.
1587 Supplier#000001587 mJGiVq4lo012P4Qd 24
34-523-646-3372 +2.056400000000000E+002 blithely final accounts wake
carefully according to the
```

1680 Supplier#000001680 9r1tXehZwE72p0i 24
 34-230-784-5114 +3.056950000000000E+003 even deposits haggle furiously.
 1814 Supplier#000001814 eHqfl3FhFG7gT2G,Kb21V4yr
 NyQhVKH04yflyj 24 34-369-553-1930 +8.321240000000000E+003
 furiously final sheaves are quickly alongside of the blithely express deposits
 1954 Supplier#000001954 QrTQJOkhS7WEFB3L5zbvDUSGh4IV oh
 24 34-861-418-3829 +5.643960000000000E+003 instructions wake. slyly
 bold requests sleep sometimes pending the
 2335 Supplier#000002335 dtvcfOsHopS5Y0 7QcGRRFcRa
 q3UuJsMKodwEyE 24 34-732-988-5709 +4.669720000000000E+003
 carefully regular ideas use slyly final requests. bold the
 2400 Supplier#000002400 rvXmKk9vCN 24
 34-521-714-2582 +2.162450000000000E+003 furiously ironic requests among
 the blithely final excuses engage slyly final theodolites. stea
 2535 Supplier#000002535 A C1WmBRZA2BePs3f nB6D
 24 34-445-685-5978 +1.917680000000000E+003 carefully sly requests haggle
 fluffily. carefully regular packages are across the slyly unusual
 3127 Supplier#000003127
 e5zpOo2lbVIwawn2OeD,uHw5urkAgBm6jTcyiA 24 34-358-351-8680
 +9.520150000000000E+003 carefully pending theodolites are quickly accordin

10 record(s) selected.

SELECT * FROM TPCD.PARTSUPP FETCH FIRST 10 ROWS ONLY

PS_PARTKEY PS_SUPPKEY PS_AVAILQTY PS_SUPPLYCOST
 PS_COMMENT

 -
 11 12 4540 +7.098700000000000E+002 final packages mold after
 the carefully unusual requests. quickly fi
 11 750012 4729 +8.949000000000000E+002 regular packages sleep
 carefully fluffily ironic ac
 11 1500012 3708 +8.187400000000000E+002 slyly pending
 theodolites wake quickly unusual, express accounts. fluffily regular requests
 cajole furiously quickly even dugouts. slyly bold platelets
 11 2250012 3213 +4.719800000000000E+002 ideas nag regular
 instructions. regular, thin pinto beans unwind furiously ironic accounts. quickly
 express platele
 37 38 7171 +8.249600000000000E+002 pending packages wake
 quietly. special, even accounts haggle unusual
 37 750038 5542 +1.265900000000000E+002 ironic, ironic packages
 are slyly. furiously regular excuses cajole blithely quickly ironic dependencies.
 regular packages use carefully furiously pending depths
 37 1500038 7113 +1.572000000000000E+001 regular, final requests
 nag across the regular, even requests. carefully regular accounts cajole carefully
 carefully ruthless dep
 37 2250038 1449 +7.456400000000000E+002 regular, silent foxes
 nag. carefully ironic deposits are fluffily. carefully regular pinto beans around the
 bravely even instructions cajole carefully furiously regul
 43 44 3211 +8.057800000000000E+002 final, express
 dependencies sleep according to the express requests. bold, regular accounts
 detect outside the slyly
 43 750044 6770 +4.931900000000000E+002 furiously special pinto
 beans cajole. ironic decoys across the

10 record(s) selected.

SELECT * FROM TPCD.CUSTOMER FETCH FIRST 10 ROWS ONLY

C_CUSTKEY C_NAME C_ADDRESS
 C_NATIONKEY C_PHONE C_ACCTBAL C_MKTSEGMENT
 C_COMMENT

 15 Customer#000000015
 YtWggXoOLdwd07b0y,BZaGUQMLJMX1Y,EC,6Dn 23
 33-687-542-7601 +2.788520000000000E+003 HOUSEHOLD fluffily bold
 dolphins detect quickly about the special instruction
 31 Customer#000000031 LUACbO0viaAv6eXOAebryDB xjVst
 23 33-197-837-7094 +5.236890000000000E+003 HOUSEHOLD carefully
 even theodolites doubt final, final deposits. regular, ironic tithes sleep
 441 Customer#000000441 gjYpcBx6MP8GvDa6 23
 33-438-355-3491 +9.451840000000000E+003 HOUSEHOLD slyly unusual
 accounts cajole sometimes. express accounts haggle furiously alongside of the
 silently final ins
 771 Customer#000000771 J9UMiYJznHVHZDuCG,ErV0iiMStETS
 23 33-761-371-4753 +7.461740000000000E+003 AUTOMOBILE
 furiously regular platelets within the furiously even ideas haggle c
 828 Customer#000000828 0PkG ELwBIgU4AsNcjDc5Q,9Gj
 23 33-108-680-4317 +7.059680000000000E+003 BUILDING braids nag!
 express theodolites haggle after the express packages. fluffily regular
 985 Customer#000000985 0uAMeIICB,wts4STD4eLL
 23 33-408-194-5161 +2.701210000000000E+003 HOUSEHOLD bold, ironic
 accounts sleep slyly. carefully special deposits haggle regular requests. slowly
 even dep
 1059 Customer#000001059 OHwYMiDjmgelQXhLINW,8LIwIEr
 23 33-683-418-9460 +1.547500000000000E+003 HOUSEHOLD
 pending accounts sleep carefully after the furiously even pinto beans. packages
 wake slyly. re
 1117 Customer#000001117 80NfzBRWj5tUUArdnsFE7Eg
 23 33-461-439-5684 +2.829070000000000E+003 FURNITURE furiously
 regular foxes cajole furiously ironic requests. carefully permane
 12761 Customer#000012761 MhuFeEQ9QO29AF
 23 33-932-614-6333 +6.484260000000000E+003 BUILDING even accounts
 maintain blithely. final s
 12900 Customer#000012900 nEYys,aQFxs kMRBkrii5BU
 23 33-486-516-9653 +2.549900000000000E+003 HOUSEHOLD slyly
 special requests are permanent

10 record(s) selected.

SELECT * FROM TPCD.ORDERS FETCH FIRST 10 ROWS ONLY

O_ORDERKEY O_CUSTKEY O_ORDERSTATUS O_TOTALPRICE
 O_ORDERDATE O_ORDERPRIORITY O_CLERK O_SHIPPRIORITY
 O_COMMENT

 3271 9917242 F +1.459124100000000E+005 01/01/1992
 1-URGENT Clerk#000126233 0 blithely regular accounts sleep
 furiously after th
 88199 10847287 F +3.062044600000000E+005 01/01/1992
 3-MEDIUM Clerk#000270228 0 pinto beans wake quickly. sp
 175975 2253217 F +2.420147600000000E+005 01/01/1992
 2-HIGH Clerk#000236510 0 careful, ironic packages use carefully.
 blithely expres
 190656 7108108 F +1.782295600000000E+005 01/01/1992 5-LOW
 Clerk#000052344 0 pending ideas haggle along the blithely
 pending accounts. carefully regula
 287971 42648970 F +3.924635000000000E+004 01/01/1992
 4-NOT SPECIFIED Clerk#000180088 0 furiously silent accounts after
 the pending ideas cajole accounts. s
 359170 32201854 F +1.018053400000000E+005 01/01/1992
 3-MEDIUM Clerk#000164687 0 carefully pending requests sleep
 unusual, even pack

```

458982 30679267 F +2.41239530000000E+005 01/01/1992
1-URGENT Clerk#000261269 0 excuses affix accounts. slyly sly
instructions alo
630278 34826452 F +1.54776900000000E+004 01/01/1992
1-URGENT Clerk#000137850 0 carefully pending platelets dazzle
fluffily even theodolit
723777 33758089 F +2.02574030000000E+005 01/01/1992
2-HIGH Clerk#000265219 0 ironic, regular theodolites sleep
blithely
727232 7557832 F +1.01369060000000E+005 01/01/1992
3-MEDIUM Clerk#000266993 0 bravely special ideas are. even pinto
beans according to the

```

10 record(s) selected.

SELECT * FROM TPCD.LINEITEM FETCH FIRST 10 ROWS ONLY

```

L_ORDERKEY L_PARTKEY L_SUPPKEY L_LINENUMBER
L_QUANTITY L_EXTENDEDPRICE L_DISCOUNT
L_TAX L_RETURNFLAG L_LINestatus L_SHIPDATE
L_COMMITDATE L_RECEIPTDATE L_SHIPINSTRUCT
L_SHIPMODE L_COMMENT

```

```

-----
1054181 4865078 1865079 1 +4.50000000000000E+001
+4.69273500000000E+004 +3.00000000000000E-002
+8.00000000000000E-002 R F 01/02/1992 02/05/1992 01/15/1992
NONE MAIL even instructions kindle furio
5018977 24611600 611601 1 +2.00000000000000E+001
+3.02074000000000E+004 +0.00000000000000E+000
+0.00000000000000E+000 A F 01/02/1992 03/19/1992
01/15/1992 NONE SHIP quickly ironic excu
14168833 46737982 988028 3 +4.90000000000000E+001
+9.88648500000000E+004 +9.00000000000000E-002
+5.00000000000000E-002 R F 01/02/1992 02/01/1992 01/28/1992
TAKE BACK RETURN SHIP furiously bold courts are careful
15413986 53978084 2978085 4 +1.40000000000000E+001
+1.62314600000000E+004 +5.00000000000000E-002
+5.00000000000000E-002 A F 01/02/1992 01/31/1992 01/04/1992
COLLECT COD TRUCK final, bold dolphins
18436929 39951321 2451348 1 +5.00000000000000E+000
+6.85165000000000E+003 +0.00000000000000E+000
+7.00000000000000E-002 A F 01/02/1992 02/27/1992 01/26/1992
TAKE BACK RETURN SHIP even, regular platelets na
19547653 37197566 1947579 1 +4.80000000000000E+001
+7.97620800000000E+004 +0.00000000000000E+000
+7.00000000000000E-002 R F 01/02/1992 02/08/1992 01/26/1992
NONE MAIL regular accounts haggle. h
19918976 6334057 2584064 6 +3.10000000000000E+001
+3.38129400000000E+004 +5.00000000000000E-002
+6.00000000000000E-002 R F 01/02/1992 02/23/1992 01/03/1992
DELIVER IN PERSON REG AIR carefully fluffy requests
22142214 56458378 1708433 7 +1.90000000000000E+001
+2.53374500000000E+004 +0.00000000000000E+000
+7.00000000000000E-002 R F 01/02/1992 03/17/1992 01/03/1992
NONE AIR carefully express requests sleep
22518080 50882189 1382222 6 +3.90000000000000E+001
+4.55769600000000E+004 +5.00000000000000E-002
+7.00000000000000E-002 R F 01/02/1992 03/06/1992 01/30/1992
COLLECT COD SHIP carefully special ideas
26601603 39300513 2550553 4 +2.00000000000000E+000
+3.02310000000000E+003 +0.00000000000000E+000
+2.00000000000000E-002 R F 01/02/1992 03/28/1992 01/08/1992
COLLECT COD RAIL special platelets wake about the slyly fin

```

10 record(s) selected.

Query Substitution Parameters

```

"Power stream Seed = 222031943"
-- TPC TPC-H Parameter Substitution (Version 1.3.0)
-- using 222031943 as a seed to the RNG
Q1 DELTA 101
Q2 SIZE 42
TYPE BRASS
REGION MIDDLE EAST
Q3 SEGMENT MACHINERY
DATE 1995-03-28
Q4 DATE 1997-05-01
Q5 REGION ASIA
DATE 1995-01-01
Q6 DATE 1995-01-01
DISCOUNT 0.02
QUANTITY 25
Q7 NATION1 CANADA
NATION2 VIETNAM
Q8 NATION VIETNAM
REGION ASIA
TYPE ECONOMY POLISHED COPPER
Q9 COLOR saddle
Q10 DATE 1993-11-01
Q11 NATION GERMANY
FRACTION 0.0000003333
Q12 SHIPMODE1 RAIL
SHIPMODE2 SHIP
DATE 1996-01-01
Q13 WORD1 express
WORD2 accounts
Q14 DATE 1996-08-01
Q15 DATE 1993-09-01
Q16 BRAND Brand#42
TYPE PROMO PLATED
SIZE1 33
SIZE2 5
SIZE3 48
SIZE4 20
SIZE5 11
SIZE6 41
SIZE7 14
SIZE8 18
Q17 BRAND Brand#25
CONTAINER WRAP BAG
Q18 QUANTITY 315
Q19 BRAND1 Brand#51
BRAND2 Brand#42
BRAND3 Brand#45
QUANTITY1 4
QUANTITY2 14
QUANTITY3 28
Q20 COLOUR blanched
DATE 1996-01-01
NATION INDONESIA
Q21 NATION CHINA
Q22 I1 19
I2 12
I3 13
I4 18
I5 10
I6 21
I7 22

"Throughput Stream = 1 Seed = 222031944"
-- TPC TPC-H Parameter Substitution (Version 1.3.0)
-- using 222031944 as a seed to the RNG
Q1 DELTA 109

```

Q2 SIZE 30
 TYPE NICKEL
 REGION ASIA
 Q3 SEGMENT FURNITURE
 DATE 1995-03-14
 Q4 DATE 1995-02-01
 Q5 REGION EUROPE
 DATE 1995-01-01
 Q6 DATE 1995-01-01
 DISCOUNT 0.08
 QUANTITY 25
 Q7 NATION1 ROMANIA
 NATION2 JORDAN
 Q8 NATION JORDAN
 REGION MIDDLE EAST
 TYPE ECONOMY BURNISHED COPPER
 Q9 COLOR puff
 Q10 DATE 1994-09-01
 Q11 NATION SAUDI ARABIA
 FRACTION 0.0000003333
 Q12 SHIPMODE1 AIR
 SHIPMODE2 SHIP
 DATE 1996-01-01
 Q13 WORD1 express
 WORD2 deposits
 Q14 DATE 1996-11-01
 Q15 DATE 1996-04-01
 Q16 BRAND Brand#32
 TYPE SMALL POLISHED
 SIZE1 22
 SIZE2 49
 SIZE3 21
 SIZE4 30
 SIZE5 35
 SIZE6 43
 SIZE7 27
 SIZE8 24
 Q17 BRAND Brand#22
 CONTAINER WRAP PKG
 Q18 QUANTITY 313
 Q19 BRAND1 Brand#53
 BRAND2 Brand#35
 BRAND3 Brand#44
 QUANTITY1 9
 QUANTITY2 15
 QUANTITY3 24
 Q20 COLOUR linen
 DATE 1995-01-01
 NATION UNITED STATES
 Q21 NATION IRAN
 Q22 I1 28
 I2 24
 I3 26
 I4 22
 I5 21
 I6 20
 I7 11

"Throughput Stream = 2 Seed = 222031945"
 -- TPC TPC-H Parameter Substitution (Version 1.3.0)
 -- using 222031945 as a seed to the RNG
 Q1 DELTA 117
 Q2 SIZE 17
 TYPE COPPER
 REGION MIDDLE EAST
 Q3 SEGMENT MACHINERY
 DATE 1995-03-30
 Q4 DATE 1997-09-01

Q5 REGION AFRICA
 DATE 1996-01-01
 Q6 DATE 1996-01-01
 DISCOUNT 0.05
 QUANTITY 24
 Q7 NATION1 IRAQ
 NATION2 ETHIOPIA
 Q8 NATION ETHIOPIA
 REGION AFRICA
 TYPE LARGE BRUSHED COPPER
 Q9 COLOR papaya
 Q10 DATE 1993-06-01
 Q11 NATION INDIA
 FRACTION 0.0000003333
 Q12 SHIPMODE1 REG AIR
 SHIPMODE2 SHIP
 DATE 1997-01-01
 Q13 WORD1 express
 WORD2 deposits
 Q14 DATE 1997-02-01
 Q15 DATE 1994-01-01
 Q16 BRAND Brand#12
 TYPE ECONOMY ANODIZED
 SIZE1 1
 SIZE2 46
 SIZE3 5
 SIZE4 9
 SIZE5 32
 SIZE6 23
 SIZE7 7
 SIZE8 47
 Q17 BRAND Brand#24
 CONTAINER SM CASE
 Q18 QUANTITY 314
 Q19 BRAND1 Brand#15
 BRAND2 Brand#13
 BRAND3 Brand#43
 QUANTITY1 4
 QUANTITY2 16
 QUANTITY3 20
 Q20 COLOUR tan
 DATE 1993-01-01
 NATION KENYA
 Q21 NATION BRAZIL
 Q22 I1 24
 I2 15
 I3 29
 I4 19
 I5 10
 I6 13
 I7 28

"Throughput Stream = 3 Seed = 222031946"
 -- TPC TPC-H Parameter Substitution (Version 1.3.0)
 -- using 222031946 as a seed to the RNG

Q1 DELTA 64
 Q2 SIZE 5
 TYPE STEEL
 REGION ASIA
 Q3 SEGMENT BUILDING
 DATE 1995-03-16
 Q4 DATE 1995-06-01
 Q5 REGION AMERICA
 DATE 1996-01-01
 Q6 DATE 1996-01-01
 DISCOUNT 0.03
 QUANTITY 25
 Q7 NATION1 CANADA

NATION2 RUSSIA
 Q8 NATION RUSSIA
 REGION EUROPE
 TYPE LARGE PLATED COPPER
 Q9 COLOR navajo
 Q10 DATE 1994-03-01
 Q11 NATION VIETNAM
 FRACTION 0.0000003333
 Q12 SHIPMODE1 FOB
 SHIPMODE2 SHIP
 DATE 1997-01-01
 Q13 WORD1 express
 WORD2 deposits
 Q14 DATE 1997-05-01
 Q15 DATE 1996-07-01
 Q16 BRAND Brand#52
 TYPE STANDARD BURNISHED
 SIZE1 22
 SIZE2 27
 SIZE3 40
 SIZE4 25
 SIZE5 12
 SIZE6 18
 SIZE7 14
 SIZE8 39
 Q17 BRAND Brand#21
 CONTAINER SM BAG
 Q18 QUANTITY 312
 Q19 BRAND1 Brand#12
 BRAND2 Brand#41
 BRAND3 Brand#32
 QUANTITY1 9
 QUANTITY2 17
 QUANTITY3 27
 Q20 COLOUR gainsboro
 DATE 1996-01-01
 NATION EGYPT
 Q21 NATION ROMANIA
 Q22 I1 33
 I2 31
 I3 30
 I4 32
 I5 25
 I6 17
 I7 10

"Throughput Stream = 4 Seed = 222031947"
 -- TPC TPC-H Parameter Substitution (Version 1.3.0)
 -- using 222031947 as a seed to the RNG

Q1 DELTA 72
 Q2 SIZE 43
 TYPE BRASS
 REGION AFRICA
 Q3 SEGMENT HOUSEHOLD
 DATE 1995-03-01
 Q4 DATE 1993-03-01
 Q5 REGION ASIA
 DATE 1996-01-01
 Q6 DATE 1996-01-01
 DISCOUNT 0.08
 QUANTITY 25
 Q7 NATION1 SAUDI ARABIA
 NATION2 KENYA
 Q8 NATION KENYA
 REGION AFRICA
 TYPE LARGE ANODIZED COPPER
 Q9 COLOR medium
 Q10 DATE 1994-12-01

Q11 NATION INDONESIA
 FRACTION 0.0000003333
 Q12 SHIPMODE1 MAIL
 SHIPMODE2 REG AIR
 DATE 1997-01-01
 Q13 WORD1 special
 WORD2 deposits
 Q14 DATE 1997-09-01
 Q15 DATE 1994-04-01
 Q16 BRAND Brand#32
 TYPE MEDIUM POLISHED
 SIZE1 7
 SIZE2 22
 SIZE3 39
 SIZE4 23
 SIZE5 37
 SIZE6 27
 SIZE7 48
 SIZE8 6
 Q17 BRAND Brand#23
 CONTAINER SM PKG
 Q18 QUANTITY 313
 Q19 BRAND1 Brand#14
 BRAND2 Brand#34
 BRAND3 Brand#31
 QUANTITY1 5
 QUANTITY2 18
 QUANTITY3 24
 Q20 COLOUR red
 DATE 1995-01-01
 NATION CHINA
 Q21 NATION IRAQ
 Q22 I1 28
 I2 29
 I3 25
 I4 16
 I5 13
 I6 19
 I7 24

"Throughput Stream = 5 Seed = 222031948"
 -- TPC TPC-H Parameter Substitution (Version 1.3.0)
 -- using 222031948 as a seed to the RNG

Q1 DELTA 80
 Q2 SIZE 31
 TYPE NICKEL
 REGION ASIA
 Q3 SEGMENT BUILDING
 DATE 1995-03-18
 Q4 DATE 1995-10-01
 Q5 REGION EUROPE
 DATE 1996-01-01
 Q6 DATE 1996-01-01
 DISCOUNT 0.06
 QUANTITY 24
 Q7 NATION1 JAPAN
 NATION2 FRANCE
 Q8 NATION FRANCE
 REGION EUROPE
 TYPE MEDIUM BRUSHED TIN
 Q9 COLOR lemon
 Q10 DATE 1993-09-01
 Q11 NATION RUSSIA
 FRACTION 0.0000003333
 Q12 SHIPMODE1 TRUCK
 SHIPMODE2 REG AIR
 DATE 1997-01-01
 Q13 WORD1 special

WORD2 deposits
 Q14 DATE 1997-12-01
 Q15 DATE 1996-11-01
 Q16 BRAND Brand#12
 TYPE ECONOMY BRUSHED
 SIZE1 12
 SIZE2 2
 SIZE3 14
 SIZE4 16
 SIZE5 21
 SIZE6 46
 SIZE7 3
 SIZE8 30
 Q17 BRAND Brand#25
 CONTAINER LG CASE
 Q18 QUANTITY 315
 Q19 BRAND1 Brand#21
 BRAND2 Brand#12
 BRAND3 Brand#31
 QUANTITY1 10
 QUANTITY2 19
 QUANTITY3 20
 Q20 COLOUR chocolate
 DATE 1993-01-01
 NATION INDIA
 Q21 NATION CANADA
 Q22 I1 16
 I2 29
 I3 18
 I4 33
 I5 13
 I6 12
 I7 26

"Throughput Stream = 6 Seed = 222031949"
 -- TPC TPC-H Parameter Substitution (Version 1.3.0)
 -- using 222031949 as a seed to the RNG

Q1 DELTA 88
 Q2 SIZE 19
 TYPE TIN
 REGION AFRICA
 Q3 SEGMENT HOUSEHOLD
 DATE 1995-03-03
 Q4 DATE 1993-06-01
 Q5 REGION MIDDLE EAST
 DATE 1997-01-01
 Q6 DATE 1997-01-01
 DISCOUNT 0.03
 QUANTITY 25
 Q7 NATION1 EGYPT
 NATION2 UNITED KINGDOM
 Q8 NATION UNITED KINGDOM
 REGION EUROPE
 TYPE MEDIUM PLATED TIN
 Q9 COLOR indian
 Q10 DATE 1994-07-01
 Q11 NATION IRAN
 FRACTION 0.0000003333
 Q12 SHIPMODE1 RAIL
 SHIPMODE2 REG AIR
 DATE 1993-01-01
 Q13 WORD1 special
 WORD2 packages
 Q14 DATE 1993-03-01
 Q15 DATE 1994-08-01
 Q16 BRAND Brand#52
 TYPE SMALL BURNISHED
 SIZE1 14

SIZE2 11
 SIZE3 29
 SIZE4 47
 SIZE5 46
 SIZE6 21
 SIZE7 34
 SIZE8 4
 Q17 BRAND Brand#22
 CONTAINER LG BAG
 Q18 QUANTITY 312
 Q19 BRAND1 Brand#23
 BRAND2 Brand#55
 BRAND3 Brand#25
 QUANTITY1 5
 QUANTITY2 20
 QUANTITY3 27
 Q20 COLOUR moccasin
 DATE 1997-01-01
 NATION UNITED KINGDOM
 Q21 NATION VIETNAM
 Q22 I1 29
 I2 18
 I3 20
 I4 21
 I5 10
 I6 11
 I7 23

Appendix D: Driver Source Code

doufload_v8.bat

REM Takes UfType and update_pair as parameters.

set RAHSLEEPTIME=999999

d:

cd \tpch\tools

perl load_UF%1_data_v8 %2

cd \tpch\ddl

load_UF1_data_V8

```
: # -*-Perl-*-
eval `exec perl5 -S $0 ${1+"$@"}` # Horrible kludge to convert this
    if 0;                          # into a "portable" perl script

# usage perl loadUFD [update pair number]

push(@INC, split(':', $ENV{'PATH'}));

# Get TPC-D specific environment variables
require 'getvars';

# Use the macros in here so that they can handle the platform differences.
# macro.pl should be sourced from cmvc, other people wrote and maintain it.
require "macro.pl";
```

Make output unbuffered.

select(STDOUT);

\$| = 1 ;

```
if (length($ENV{"TPCD_AUDIT_DIR"}) <= 0)
{
    die "TPCD_AUDIT_DIR environment variable not set\n";
}
if (length($ENV{"TPCD_DBNAME"}) <= 0)
{
    die "TPCD_DBNAME environment variable not set\n";
}
if (length($ENV{"TPCD_SF"}) <= 0)
{
    die "TPCD_SF environment variable not set\n";
}
if (length($ENV{"TPCD_PLATFORM"}) <= 0)
{
    die "TPCD_PLATFORM environment variable not set\n";
}
if (length($ENV{"TPCD_PATH_DELIM"}) <= 0)
{
    die "TPCD_PATH_DELIM environment variable not set\n";
}
if (length($ENV{"TPCD_PRODUCT"}) <= 0)
{
    die "TPCD_PRODUCT environment variable not set\n";
}
if (length($ENV{"TPCD_AUDIT"}) <= 0)
{
    die "Must set TPCD_AUDIT env't var. Real audit timing sequence run if
yes\n";
}
if (length($ENV{"TPCD_PHYS_NODE"}) <= 0)
{
    die "TPCD_PHYS_NODE env't var not set\n";
}
}
```

#set up local variables

\$auditDir=\$ENV{"TPCD_AUDIT_DIR"};

\$dbname=\$ENV{"TPCD_DBNAME"};

\$sf=\$ENV{"TPCD_SF"};

```
$splatform=$ENV{"TPCD_PLATFORM"};
$delim=$ENV{"TPCD_PATH_DELIM"};
$gatherstats=$ENV{"TPCD_GATHER_STATS"};
$product=$ENV{"TPCD_PRODUCT"};
$RealAudit=$ENV{"TPCD_AUDIT"};
$inlistmax=$ENV{"TPCD_INLISTMAX"};
$pn=$ENV{"TPCD_PHYS_NODE"};
$flatfilepath=$ENV{"TPCD_FLATFILES"};
$coldel="|";
$dblquote="";
```

\$PairNum=\$ARGV[0];

```
system("db2 connect to tpcd\n");
print "Beginning ....Preload of Update Function Data. Orders \n";
$str="db2 \" load from ";
$str="$str$flatfilepath${delim}lineitem.tbl.new.u" ;
$str="$str$PairNum";
$str="$str of del modified by coldel| fastparse messages
\\tmp\\TPCD\\line.msg.u";
# $str="$str$PairNum replace into TPCDTEMP.LINEITEM_NEW statistics no
nonrecoverable CPU_PARALLELISM 8";
# $str="$str$PairNum replace into TPCDTEMP.LINEITEM_NEW statistics yes
nonrecoverable DATA BUFFER 16 CPU_PARALLELISM 8 ";
$str="$str$PairNum replace into TPCDTEMP.LINEITEM_NEW statistics no
nonrecoverable ";
$str="$str partitioned db config mode load_only partitioning_dbpartnums
(0,1,2,3,4,5,6,7)";
$str="$str part_file_location $flatfilepath \" " ;
```

```
print "$str \n";
$ret=system($str);
system("db2 commit\n");
if ($ret == 0)
{
    print "Preload Orders updates completed successfully.\n";
}
else
{
    print "Preload Orders updates failed. ret=$ret\n";
    exit -1;
}
```

```
print "Beginning ....Preload of Update Function Data. Lineitem \n";
$str="db2 \" load from ";
$str="$str$flatfilepath${delim}order.tbl.new.u" ;
$str="$str$PairNum";
$str="$str of del modified by coldel| fastparse messages
\\tmp\\TPCD\\orders.msg.u";
# $str="$str$PairNum replace into TPCDTEMP.ORDERS_NEW statistics no
nonrecoverable DATA BUFFER 16 CPU_PARALLELISM 8";
# $str="$str$PairNum replace into TPCDTEMP.ORDERS_NEW statistics yes
nonrecoverable DATA BUFFER 16 CPU_PARALLELISM 8 ";
$str="$str$PairNum replace into TPCDTEMP.ORDERS_NEW statistics no
nonrecoverable ";
$str="$str partitioned db config mode load_only partitioning_dbpartnums
(0,1,2,3,4,5,6,7)";
$str="$str part_file_location $flatfilepath \" " ;
```

```
print "$str \n";
$ret=system($str);
system("db2 commit\n");
if ($ret == 0)
{
    print "Preload Lineitem updates completed successfully.\n";
}
else
{
    print "Preload Lineitem updates failed. ret=$ret\n";
    exit -1;
}
```

```
# print "$str\n";
# $ret=system($str);
# system("db2 commit\n");
if ($ret == 0)
{
    print "Preload Orders updates completed successfully.\n";
}
else
{
    print "Preload Orders updates failed. ret=$ret\n";
    exit -1;
}
```

load_UF2_data_V8

```
: # -*-Perl-*-
eval 'exec perl5 -S $0 ${1+"$@"}' # Horrible kludge to convert this
    if 0;          # into a "portable" perl script

# usage perl loadUFD [update pair number] [nodenumber]

push(@INC, split(':', $ENV{'PATH'}));

# Get TPC-D specific environment variables
require 'getvars';

# Use the macros in here so that they can handle the platform differences.
# macro.pl should be sourced from cmvc, other people wrote and maintain it.
require "macro.pl";
```

```
# Make output unbuffered.
select(STDOUT);
$| = 1 ;

if (length($ENV{"TPCD_AUDIT_DIR"}) <= 0)
{
    die "TPCD_AUDIT_DIR environment variable not set\n";
}
if (length($ENV{"TPCD_DBNAME"}) <= 0)
{
    die "TPCD_DBNAME environment variable not set\n";
}
if (length($ENV{"TPCD_SF"}) <= 0)
{
    die "TPCD_SF environment variable not set\n";
}
if (length($ENV{"TPCD_PLATFORM"}) <= 0)
{
    die "TPCD_PLATFORM environment variable not set\n";
}
if (length($ENV{"TPCD_PATH_DELIM"}) <= 0)
{
    die "TPCD_PATH_DELIM environment variable not set\n";
}
if (length($ENV{"TPCD_PRODUCT"}) <= 0)
{
    die "TPCD_PRODUCT environment variable not set\n";
}
if (length($ENV{"TPCD_AUDIT"}) <= 0)
{
    die "Must set TPCD_AUDIT env't var. Real audit timing sequence run if
yes\n";
}
if (length($ENV{"TPCD_PHYS_NODE"}) <= 0)
{
    die "TPCD_PHYS_NODE env't var not set\n";
}

#set up local variables
$auditDir=$ENV{"TPCD_AUDIT_DIR"};
$dbname=$ENV{"TPCD_DBNAME"};
```

```
$sf=$ENV{"TPCD_SF"};
$platform=$ENV{"TPCD_PLATFORM"};
$delim=$ENV{"TPCD_PATH_DELIM"};
$gatherstats=$ENV{"TPCD_GATHER_STATS"};
$product=$ENV{"TPCD_PRODUCT"};
$RealAudit=$ENV{"TPCD_AUDIT"};
$inlistmax=$ENV{"TPCD_INLISTMAX"};
$pn=$ENV{"TPCD_PHYS_NODE"};
$flatfilepath=$ENV{"TPCD_FLATFILES"};
$coldel="|";
$dblquote="";
```

```
$PairNum=$ARGV[0];
```

```
print "Beginning ....Preload of Update Function Data. Deletes\n";
```

```
system("db2 connect to tpcd\n");
$str="db2 \" load from ";
$str="$str$flatfilepath$ {delim}delete.new." ;
$str="$str$PairNum";
$str="$str of del modified by coldel| fastparse messages \\tmp\\TPCD\\del.msg.u";
#$str="$str$PairNum replace into TPCDTEMP.ORDERS_DEL statistics yes
nonrecoverable DATA BUFFER 16 CPU_PARALLELISM 8";
$str="$str$PairNum replace into TPCDTEMP.ORDERS_DEL statistics no
nonrecoverable ";
$str="$str partitioned db config mode load_only output_dbpartnums
(0,1,2,3,4,5,6,7)";
$str="$str part_file_location $flatfilepath \" \" ;
```

```
print "$str\n";
$ret=system($str);
system("db2 commit\n");
if ($ret == 0)
{
    print "Preload Deletes updates completed successfully.\n";
}
else
{
    print "Preload Deletes updates failed. ret=$ret\n";
    exit -1;
}
```

loadSampleUFData

```
#!/usr/bin/perl
# usage LoadSampleUFData
```

```
($myName = $0) =~ s@.*@/@; $usage="
Usage: loaddata [nodenumber] [source dir]
      nodenumber = local node number
      source dir = source dir to load data from\n";
```

```
die $usage if (@ARGV > 2);
```

```
push(@INC, split(':', $ENV{'PATH'}));
```

```
# Get TPC-D specific environment variables
require 'getvars';
```

```
# Use the macros in here so that they can handle the platform differences.
# macro.pl should be sourced from cmvc, other people wrote and maintain it.
require "macro.pl";
```

```
# Make output unbuffered. I'm not sure why we would want to do this but many
# of the fvt testcases do it.
select(STDOUT);
$| = 1 ;
```

```
open(OUTFILE, ">temp_UF_load.bat");
## print OUTFILE "cd d:\tpch\ddl\n";
print OUTFILE "call doUFload_v8 1 30\n";
```



```

    print OUTFILE "call doUfload_v8 2 30\n";
    print OUTFILE "call runstats_u\n";
    close(OUTFILE);
system("temp_UF_load.bat");
1;

```

runpower

```

: # -*-Perl-*-
eval 'exec perl5 -S $0 ${1+"$@"}' # Horrible kludge to convert this
    if 0;          # into a "portable" perl script

# usage  runpower [UF]
# where UF is the optional parameter that says to run the power test
# with the update functions.  By default, the update functions are not
# run

push(@INC, split(':', $ENV{'PATH'}));

# Get TPC-D specific environment variables
require 'getvars';

# Use the macros in here so that they can handle the platform differences.
# macro.pl should be sourced from cmvc, other people wrote and maintain it.
require "macro.pl";
require "tpcdmacro.pl";

# Make output unbuffered.
select(STDOUT);
$|= 1;

if (@ARGV > 0)
{
    $runUF=$ARGV[0];
}
else
{
    $runUF="no";
}

if (length($ENV{"TPCD_AUDIT_DIR"}) <= 0)
{
    die "TPCD_AUDIT_DIR environment variable not set\n";
}
if (length($ENV{"TPCD_RUN_DIR"}) <= 0)
{
    die "TPCD_RUN_DIR environment variable not set\n";
}
if (length($ENV{"TPCD_DBNAME"}) <= 0)
{
    die "TPCD_DBNAME environment variable not set\n";
}
if (length($ENV{"TPCD_RUNNUMBER"}) <= 0)
{
    die "TPCD_RUNNUMBER environment variable not set\n";
}
if (length($ENV{"TPCD_SF"}) <= 0)
{
    die "TPCD_SF environment variable not set\n";
}
if (length($ENV{"TPCD_PLATFORM"}) <= 0)
{
    die "TPCD_PLATFORM environment variable not set\n";
}
if (length($ENV{"TPCD_PATH_DELIM"}) <= 0)
{
    die "TPCD_PATH_DELIM environment variable not set\n";
}
if (length($ENV{"TPCD_PRODUCT"}) <= 0)
{
    die "TPCD_PRODUCT environment variable not set\n";
}
if (length($ENV{"TPCD_AUDIT"}) <= 0)

```

```

{
    die "Must set TPCD_AUDIT env't var.  Real audit timing sequence run if
yes\n";
}
if (length($ENV{"TPCD_PHYS_NODE"}) <= 0)
{
    die "TPCD_PHYS_NODE env't var not set\n";
}
if (length($ENV{"TPCD_LOG_DIR"}) <= 0)
{
    $ENV{"TPCD_LOG_DIR"} = "NULL";
}
if (length($ENV{"TPCD_MODE"}) <= 0)
{
    die "TPCD_MODE environment variable not set - uni/smp/mln\n";
}
if (length($ENV{"TPCD_ROOTPRIV"}) <= 0)
{
    die "TPCD_ROOTPRIV environment variable not set - yes/no\n";
}

#set up local variables
$runNum=$ENV{"TPCD_RUNNUMBER"};
$runDir=$ENV{"TPCD_RUN_DIR"};
$auditDir=$ENV{"TPCD_AUDIT_DIR"};
$dbname=$ENV{"TPCD_DBNAME"};
$sf=$ENV{"TPCD_SF"};
$platform=$ENV{"TPCD_PLATFORM"};
$delim=$ENV{"TPCD_PATH_DELIM"};
$gatherstats=$ENV{"TPCD_GATHER_STATS"};
$product=$ENV{"TPCD_PRODUCT"};
$RealAudit=$ENV{"TPCD_AUDIT"};
$sinlistmax=$ENV{"TPCD_INLISTMAX"};
$pn=$ENV{"TPCD_PHYS_NODE"};
$logDir=$ENV{"TPCD_LOG_DIR"};
$rootPriv=$ENV{"TPCD_ROOTPRIV"};
$mode=$ENV{"TPCD_MODE"};
if (( $mode eq "uni" ) || ( $mode eq "smp" ))
{
    $all_in="once";
    $all_pn="once";
    $once="once";
}
else
{
    $all_in="all_in";
    $all_pn="all_pn";
    $once="once";
}

if ($sinlistmax eq "default")
{
    $sinlistmax = 400;
}

# the auditruns directory is where we have already generate the sql files for the
# updates and the power tests

# append isolation level information about tpcdbatch to the miso file
# the miso file is created here but appended to for power and throughput
#information

$misofile="$runDir${delim}miso$runNum";
if ( -e $misofile )
{
    &rm("$misofile");
}
# if we are in real audit mode then we must start the db manager now since
# there must be no activity on the database between the time the build script
# has finished and the time the power test is started
if ( $RealAudit eq "yes" )
{
    system("db2start");
}

```

```

system("db2 activate database $dbname");
sleep 10;
}

# do not activate the database
#if ( $RealAudit ne "yes" )
#{
#   system("db2 activate database $dbname");
#}

#Report current log info to the run# directory in a file called startLog.Info
#system("perl getLogInfo.pl startLog");
system("getlog.bat startlog");

open(MISO, ">$misofile") || die "Can't open $misofile: $!\n";
$curTs = `perl gettimestamp "long"`;
print MISO "Timestamp and isolation level of tpcdbatch before power run at :
$curTs\n";
close(MISO);
if ( $product eq "pe" )
{
    system("db2 \"connect to $dbname\"; db2 \"select
name,creator,valid,unique_id,isolation from sysibm.sysplan where name like
'TPCD%\"; db2 connect reset; db2 terminate >> $runDir${delim}miso$runNum
");
}
else
{
    &verifyTPCDBatch("$misofile", "$dbname");
}

if ($platform eq "aix")
{
    # Create the sysunused file. This reports what disks are attached, and which
    # ones are being used. Its use spans both the runpower and runthroughput tests
    system("echo \"The following disks are assigned to the indicated volume
groups\" > $runDir/sysunused$runNum") && die "cannot create
$runDir/sysunused$runNum";

    system("lspv >> $runDir/sysunused$runNum");
    system("echo \"The following volume groups are currently online\" >>
$runDir/sysunused$runNum");
    $curTs = `perl gettimestamp "long"`;
    system("echo \"$curTs\" >> $runDir/sysunused$runNum");
    system("lsvg -o >> $runDir/sysunused$runNum");
    # show the disks that are used/unused
    #system("getdisks \"Before the start of the Power Test\");

}
else
{
    # for all other platforms
    system("echo Assume that all portions of the system are used >>
$runDir${delim}sysunused$runNum");
}

&getConfig("p");
if ( $rootPriv eq "yes" )
{
    # get the o/s tuning parameters...currently AIX only and only if your
    # user has root privileges to run this
    &getOSTune("p");
}
if ($gatherstats eq "on")
{
    # gather vm io and net stats
    if ($platform eq "aix" || $platform eq "sun" || $platform eq "ptx" ||
        $platform eq "hp" || $platform eq "linux")
    {
        # gather vmstats and iostats (and net stats if in mpp mode)
        system("perl getstats p &");
    }
}
else
{
    print "Stats gather not set up for current platform $platform\n";
}

# print to screen what type of run is running and set variables to run
# the query and update streams in parallel
if ($runUF ne "UF")
{
    $semcontrol = "off";
    print "Beginning power stream.....no update functions\n";

    $streamEx = "";
    $streamExNT = "";
}
else
{
    $semcontrol = "on";
    print "Beginning power stream.....with update functions\n";
    if ( $platform eq "nt" )
    {
        $streamExNT = "start /b";
        $streamEx = "";
    }
    else
    {
        $streamExNT = "";
        $streamEx = "&";
    }
}

# bbe This new line (below) runs queries for power test

print "Starting tpcdbatch...\n";
$ret=system("$streamExNT $auditDir${delim}auditruns${delim}tpcdbatch -d
$dbname -f $runDir${delim}qtextpow.sql -r on -b on -s $sf -u p1 -m $inlistmax -n
0 -p $semcontrol $streamEx");

if ( $runUF eq "UF" )
{
    $ret2 = system("$auditDir${delim}auditruns${delim}tpcdbatch -d $dbname -f
$runDir${delim}qtextqf.sql -r on -b on -s $sf -u p2 -m $inlistmax -n 0");
}
else
{
    $ret2 = 0; # If UFs were not running, then the stream cannot fail
}

if (($ret2 == 0) && ($ret == 0))
{
    print "Power stream completed succesfully.\n";
}
else
{
    print "Power stream failed. ret=$ret\n";
}

if ($platform eq "aix")
{
    # show that the same disks are still used or unused
    # system("getdisks \"After completion of the Power Test\");

    #clean up
}
if ($gatherstats eq "on")
{
    # gather vm io and net stats
    if ($platform eq "aix" || $platform eq "sun" || $platform eq "ptx" || $platform eq
"linux")
    {

```

```

# kill the stats that were being gathered
if ($platform eq "ptx")
{
    $src= `perl5 zap "-f" "sar";`
    $src= `perl5 zap "-f" "sadc";`
}
else
{
    $src= `perl5 zap "-f" "vmstat";`
    $src= `perl5 zap "-f" "iostat";`
}
if ( $pn > 1 )
{
    $src= `perl5 zap "-f" "netstat";`
}
$src= `perl5 zap "-f" "getstats";`
}

open(MISO, ">>$misofile") || die "Can't open $misofile: $!\n";
$curTs = `perl gettimestamp "long";`
print MISO "Timestamp and isolation level of tpcdbatch after power run at :
$curTs\n";
close(MISO);

if ( $product eq "pe" )
{
    system("db2 \"connect to $dbname\"; db2 \"select
name,creator,valid,unique_id,isolation from sysibm.sysplan where name like
'TPCD%'\";db2 connect reset;db2 terminate >>
$runDir${delim}miso$runNum");
}
else
{
    &verifyTPCDBatch("$misofile", "$dbname");
}
if ( $RealAudit ne "yes" )
{
    $curTs = `perl gettimestamp "short";`
    # grab the db and dbm snapshot before we deactivate
    system("db2 get snapshot for all on $dbname >
$runDir${delim}dbrun$runNum.snap.$curTs");
    system("db2 get snapshot for database manager >>
$runDir${delim}dbrun$runNum.snap.$curTs");
}

#####

# now copy the reports from the count of streams files into one final file
&cat("$runDir${delim}pstrcnt*","$runDir${delim}mpstrcnt$runNum");
#(NOTE: there is a dependency that this mpstrcnt file exist before the
# calcmetrics.pl script is called, both because it is used as input for
# calcmetrics.pl, and because the output from calcmetrics is used as
# the trigger for watchstreams to complete, and watchstreams cats its
# output at the end of the mstrcnt file.

# generate the mpinter?.metrics file in the run directory
#require 'calcmetrics.pl';
if ( $runUF eq "UF" )
{
    system("perl calcmetrics.pl UF");
}
else
{
    system("perl calcmetrics.pl");
}

# concatenate all the throughput inter files that were used to
# generate these results into the calcmetrics output file (mpinterX.metrics)
#cd $TPCD_RUN_DIR
&cat("$runDir${delim}mpqinter*","$runDir${delim}mpinter$runNum.metrics");

if ($runUF eq "UF") {

```

```

&cat("$runDir${delim}mpufinter*","$runDir${delim}mpinter$runNum.metrics")
;
}

# if ($runUF eq "no") {
# &rm("$runDir${delim}mpuf*");
#}

#####

# no longer activate/deactivate the database
# if ( $RealAudit ne "yes" )
#{
# # deactivate the database
# system("db2 deactivate database $dbname");
#}

# do not stop the database after the power test
# if ( $RealAudit ne "yes" )
#{
# system("db2stop");
#}

1;

sub getConfig
{
    $testtype=$_[0];
    print "Getting database configuration.\n";
    $dbtune="$runDir${delim}m${testtype}dbtune${runNum}";
    open(DBTUNE, ">$dbtune") || die "Can't open $dbtune: $!\n";
    $timestamp=`perl gettimestamp "long";`
    print DBTUNE "Database and Database manager configuration taken at :
$timestamp";
    close(DBTUNE);
    system("db2level >> $dbtune");
    system("db2 get database configuration for $dbname >> $dbtune");
    system("db2 get database manager configuration >> $dbtune");
    system("db2set >> $dbtune");
    if (( $mode eq "mln" ) || ( $mode eq "mpp" ))
    {
        $cfgfile="$runDir${delim}dbtune${runNum}.";
        #removed by Alex due to hang
        #system("db2 _all \"||\" typeset -i ln=###; db2 get db cfg for $dbname >
$cfgfile${ln} ; db2 get dbm cfg >> $cfgfile${ln} ; db2set >> $cfgfile${ln} ; db2
terminate \"");
    }
}

sub getOSTune
{
    $testtype=$_[0];
    if ( $platform eq "aix" )
    {
        print "Getting OS and VM database configuration.\n";
        $ostune="$runDir${delim}m${testtype}ostune${runNum}";
        open(OSTUNE, ">$ostune") || die "Can't open $ostune: $!\n";
        $timestamp=`perl gettimestamp "long";`
        print OSTUNE "Operating System and Virtual Memory configuration taken at
: $timestamp";
        close(OSTUNE);
        system("${delim}usr${delim}samples${delim}kernel${delim}schedtune >>
$ostune");
        system("${delim}usr${delim}samples${delim}kernel${delim}vmtune >>
$ostune");
    }
    else
    {
        print "OS parameters retrieval not supported for $platform \n";
    }
}

```

```

sub verifyTPCDBatch
{
    $logfile=$_[0];
    $dbname=$_[1];
    $file="verifytpcdbatch.clp";
    open(VERTBL, ">$file") || die "Can't open $file: $!\n";
    print VERTBL "connect to $dbname;\n";
    print VERTBL "select name,creator,valid,last_bind_time,isolation from
sysibm.sysplan where name like 'TPCD%'\n";
    print VERTBL "connect reset;\n";
    print VERTBL "terminate;\n";
    close(VERTBL);
    system("db2 -vtf $file >> $logfile");
}

```

runthroughput

```

: # *-Perl-*
eval `exec perl5 -S $0 ${1+"$@"}' # Horrible kludge to convert this
if 0;          # into a "portable" perl script

# usage runthroughput [UF]
# where UF is the optional parameter that says to run the throughput test
# with the update functions. By default, the update functions are not
# run
# If UF is not supplied and a number is supplied, then that number is taken
# as the number of concurrent throughput streams to run. This is also optional

push(@INC, split(':', $ENV{'PATH'}));

# Get TPC-D specific environment variables
require 'getvars';

# Use the macros in here so that they can handle the platform differences.
# macro.pl should be sourced from cmvc, other people wrote and maintain it.
require "macro.pl";
require "tpcdmacro.pl";

$runUF="no";
if (@ARGV > 0)
{
    if ($ARGV[0] eq "UF")
    {
        $runUF=$ARGV[0];
    }
}

@reqVars = ("TPCD_AUDIT_DIR",
            "TPCD_RUN_DIR",
            "TPCD_DBNAME",
            "TPCD_RUNNUMBER",
            "TPCD_SF",
            "TPCD_PLATFORM",
            "TPCD_PATH_DELIM",
            "TPCD_PRODUCT",
            "TPCD_AUDIT",
            "TPCD_PHYS_NODE",
            "TPCD_MODE",
            "TPCD_ROOTPRIV",
            "TPCD_NUMSTREAM");
##      "TPCD_NUMSTREAM",
##      "TPCD_RUN_ON_MULTIPLE_NODES");

&setVar(@reqVars, "ERROR");

if (length($ENV{"TPCD_LOG_DIR"}) <= 0)
{
    $ENV{"TPCD_LOG_DIR"} = "NULL";
}

#set up local variables

```

```

$runNum=$ENV{"TPCD_RUNNUMBER";
$numStream=$ENV{"TPCD_NUMSTREAM";
$runDir=$ENV{"TPCD_RUN_DIR";
$auditDir=$ENV{"TPCD_AUDIT_DIR";
$dbname=$ENV{"TPCD_DBNAME";
$sf=$ENV{"TPCD_SF";
$product=$ENV{"TPCD_PRODUCT";
$platform=$ENV{"TPCD_PLATFORM";
$delim=$ENV{"TPCD_PATH_DELIM";
$realAudit=$ENV{"TPCD_AUDIT";
$inlistmax=$ENV{"TPCD_INLISTMAX";
$gatherstats=$ENV{"TPCD_GATHER_STATS";
$logDir=$ENV{"TPCD_LOG_DIR";
$rootPriv=$ENV{"TPCD_ROOTPRIV";
$mode=$ENV{"TPCD_MODE";

$path="$auditDir${delim}auditruns";

if (( $mode eq "uni" ) || ( $mode eq "smp" ))
{
    $all_in="once";
    $all_pn="once";
    $once="once";
}
else
{
    $all_in="all_in";
    $all_pn="all_pn";
    $once="once";
}

# return 1 if the given pattern(parameter $_[0]) matches any file
sub existfile {
    if ($platform eq "aix" || $platform eq "sun" || $platform eq "ptx" || $platform eq
"linux")
    {
        `ls $_[0] 2> /dev/null | wc -l` + 0 != 0;
    }
    else
    {
        `dir /b $_[0] 2> NUL | wc -l` + 0 != 0;
    }
}

if ($inlistmax eq "default")
{
    $inlistmax = 400;
}

# no longer stop and start the dbm between runs when not in realaudit mode
#if ( $RealAudit ne "yes" )
#{
# # if we are not in real audit mode then we must start the db manager now
# system("db2start");
# # activate the database
# system("db2 activate database $dbname");
#}

$misofile="$runDir${delim}miso$runNum";
# append isolation level information about tpcdbatch to the miso file
open(MISO, ">>$misofile") || die "Can't open $misofile: $!\n";
$curTs = `perl gettimestamp "long"`;
print MISO "Timestamp and isolation level of tpcdbatch before throughput run at
: $curTs\n";
close(MISO);

if ( $product eq "pe" )
{
    system("db2 \"connect to $dbname\"; db2 \"select
name,creator,valid,unique_id,isolation from sysibm.sysplan where name like
'TPCD%'\n\" >> $runDir${delim}miso$runNum ");
}
else
{
}

```

```

    &verifyTPCDBatch("$misofile","$dbname");
}

# kick off the script that will monitor for the database applications during
# the running of the throughput tests. This will quit when the mtinterX.metrics
# (where X=runnumber) file has been created.

# set variables to run streams in parallel
if ( $platform eq "nt" )
{
    $streamExNT = "start /b";
    $streamEx = "";
}
else
{
    $streamExNT = "";
    $streamEx = "&";
}
if ( $platform eq "aix" || $platform eq "sun" || $platform eq "nt" || $platform eq
"hp" || $platform eq "linux")
{
    system("$streamExNT perl watchstreams $streamEx");
}
else
{
    die "platform not supported, can't start watchstreams in background";
}

# show the disks that are used/unused
if ($platform eq "aix")
{
    system("getdisks \"Before the start of the Throughput Test\"");
}
if ($gatherstats eq "on")
{
    # gather vm io and net stats
    if ($platform eq "aix" || $platform eq "sun" || $platform eq "ptx" || $platform eq
"hp" || $platform eq "linux")
    {
        # gather vmstats and iostats (and net stats if in mpp mode)
        system("perl getstats t &");
    }
    else
    {
        print "Stats gather not set up for current platform $platform\n";
    }
}

# the auditruns directory is where we have already generated the sql files
# for the updates and the power tests

$loopStream=1;

for ( $loopStream = 1; $loopStream <= $numStream; $loopStream++)
{
    print "starting stream $loopStream\n";
    system("echo Executing stream $loopStream out of $numStream.");
    # run the queries
    if ( $platform eq "aix" || $platform eq "sun" || $platform eq "nt" || $platform eq
"ptx" ||
        $platform eq "hp" || $platform eq "linux")
    {
        system("$streamExNT $path${delim}tpcdbatch -d $dbname -f
$runDir${delim}qtextt$loopStream.sql -r on -b on -s $sf -u t1 -m $inlistmax -n
$loopStream $streamEx");
    }
    else
    {
        die "platform $platform not supported yet";
    }
}

# run the update function stream....this will wait until the queries have

```

```

# completed to kick off the updates
print "starting update stream\n";

if ($runUF eq "no") {
    $ret=system("$auditDir${delim}auditruns${delim}tpcdbatch -d $dbname -f
$runDir${delim}quft.sql -r on -b on -s $sf -u t -m $inlistmax -n $numStream");
}
else {
    $ret=system("$auditDir${delim}auditruns${delim}tpcdbatch -d $dbname -f
$runDir${delim}quft.sql -r on -b on -s $sf -u t2 -m $inlistmax -n $numStream");
}
print "update stream done\n";

&getConfig("t");
if ( $rootPriv eq "yes" )
{
    # get the o/s tuning parameters...currently AIX only and only if your
    # user has root privileges to run this
    &getOSTune("t");
}

if ($platform eq "aix")
{
    # show the disks that are used/unused
    system("getdisks \"After the completion of the Throughput Test\"");
}
if ($gatherstats eq "on")
{
    # gather vm io and net stats
    if ($platform eq "aix" || $platform eq "sun" || $platform eq "ptx" || $platform eq
"linux")
    {
        # kill the stats that were being gathered
        if ($platform eq "ptx")
        {
            $src= `perl5 zap -f "sar"`;
            $src= `perl5 zap -f "sadc"`;
        }
        else
        {
            $src= `perl5 zap -f "vmstat"`;
            $src= `perl5 zap -f "iostat"`;
        }
        if ( $pn > 1 )
        {
            $src= `perl5 zap -f "netstat"`;
        }
        $src= `perl5 zap -f "getstats"`;
    }
}

open(MISO, ">>$misofile") || die "Can't open $misofile: $!\n";
$curTs = `perl gettimestamp "long"`;
print MISO "Timestamp and isolation level of tpcdbatch after throughput run at :
$curTs\n";
close(MISO);

if ( $product eq "pe" )
{
    system("db2 \"connect to $dbname\"; db2 \"select
name,creator,valid,unique_id,isolation from sysibm.sysplan where name like
'TPCD%'\>> $runDir${delim}miso$runNum");
}
else
{
    &verifyTPCDBatch("$misofile","$dbname");
}

if ( $RealAudit ne "yes" )
{
    $curTs = `perl gettimestamp "short"`;
    # grab the db and dbm snapshot before we deactivate

```

```

system("db2 get snapshot for all on $dbname >
$runDir${delim}dbTrun$runNum.snap.$curTs");
system("db2 get snapshot for database manager >>
$runDir${delim}dbTrun$runNum.snap.$curTs");
}

# now copy the reports from the count of streams files into one final file
&cat("$runDir${delim}strcnt*","$runDir${delim}mstrcnt$runNum");
#(NOTE: there is a dependancy that this mstrcnt file exist before the
# calcmetrics.pl script is called, both because it is used as input for
# calcmetrics.pl, and because the output from calcmetrics is used as
# the trigger for watchstreams to complete, and watchstreams cats its
# output at the end of the mstrcnt file.

# generate the mtinter?.metrics file in the run directory
#require 'calcmetrics.pl';

if ( $runUF ne "no")
{
system("perl calcmetrics.pl $numStream UF");
}
else
{
system("perl calcmetrics.pl $numStream");
}

# concatenate all the throughput inter files that were used to
# generate these results into the calcmetrics output file (mtinterX.metrics)
#cd STPCD_RUN_DIR
&cat("$runDir${delim}mts*inter*","$runDir${delim}mtinter$runNum.metrics");

if ($runUF ne "no") {

&cat("$runDir${delim}mtufinter*","$runDir${delim}mtinter$runNum.metrics");
}

if (&existfile("$runDir${delim}mp*")) {
# generate the mplot stuff
system("perl gen_mplot");

# generate the mlog information file
require 'buildmlog';
}

#if ($runUF eq "no") {
# &rm("$runDir${delim}mtuf*");
#}

# deactivate the database this needs to remain at the end of run throughput so
# asynchronous writing of the log files completes.
system("db2 deactivate database $dbname");
$rc=&dodb_noconn("db2 get db cfg for $dbname | grep -i log >>
$runDir${delim}endLog.Info",$all_ln);
if ( $logDir ne "NULL" )
{
$rc=&dodb_noconn("$dircmd $logDir >>
$runDir${delim}endLog.Info",$all_ln);
}

#system("db2_all `}]`db2 get db cfg for tpcd | grep -i log >>
$runDir${delim}endLog.Info ; db2 terminate\' ");
#system("ls -ltr /node??vg.log/NODE00* >> $runDir${delim}endLog.Info");

#Create Catalog info
$rc = system("perl catinfo.pl p");

if ( $rc != 0 )
{
warn "catinfo failed!!!\n";
}

#Report current log info to the run# directory in a file called endLog.Info
#system("perl getLogInfo.pl endLog");

```

```

system("getlog.bat endLog");

# if we are in audit mode we must do a db2stop at the end of the
power/throughput run
if ( $RealAudit eq "yes" )
{
system("db2stop");
}

1;

sub getConfig
{
$testtype=$_[0];
print "Getting database configuration.\n";
$dbtunefile="$runDir${delim}m${testtype}dbtune${runNum}";
open(DBTUNE, ">$dbtunefile") || die "Can't open $dbtunefile: $!\n";
$timestamp=`perl gettimestamp "long"`;
print DBTUNE "Database and Database manager configuration taken at :
$timestamp";
close(DBTUNE);
system("db2level >> $dbtunefile");
system("db2 get database configuration for $dbname >> $dbtunefile");
system("db2 get database manager configuration >> $dbtunefile");
system("db2set >> $dbtunefile");
}

sub getOSTune
{
$testtype=$_[0];
if ( $platform eq "aix" || $platform eq "linux")
{
print "Getting OS and VMdatabase configuration.\n";
$ostunefile="$runDir${delim}m${testtype}ostune${runNum}";
open(OSTUNE, ">$ostunefile") || die "Can't open $ostunefile: $!\n";
$timestamp=`perl gettimestamp "long"`;
print OSTUNE "Operating System and Virtual Memory configuration taken at
: $timestamp";
close(OSTUNE);
system("$delimusr$delimsamples$delimkernel$delimschedtune >>
$ostunefile");
system("$delimusr$delimsamples$delimkernel$delimvmtune >>
$ostunefile");
}
else
{
print "OS parameters retrieval not supported for $platform \n";
}
}

sub verifyTPCDBatch
{
$logfile=$_[0];
$dbname=$_[1];
$file="verifytpcdbatch.clp";
open(VERTBL, ">$file") || die "Can't open $file: $!\n";
print VERTBL "connect to $dbname;\n";
print VERTBL "select name,creator,valid,last_bind_time,isolation from
sysibm.sysplan where name like 'TPCD%'\n";
print VERTBL "connect reset;\n";
print VERTBL "terminate;\n";
close(VERTBL);
system("db2 -vtf $file >> $logfile");
}

tpcd_cl.bat

erase tpcdUF.c
erase tpcdUF.obj
erase tpcdbatch.c
erase tpcdbatch.obj

```

erase tpcdbatch.map

```
set db2options=+c -t +p -v
db2start
db2 connect to %1
db2 prep tpcdbatch.sqc bindfile package isolation rr blocking all OPTLEVEL 1
DATETIME ISO
db2 prep tpcdUF.sqc bindfile package isolation rr blocking all OPTLEVEL 1
DEGREE 1 DATETIME ISO
db2 connect reset
db2 terminate
REM make sure LIBPATH is set to include the compiler libraries and db2
libraries
cl -c -Z7 -DSQLWINT -W3 -J tpcdbatch.C
cl -c -Z7 -DSQLWINT -W3 -J tpcdUF.C
link -debug -out:tpcdbatch.exe tpcdbatch.obj tpcdUF.obj user32.lib kernel32.lib
db2api.lib -subsystem:console
```

tpcdbatch.h

```
/*
*****
*
*   TPCDBATCH.H
*
*   Revision History:
*
*   * 27 may 99 bbe from (24 nov 98 jen) fixNTtimestamp - fixed NT timestamp to
print millisecond correctly
*   * 27 may 99 bbe from (10 dec 98 jen) SUN - added Haider's changes necessary
for SUN
*   * 17 jun 99 jen Increased version to 5.1
*   * 10 aug 99 bbe Increased version to 5.2
*   * 13 aug 99 bbe Increased version to 5.3
*   * 18 mar 02 ken Increased version to 5.7
*****
*/

/** Necessary header files **/

/** System header files **/
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#include <math.h>
#include <fcntl.h> /* SUN bbe */

#include <time.h>
#include <ctype.h>
#if (defined(SQLAIX) || defined(SQLPTX) || defined(LINUX) || defined(SQLHP))
#include <unistd.h> /* SUN */
#include <sys/stat.h> /* SUN */
#endif
#if ((defined(SQLAIX) || defined(SQLPTX)) && !defined(LINUX))
#include <sys/vnode.h> /* SUN */
#endif
#ifndef SQLWINT
#include <sys/time.h> /*@d33143aha*/
#include <sys/ipc.h>
#include <sys/sem.h>
#if (!defined(SQLPTX) && !defined(LINUX)&& !defined(SQLHP))
#include <sys/mode.h>
#endif
#include <sys/timeb.h>
#include <sys/types.h>
#else
#include <windows.h>
#include <sys/timeb.h>
#endif
#include <errno.h>

/** External header files **/
```

```
#include "sqllda.h"
#include "sqlenv.h"
#include "sql.h"
#include "sqlmon.h"
#include "sqlca.h"
#include "sqlutil.h"
#include "sqlcodes.h"

/** Internal header files **/
/** #ifdef __cplusplus **/
/** #include "sqlz.h" **/
/** #include "sqlzcopy.h" **/
/** #endif **/

/*
*****
*/
/* Define synonyms here */
/*
*****
*/
#define TPCDBATCH_VERSION "5.7"

#define TPCDBATCH_NONSQL 10 /* @d23684 tlg */
#define TPCDBATCH_SELECT 20
#define TPCDBATCH_NONSELECT 30
#define TPCDBATCH_EOBLOCK 40 /* @d30369 tlg */
#define TPCDBATCH_INSERT 50
#define TPCDBATCH_DELETE 60

#define TPCDBATCH_MAX_COLS 100 /* @d30369 tlg */

#define TPCDBATCH_CHAR char

#define TPCDBATCH_PRINT_FLOAT_WIDTH 20
/* kmw - allow 15 whole digit for %#.3f format */
/* - note: use > 18, size of long identifier so that it will */
/* be larger than any column heading */
#define TPCDBATCH_PRINT_FLOAT_MAX 1e15 /* kmw */
/* #define TPCD_PREPARETIME 1 */ /* for separate prep/exec on uf jen
1106 */

#ifdef SQLWINT
#define PATH_DELIM '\\'
// #define sleep(a) Sleep((a)*1000)
#define sleep(a) Sleep(a)
#else
#define PATH_DELIM '/'
#endif

#define PARALLEL_UPDATES 1

#ifdef PARALLEL_UPDATES
#define UF1OUTSTREAMPATTERN "%s%cuf1.%02d.%d.out"
#define TPCD_NONPARTITIONED
#define UF2OUTSTREAMPATTERN "%s%cuf2.%02d.%d.out"
#else
/* kelly add same as NONPART. */
#define UF2OUTSTREAMPATTERN "%s%cuf2.%02d.%d.out"
/* kelly ... take this out ... should be same name as for non-partitioned
#define UF2OUTSTREAMPATTERN "%s%cuf2.%02d.%d.%d.out" */
/*DELjen add delchunk*/
#endif
#define BUFSIZE 1024
#endif

#define T_STAMP_FORM_1 1
#define T_STAMP_FORM_2 2
/* jen TIME_ACC start */
#define T_STAMP_FORM_3 3
#define T_STAMP_ILLEN 17
#if defined (SQLUNIX) || defined (SQLAIX) || defined (SQLHP)
#define T_STAMP_3LEN 24
```

```

#elif (defined (SQLOS2) || defined (SQLWINT) || defined (SQLWIN) ||
defined (SQLDOS))
#define T_STAMP_3LEN 21 /* WIN NT timestamp fix bbe */
#else
#error Unknown operating system
#endif
/* jen TIME_ACC start */

#define BLANKS ""
#define READMODE "r0"
#define WRITEMODE "w0"
#define APPENDMODE "a0"
#define mem_error(xx) \
{ fprintf(stderr, "\n--Out of memory when %s.\n", xx); }
/* Display out-of-memory and end */

#define TPCDBATCH_MIN(x,y) ((x) < (y) ? (x) : (y))
/** Returns the smaller of both x and y */
#define TPCDBATCH_MAX(x,y) ((x) > (y) ? (x) : (y)) /* @d22817 tlg */
/** Returns the larger of both x and y */

/** Defines needed for decimal conversion */
#define SQLZ_DYNLINK
#define TRUE 1
#define LEFT 1
#define RIGHT 0
#define FALSE 0
#define sqlrx_get_left_nibble(byte) (((unsigned char)(byte)) >> 4)

#define sqlrx_get_right_nibble(byte) (((unsigned char)(byte) & 'x0f'))
#define SQL_MAXDECIMAL 31
#define SQLRX_PREFERRED_PLUS 0x0c

/** Timer-necessary defines for portability */
#if (defined (SQLOS2) || defined (SQLWINT) || defined (SQLWIN) ||
defined (SQLDOS))
typedef struct timeb Timer_struct;
#elif (defined (SQLUNIX) || defined (SQLAIX) || defined (SQLHP))
/*TIMER jen*/
typedef struct timeval Timer_struct;
#else
#error Unknown operating system
#endif

/* sleep time between starting subsequent tpcdbatches running UF1 and UF2 */
#define UF1_SLEEP 1
#define UF2_SLEEP 1
#define UF_DEADLOCK_SLEEP 1 /* sleep between deadlock retries in
UF1,UF2 */

#define MAXWAIT 50 /* maximum retries for deadlock encounters */

#define DEBUG 0 /* to be set to 1 for diagnostic purposes if needed */
/* #define UF1DEBUG 1 */
/* #define UF2DEBUG 1 */

```

tpcdbatch.sqc

```

/*****
*****
*
* TPCDBATCH.SQC
*
* Revision History:
*
* 21 Dec 95 jen Corrected calculation of geometric mean to include in the
count of statements the update functions.
* 03 Jan 96 jen Corrected calculation of arithmetic mean to not include the
timings for the update functions. (only want query timings

```

```

* as part of arithmetic mean)
* 15 Jan 96 jen Added extra timestamps to the update functions.
* 22 Jan 96 jen Get rid of checking of short_time....we always use the long
timings.
* Fixed timings to print query/uf times rounded up to 0.1 seconds
and uses these rounded time values in subsequent calculations
* Fixed bug where last seed in msecdme file wasn't getting read
correctly - EOF processing done too soon.
*
* 22 Feb 96 kbs port to NT
* 26 Mar 96 kbs Fix to avoid counting UFs as queries for min max
* 27 Jun 97 wlc Temporarily fixed deadlock problems when doing UF1, UF2
* 30 Jul 97 wlc Add in support for load_update and TPCD_SPLIT_DELETES
* 13 Aug 97 wlc fixed UF1 log file formatting problem,
* using TPCD_TMP_DIR for temp files instead of /tmp,
* make summary table fit in 80-column,
* fixed UF2 # of deleted rows reporting problem
* 18 Aug 97 wlc added command line support for inlistmax
* 20 Aug 97 wlc added support for runthroughput without UF
* 27 Aug 97 aph Replaced hardcoded 'tpcdaudit' with
getenv("TPCD_AUDIT_DIR")
* 05 Sep 97 wlc fixing free() problem in NT
* 26 Sep 97 kmw change FLOAT processing in echo_sqllda and print_headings
* 10 oct 97 jen add lock table in share mode for staging tables
* 21 oct 97 jen added explicit rollback on failure of ufl
* 27 oct 97 jen don't update TPCD.xxxx.update.pair.num if not running UFs in
throughput run
* 01 nov 97 jen temp code to do a prep then execute stmt in UFs so we can
get timings
* 03 nov 97 jen realigned UF code for readability
* pushed UF2 commit into loop for inlistmax
* fixed UF2 code so rollback performed
* 04 nov 97 jen Added code to handle vldb
* 06 nov 97 jen Commented out temp code for prep then execute stmts using
TPCD_PREPARETIME def
* Updated version number to 2.2
* send all output during update functions to output files, not
stderr
* 10 nov 97 jen jenCI Updated version number to 2.3
* Added handling of TPCD_CONCURRENT_INSERTS. Change
control of
* chunk processing to use the concurrent_inserts value as the
control. Now the inserts will be run in
TPCD_CONCURRENT_INSERTS
* sets, each having concurrent_inserts/
* 13 nov 97 jen jen DEADLOCK. Fixed bug that Alex found where deadlock
count
* (maxwait) was incremented on every execution of the stmt as
opposed to just when deadlock really happened.
* 14 nov 97 jen jenSEM - fix up error reporting on semaphore failure
sem_op now returns failure to caller so caller can report where
failure has happened.
* Forced dbname to be upper case, an all other parts of update
pair number to be lowercase
* 15 nov 97 jen SEED Reworked code to grab the seed from the seed file. Now
reusing seeds between runs, so power run will always use first
seed, throughput will use the 2nd - #stream+1 seeds
*
* 13 jan 98 jen LONG Increase stmt_str to be able to hold inlists with larger
order key numbers
* 04 mar 98 jen IMPORT added support for TPCD_UPDATE_IMPORT to chose
whether
* using import or load api's for loading data into the staging
tables
* 04 mar 98 jen TIMER changed from using gettimeofday to gettimeofday for unix
* 01 apr 98 jen Fixed IMPORT code to do the proper checking on strcmp (ie
!strcmp)
* 01 apr 98 jen removed code to handle vldb - not needed
* Upgraded version to 2.4 for ( chunk
* 01 apr 98 jen Fixed up import code on NT so the variable is recognized in the
children
* 25 may 98 sks Reworked some of the environment variable code so consolidate
as
* much as possible. Not all complete because of differences in

```



```

* the way nt and AIX calls (and starts stuff in background) for UFs
* 29 may 98 jen REUSE_STAGE Changed UF1 so we reuse the same staging
  tables
* instead of having a new set for each update pair
* 06 jul 98 jen Removed locking of staging tables since they are created with
  locksize table now
* 06 jul 98 jen 912RETRY - added code to retry query execution on 912 as well
  as 911
* 07 jul 98 jen Fixed summary_table() so 1000x adjustment not based on UF
  (setting
* of max and min pointers
* Added generic SleepSome function to handle NT vs AIX sleep
  differences
* 01 apr 98 djf Added change to permit the use of table functions for UF1.
* to enable this set TPCD_UPDATE_IMPORT to tf in TPCD.SETUP
  file.
* MERGED this into base copy on Jul 07
* 10 jul 98 jen haider's fix for 'outstream' var for error processing in
  runUF1_fn and runUF2_fn
* Updated version to 2.5
* 25 sep 98 jen Added stream number printing into mpqry* files and increases
  accuracy of timestamp in mpqry (and mts*qry*) files
* 06 oct 98 jen TIME_ACC Added accuracy of timestamp in mpqry (and
  mts*qry*)
* files. Cleaned up misuse of Sleep and flushed buffers on
  deadlocks
* 19 oct 98 kbs fix UF2_fn to correctly count rows deleted in case of deadlock
* 20 oct 98 kbs rewrite UF2 and UF2_fn for static SQL with staging table
* 23 oct 98 jen Cleaned up retrying of order/lineitem on lineitem deadlock in
  UF1
* 24 oct 98 jen Used load_ufl and load_ufl instead of general load_updates
* 26 oct 98 kbs inject the UF1 with a single staging table
* 02 nov 98 jen Fixed processing of multiple chunks in uf2 so don't duplicate
* 21 nov 98 kmw Fixed BIGINT
* 05 dec 98 aph Moved runUF1_fn() and runUF2_fn() into a separate file
  tpcdUF.sqc
* so that it can be bound separately with a different isolation level.
* 21 dec 98 aph Integrated Jennifer's QppD calculation (rounding & adjustment)
  fixes.
* 22 dec 98 aph For UFs during Throughput run, defer CONNECT until children
  launched.
* 28 dec 98 aph Removed error_check() call after CONNECT RESET
* 29 dec 98 aph For UFs do not COMMIT in tpcdbatch.sqc. COMMITs happen
  in tpcdUF.sqc.
* 18 jan 99 kal replaced header with #include "tpcdbatch.h"
* 27 may 99 bbeaton from (03 mar 99 jen) Fixed SUN fix that wasn't compatible
  with
* NT (using %D %T instead of %x %X for strftime)
* 16 jun 99 jen Added missing LPCTSTR cast of semaphore file name for NT
* 17 jun 99 jen SEMA Changes semaphore file for update functions to look for
  tpcd.setup
* not for the orders.*** update data file
* 21 jul 99 bbeaton Added semaphore control that allows runpower to be run as
  two
* separate streams (update and query). This involves the use of
* two semaphores to be used as it executes in three different
* sections. The first is the update inserts. The next is the query
* stream which is started with the update stream, but waits until
* the inserts are complete. The third section is the update deletes
* which execute after the queries are complete.
* 21 jul 99 bbeaton Added functions to handle semaphore creation, control, etc.
* 21 jul 99 bbeaton Modified output to mp*inter files. It now only outputs
  intermediate data that will be calculated by calcmetric.pl. This
  is a result of the runpower being split into two streams and thus
  tpcdbatch not having access to all data.
* 21 jul 99 bbeaton The start time for runpower UF2 now does not start until after
  the query stream is complete so that its wait time is not included
  NOTE: The wait time that the first UF1 in runthroughput still
  includes the wait period that occurs waiting on queries.
* 18 mar 02 kentond removed the need for list files. Instead of using the *.list
  files to determine the name of the output files, the tags for the
  source sql files are used.
*****
*****/

```

```

/* included in tpcdbatch.sqc and tpcdUF.sqc */

#include "tpcdbatch.h"

/*****
*****/
/* global structure containing elements passed between different functions */
/*****
*****/
struct global_struct
{
  struct stmt_info *s_info_ptr; /* ptr to stmt_info list */
  struct stmt_info *s_info_stop_ptr; /* ptr to last struct in list */
  struct comm_line_opt *c_l_opt; /* ptr to comm_line_opt struct */
  struct ctrl_flags *c_flags; /* ptr to ctrl_flags struct */
  Timer_struct stream_start_time; /* start time for stream TIME_ACC */
  Timer_struct stream_end_time; /* end time for stream TIME_ACC */
  char file_time_stamp[50]; /* time stamp for output files */
  double scale_factor; /* scale factor of database */
  char run_dir[150]; /* directory for output files */
  int copy_on_load; /* indication of whether or not */
  /* to do use a copy directory */
  /* (equiv to COPY YES) on load */
  /* default is FALSE */
  long lSeed; /* seed used to generate the */
  /* queries for this particular */
  /* run. */
  FILE *stream_list; /* ptr to query list file */
  char update_num_file[150]; /* name of file that keeps track */
  /* of which update pairs have run */
  char sem_file[150]; /* semaphore name */
  char sem_file2[150]; /* semaphore name bbe */
  FILE *stream_report_file; /* file to report start stop */
  /* progress of the stream */
};

/*****
*****/
/* New type declaration to store details about SQL statement */
/*****
*****/
struct stmt_info
{
  long max_rows_fetch;
  long max_rows_out;
  int query_block; /* @d30369 tlg */
  unsigned int stmt_num; /* @d24993 tlg */
  double elapse_time; /* @d24993 tlg */
  double adjusted_time;
  char start_stamp[50]; /* start time stamp for block */
  char end_stamp[50]; /* end time stamp for block */
  char tag[50]; /* block tag */
  char qry_description[100];
  struct stmt_info *next; /* @d24993 tlg */
};

/*****
*****/
/* Structure containing command line options */
/*****
*****/
struct comm_line_opt
{
  /* @d22275 tlg */
  /* kjd715 */
  /* char str_file_name[256]; /* output filename */
  /* kjd715 */
  char infile[256]; /* input filename */
  int intStreamNum; /* integer version of stream number */
  int a_commit; /* auto-commit flag */
};

```

```

int      short_time;  /* time interval flag */
int      update;
int      outfile;
};

/*****
***/
/* Structure used to hold precision for decimal numbers */
/*****
***/
struct declen
{
/* kmw */
    unsigned char m; /* # of digits left of decimal */
    unsigned char n; /* # of digits right of decimal */
};

/*****
***/
/* Structure containing control flags passed between functions */
/*****
***/
struct ctrl_flags
{
/* @d25594 tlg */
    int eo_infile;
    int time_stamp;
    int eo_block; /* @d30369 tlg */
    int select_status;
};

/*****
***/
/* Function Prototypes */
/*****
***/
int SleepSome( int amount );
int get_env_vars(void);
int Get_SQL_stmt(struct global_struct *g_struct);

void print_headings (struct sqllda *sqllda, int *col_lengths); /* @d22817 tlg */
void echo_sqllda(struct sqllda *sqllda, int *col_lengths);
void allocate_sqllda(struct sqllda *sqllda);

void get_start_time(Timer_struct *start_time);
double get_elapsed_time (Timer_struct *start_time);

long error_check(void); /* @d28763 tlg */
void dumpCa(struct sqlca*); /* kmw */

void display_usage(void);
char *uppercase(char *string);
char *lowercase(char *string);
void comm_line_parse(int agrc, char *argv[], struct global_struct *g_struct);
int sqlrxd2a(char *decptr, char *asciiptr, short prec, short scal);
void init_setup(int argc, char *argv[], struct global_struct *g_struct);
void runUF1( struct global_struct *g_struct, int updatePair );
void runUF2( struct global_struct *g_struct, int updatePair );

/* These need to be extern because they're in another SQC file.  aph 981205 */
/*extern void runUF1_fn( int updatePair, int i );*/ /* aph 981205 */
/*extern void runUF2_fn( int updatePair, int i, int numChunks );*/ /* aph 981205 */
/*
/* Added four new arguments because SQL host vars can't be global.  aph 981205 */
extern void runUF1_fn ( int updatePair, int i, char *dbname, char *userid, char
*passwd );
extern void runUF2_fn ( int updatePair, int thisConcurrentDelete, int numChunks,
char *dbname, char *userid, char *passwd );

int sem_op (int semid, int semnum, int value);

```

```

char *get_time_stamp(int form, Timer_struct *timer_pointer); /* TIME_ACC
jen */
void summary_table (struct global_struct *g_struct);
void free_sqllda (struct sqllda *sqllda, int select_status); /* @d30369 tlg */
void output_file(struct global_struct *g_struct);
int PreSQLprocess(struct global_struct *g_struct, Timer_struct *start_time);
void SQLprocess(struct global_struct *g_struct);
int PostSQLprocess(struct global_struct *g_struct, Timer_struct *start_time);
int cleanup(struct global_struct *g_struct);

/* Semaphore control functions */
void create_semaphores(struct global_struct *g_struct);
void throughput_wait(struct global_struct *g_struct);
void runpower_wait(struct global_struct *g_struct, int sem_num);
void release_semaphore(struct global_struct *g_struct, int sem_num);
#ifdef SQLWINT
HANDLE open_semaphore(struct global_struct *g_struct, int num);
#else
int open_semaphore(struct global_struct *g_struct);
#endif

EXEC SQL INCLUDE SQLCA;

/*****
***/
/* Declare the SQL host variables. */
/*****
***/
EXEC SQL BEGIN DECLARE SECTION;

char  stmt_str1[4000] = "\0"; /* Assume max SQL statment
of 4000 char */
struct {
    short len;
    char data[32700];
} stmt_str; /* jen LONG */
char  dbname[9] = "\0";
char  userid[9] = "\0";
char  passwd[9] = "\0";
char  sourcefile[256]; /* used for semaphores and table functions?*/
sqlint32 chunk = 0; /* jenCI counter for within the set of chunks*/

EXEC SQL END DECLARE SECTION;

/*****
***/
/* Declare the global variables. */
/*****
***/
struct sqllda *sqllda; /* SQL Descriptor area */

/* Global environment variables (sks May 25 98)*/
char env_tpcd_dbname[100];
char env_user[100];
char env_tpcd_audit_dir[150];
char env_tpcd_path_delim[2];
char env_tpcd_tmp_dir[150];
char env_tpcd_run_on_multiple_nodes[10];
char env_tpcd_copy_dir[150];
char env_tpcd_update_import[10];

/* Other globals */
FILE *instream, *outstream; /* File pointers */
int verbose = 0; /* Verbose option flag */
int semcontrol = 1; /* allows/disallows smaphores usage */
int updatePairStart; /* update pair to start at */
int currentUpdatePair; /* update pair running */
int updatePairStop; /* update pair to stop before */
char newtime[50] = "\0"; /* Des - moved from get_time_stamp */
char outstreamfilename[256]; /* store filename of outstream
wlc 081397 */
int inlistmax = 400; /* define # of keys to delete at a time

```

```

        wlc 081897 */
int      sqlda_allocated = 0; /* fixing free() problem in NT
        wlc 090597 */
int      iImportStagingTbl=0; /* IMPORT use import or load (default) */
char      temp_time_stamp[50]; /* holds end timestamp to be copied into
start_time_stamp of next query bbeaton */
Timer_struct temp_time_struct; /* holds end time value to be copied into
start_time of next query bbeaton */

/* constants for the semaphores used; 1 for throughput and 2 for power */
#define INSERT_POWER_SEM 1
#define QUERY_POWER_SEM 2
#define THROUGHPUT_SEM 1

/*****
**/
/* Start main program processing. */
/*****
**/
int main(int argc, char *argv[])
{
    /* kjd715 */
    /*struct comm_line_opt c_l_opt = { "\0", "\0", 0, 1, 0, 0, 0 };*/ /* kjd715 */
    struct comm_line_opt c_l_opt = { "\0", 0, 1, 0, 0, 0 };
    /* kjd715 */
    /* command line options */
    Timer_struct start_time; /* start point for elapsed time */

    struct stmt_info s_info = { -1, -1, 0, 1, -1, -1, "\0", "\0", "\0", "\0", NULL };
    /* first stmt_info structure */

    struct ctrl_flags c_flags = { 0, 1, 0, TPCDBATCH_SELECT };
    /* structure holding ctrl flags
    passed between functions */

    /* TIME_ACC jen start */
    #if defined (SQLUNIX) || defined (SQLAIX)
        struct global_struct g_struct =
        { NULL, NULL, NULL, NULL, {0,0}, {0,0}, "\0", 0.1, "\0", FALSE, 0,
        NULL, "\0", "\0", "\0", NULL };

    #elif (defined (SQLOS2) || defined (SQLWINT) || defined (SQLWIN) ||
    defined (SQLDOS))
        struct global_struct g_struct =
        { NULL, NULL, NULL, NULL, {0,0,0,0}, {0,0,0,0}, "\0", 0.1, "\0", FALSE, 0,
        NULL, "\0", "\0", "\0", NULL };
    #else
    #error Unknown operating system
    #endif
    /* TIME_ACC jen end */

    /* Get environment variables */
    if (get_env_vars() != 0)
        return -1;

    /* perform setup and initialization and get process id of agent */
    outstream = stdout;
    g_struct.c_flags = &c_flags;

    g_struct.s_info_ptr = &s_info;
    g_struct.c_l_opt = &c_l_opt;

    init_setup(argc,argv,&g_struct); /* @d22275 tjg */

    if ((g_struct.c_l_opt->update == 1) && (semcontrol == 1))
    /* runpower: wait for insert function to complete */
    /* waiting on the INSERT_POWER_SEM semaphore */
        runpower_wait(&g_struct, INSERT_POWER_SEM);

    strcpy(temp_time_stamp, "0");

```

```

/*****
*****
*
* This is the transition from the "driver" to the "SUT"
*
*****
*****/

/*****
*****/
/* Read in each statement, prepare, execute, and send output to file. */
/*****
*****/

while (!c_flags.eof_infile) { /* Check to see if there's no more input */

    c_flags.eof_block = 0;

    if (c_l_opt.outfile)
        output_file(&g_struct); /* determine appropriate name for output files */
    if ((g_struct.c_l_opt->update != 3) && (g_struct.c_l_opt->update != 4))
    {
        if (!strcmp(temp_time_stamp, "0")) /* if first query, get timestamp */
        {
            get_start_time(&start_time);
            strcpy(g_struct.s_info_ptr->start_stamp,
            get_time_stamp(T_STAMP_FORM_3,&start_time)); /* TIME_ACC
jen*/
        }
        else /* else get the end timestamp of previous query */
        {
            strcpy(g_struct.s_info_ptr->start_stamp, temp_time_stamp);
            start_time = temp_time_struct;
        }
        /* write the start timestamp to the file...if this is not a qualification */
        /* run, then write the seed used as well */

        fprintf( outstream,"Start timestamp %*.s \n",
            T_STAMP_3LEN,T_STAMP_3LEN, /* TIME_ACC jen*/
            g_struct.s_info_ptr->start_stamp);
        if (c_l_opt.intStreamNum >= 0)
        {
            if (g_struct.lSeed == -1)
            {
                fprintf( outstream,"Using default qgen seed file");
            }
            else
                fprintf( outstream,"Seed used = %ld",g_struct.lSeed);

            fprintf( outstream,"\n");
        }
    }
    do { /* Loop through these statements as long as we haven't reached
    the end of the input file or the end of a block of statements
    */

        /* Read in the next statment */
        c_flags.select_status=Get_SQL_stmt(&g_struct);

        if (PreSQLprocess(&g_struct, &start_time) == FALSE)
        /* if after reading the next statement we see that we should
        exit this loop (i.e. eof, update functions, etc...), get out
        */
            break;

    } while (1);

/*****
*****
*
*

```

```

* The SQLprocess function implements the implementation specific layer.
*
* It can handle arbitrary SQL statements.
*
*****
*****/

/* If we've got up to here then processing
a regular SQL statement */
SQLprocess(&g_struct);

} while ((!c_flags.eo_block) && (!c_flags.eo_infile)); /* @d30369 tlg */

if (PostSQLprocess(&g_struct,&start_time) == FALSE)
/* if we've reached the end of the input file, then get out
of this loop (i.e. no more statements). Otherwise get
elapsed times and display info about rows */
break;

} /* end of for loop for multiple SQL statements */

g_struct.s_info_ptr = &s_info; /* set the global pointer to start of
linked list */

cleanup(&g_struct); /* finish some semaphore stuff, cleanup files,
and print out summary table */

/*****
*****
*
* In cleanup we make the transition back from the "SUT" to the "driver"
*
*****
*****/

return(0);

} /* end of main */

/*****
*****/
/* Generic form of Sleep */
int SleepSome( int amount)
{
#ifdef SQLWINT
sleep (amount);
#else
// Sleep (amount*100); /* 10x for NT DJD Changed "sleep" to "Sleep" */
Sleep (amount); /* 10x for NT DJD Changed "sleep" to "Sleep" */
#endif
return 0;
}

/*****
*****/

/*****
***/
/* Get environment variables. (sks May 25 98) */
/*****
***/

int get_env_vars(void) {
if (strcpy(env_tpcd_dbname, getenv("TPCD_DBNAME")) == NULL) {
fprintf(stderr, "\n The environment variable $TPCD_DBNAME is not setup
correctly.\n");
return -1;
}
if (strcpy(env_user, getenv("USER")) == NULL) {

```

```

fprintf(stderr, "\n The environment variable $USER is not setup correctly.\n");
return -1;
}
if (strcpy(env_tpcd_audit_dir, getenv("TPCD_AUDIT_DIR")) == NULL) {
fprintf(stderr, "\n The environment variable $TPCD_AUDIT_DIR is not setup
correctly.\n");
return -1;
}
if (strcpy(env_tpcd_tmp_dir, getenv("TPCD_TMP_DIR")) == NULL) {
fprintf(stderr, "\n The environment variable $TPCD_TMP_DIR is not setup
correctly.\n");
return -1;
}
#endif
if (strcpy(env_tpcd_path_delim, getenv("TPCD_PATH_DELIM")) == NULL ||
(strcmp(env_tpcd_path_delim, "/") && strcmp(env_tpcd_path_delim, "\\"))){
fprintf(stderr, "\n The environment variable $TPCD_PATH_DELIM is not
setup correctly , env_tpcd_path_delim'%s'.\n", env_tpcd_path_delim);

return -1;
}
}
#endif
strcpy( env_tpcd_path_delim , "/" ); /*kmw*/
if (strcpy(env_tpcd_run_on_multiple_nodes,
getenv("TPCD_RUN_ON_MULTIPLE_NODES")) == NULL) {
fprintf(stderr, "\n The environment variable
$TPCD_RUN_ON_MULTIPLE_NODES");
fprintf(stderr, "\n is not setup correctly.\n");
return -1;
}
if (strcpy(env_tpcd_copy_dir, getenv("TPCD_COPY_DIR")) == NULL) {
fprintf(stderr, "\n The environment variable $TPCD_COPY_DIR is not setup
correctly.\n");
return -1;
}
/* If TPCD_UPDATE_IMPORT is not set then, the default is set to false, */
/* which is done in init_setup subroutine */
strcpy(env_tpcd_update_import, getenv("TPCD_UPDATE_IMPORT"));

return 0;
}

/*****
***/
/* Get the SQL statement and any control statements from input. */
/*****
***/
int Get_SQL_stmt(struct global_struct *g_struct)
{
char input_ln[256] = "\0"; /* buffer for 1 line of text */
char temp_str[4000] = "\0"; /* temp string for SQL stmt */
char control_str[256] = "\0"; /* control string */

char *test_semi; /* ptr to test for semicolon */
char *control_opt; /* ptr used in control_str parsing */
char *select_status; /* ptr to first word in query */
char *temp_ptr; /* general purpose temp ptr */

int good_sql = 0; /* good-sql stmt flag @d23684 tlg */
int stmt_num_flag = 1; /* first line of SQL stmt flag */
int eostmt = 0; /* flag to signal end of statement */

stmt_str.data[0]='\0'; /* Initialize statement buffer */

if (verbose)
fprintf (stderr, "\n-----\n");
fprintf (outstream, "\n-----\n");

do {
/** Read in lines from input one at a time */
fscanf(instream, "\n%[^\n]\n", input_ln);

```

```

if (strstr(input_ln, "--") == input_ln) { /* Skip all -- comments */

    if (strstr(input_ln, "--SET") == input_ln) {
        /* Store control string but
           keep going to find SQL stmt */
        strcpy(control_str, input_ln);
        if (verbose)
            fprintf(stderr, "%s\n", uppercase(control_str));
        fprintf(outstream, "%s\n", uppercase(control_str));

        /** Start parsing control str. and update appropriate vars. **/
        control_opt = strtok(control_str, " ");
        while (control_opt != NULL) {
            if (strcmp(control_opt, "--SET") == 0) { /* Skip the #SET token */
                if (!strcmp(control_opt, "ROWS_FETCH"))
                    g_struct->s_info_ptr->max_rows_fetch = atoi(strtok(NULL, " "));

                if (!strcmp(control_opt, "ROWS_OUT"))
                    g_struct->s_info_ptr->max_rows_out = atoi(strtok(NULL, " "));
            }

            control_opt = strtok(NULL, " ");
        }

        /* if the block option has been set, then check if we've
           reached the end of a block of statements */
        if (g_struct->s_info_ptr->query_block) /* @d30369 tlg */
            if (strstr(input_ln, "--EOBLK") == input_ln) {
                g_struct->c_flags->eo_block = 1;
                return TPCDBATCH_EOBLOCK;
            }

        if (strstr(input_ln, "-- Query") == input_ln)
            strcpy(g_struct->s_info_ptr->qry_description, input_ln);

        if (strstr(input_ln, "--#TAG") == input_ln)
            strcpy(g_struct->s_info_ptr->tag, (input_ln + sizeof("--#TAG")));

        /* if we're using update functions, return that info
           appropriately */
        if (g_struct->c_l_opt->update != 0) {
            if (strstr(input_ln, "--#INSERT") == input_ln)
                return TPCDBATCH_INSERT;

            if (strstr(input_ln, "--#DELETE") == input_ln)
                return TPCDBATCH_DELETE;
        }

        if (strstr(input_ln, "--#COMMENT") == input_ln) { /* @d25594 tlg */
            temp_ptr = (input_ln + 11); /* User-specified comments go to
                the outfile */
            if (verbose)
                fprintf(stderr, "%s\n", temp_ptr);
            fprintf(outstream, "%s\n", temp_ptr);
        }

        eostmt = 0;
    }

    /* Need this hack here to check if there's any more empty lines left
       in the input file. Continue only if there are aren't any */
    else if (strcmp(input_ln, "0")) /* HACK */ { /* A regular SQL statement */
        if (stmt_num_flag) { /* print this out only if it's the first line
            of the SQL statement. We only want this
            line to appear once per statement */
            if (verbose)
                fprintf(stderr, "\n%s\n", g_struct->s_info_ptr->qry_description);
            fprintf(outstream, "\n%s\n", g_struct->s_info_ptr->qry_description);
        }

        if (verbose)
            fprintf(stderr, "\nTag: %-5.5s Stream: %d Sequence number: %d\n",
                g_struct->s_info_ptr->tag, g_struct->c_l_opt->intStreamNum,
                g_struct->s_info_ptr->stmt_num); /*jen0925*/
        fprintf(outstream, "\nTag: %-5.5s Stream: %d Sequence number: %d\n",

```

```

        g_struct->s_info_ptr->tag, g_struct->c_l_opt->intStreamNum,
        g_struct->s_info_ptr->stmt_num); /*jen0925*/

        /* Turn off this flag once the number has been printed */
        stmt_num_flag = 0;

    } /** Print out this heading the first time you encounter a
        non-comment statement **/

    /* Test to see if we've reached the end of a statement */
    good_sql = TRUE; /* @d23684 tlg */
    test_semi = strstr(input_ln, ";");
    if (test_semi == NULL) { /* if there's no semi-colon keep on going */
        strcat(stmt_str.data, input_ln); /* jen LONG */
        strcat(stmt_str.data, " "); /* jen LONG */
        stmt_str.len = strlen(stmt_str.data); /* jen LONG */
        eostmt = 0;
    }

    else { /* else replace the ; with a \0 and continue */
        *test_semi = '\0';
        strcat(stmt_str.data, input_ln); /* jen LONG */
        stmt_str.len = strlen(stmt_str.data); /* jen LONG */
        eostmt = 1;
    }

    fprintf(outstream, "\n%s", input_ln);
    if (verbose)
        fprintf(stderr, "\n%s", input_ln);
}

/** Test to see if we've reached the EOF. Get out if that's the case **/
if (feof(instream)) {
    eostmt = TRUE;
    g_struct->c_flags->eo_infile = TRUE; /* @d22275 tlg */
}

} while (!eostmt);

fprintf(outstream, "\n");
if (verbose)
    fprintf(stderr, "\n");

/** erase the old control string **/
strcpy(control_str, "\0");

/** Determine whether statement is a SELECT or other SQL **/
if (good_sql) {
    strcpy(temp_str, stmt_str.data); /* jen LONG */
    uppercase(temp_str); /* Make sure that select is made to SELECT */
    select_status = strtok(temp_str, " ");
    if ((stmt_str.data[0] == '(') || (!strcmp(select_status, "SELECT"))) ||
        (!strcmp(select_status, "VALUES")) ||
        (!strcmp(select_status, "WITH")))
        return TPCDBATCH_SELECT;
    else
        return TPCDBATCH_NONSELECT;
}

/** If you go through a file with just comments or control statments
    with no SQL, there's nothing to process...Exit TPCDBATCH **/

else /* @d23684 tlg */
    return TPCDBATCH_NONSQL;
} /* Get_SQL_stmt */

*****
**/
/* allocate_sqlda -- This routine allocates space for the SQLDA. */

```

```

/*****
**/

void allocate_sqlda(struct sqlda *sqlda)
{
    int loopvar;          /* Loop counter */

    for (loopvar=0; loopvar<sqlda->sqld; loopvar++)
    {
        switch (sqlda->sqlvar[loopvar].sqltype)
        {
            case SQL_TYP_INTEGER:          /* INTEGER */
            case SQL_TYP_NINTEGER:
                if ((sqlda->sqlvar[loopvar].sqldata=
                    (TPCDBATCH_CHAR *)malloc(sizeof(sqlint32))) == NULL)
                    mem_error("allocating INTEGER");
                break;
            case SQL_TYP_BIGINT:             /* BIGINT */ /*kmwBIGINT*/
            case SQL_TYP_NBIGINT:
                /*#ifdef SQLWINT */
                /* if ((sqlda->sqlvar[loopvar].sqldata= */
                /* (TPCDBATCH_CHAR *)malloc(sizeof(__int64))) == NULL)*/
                /*#else */
                if ((sqlda->sqlvar[loopvar].sqldata=
                    (TPCDBATCH_CHAR *)malloc(sizeof(sqlint64))) == NULL)
                /*#endif*/
                    mem_error("allocating BIGINT");
                break;
            case SQL_TYP_CHAR:              /* CHAR */
            case SQL_TYP_NCHAR:
                if ((sqlda->sqlvar[loopvar].sqldata=
                    (TPCDBATCH_CHAR *)calloc(256,sizeof(char))) == NULL)
                    mem_error("allocating CHAR/VARCHAR");
                break;
            case SQL_TYP_VARCHAR:           /* VARCHAR */
            case SQL_TYP_NVARCHAR:
                if ((sqlda->sqlvar[loopvar].sqldata=
                    (TPCDBATCH_CHAR *)calloc(4002,sizeof(char))) == NULL)
                    mem_error("allocating CHAR/VARCHAR");
                break;
            case SQL_TYP_LONG:              /* LONG VARCHAR */
            case SQL_TYP_NLONG:
                if ((sqlda->sqlvar[loopvar].sqldata=
                    (TPCDBATCH_CHAR *)calloc(32702,sizeof(char))) == NULL)
                    mem_error("allocating VARCHAR/LONG VARCHAR");
                break;
            case SQL_TYP_FLOAT:             /* FLOAT */
            case SQL_TYP_NFLOAT:
                if ((sqlda->sqlvar[loopvar].sqldata=
                    (TPCDBATCH_CHAR *)malloc(sizeof(double))) == NULL)
                    mem_error("allocating FLOAT");
                break;
            case SQL_TYP_SMALL:             /* SMALLINT */
            case SQL_TYP_NSMALL:
                if ((sqlda->sqlvar[loopvar].sqldata=
                    (TPCDBATCH_CHAR *)malloc(sizeof(short))) == NULL)
                    mem_error("allocating SMALLINT");
                break;
            case SQL_TYP_DECIMAL:           /* DECIMAL */
            case SQL_TYP_NDECIMAL:
                if ((sqlda->sqlvar[loopvar].sqldata=
                    (TPCDBATCH_CHAR *)malloc(20)) == NULL)
                    mem_error("allocating DECIMAL");
                break;
            case SQL_TYP_CSTR:              /* VARCHAR (null terminated) */
            case SQL_TYP_NCSTR:
                if ((sqlda->sqlvar[loopvar].sqldata=
                    (TPCDBATCH_CHAR *)calloc(4001,sizeof(char))) == NULL)
                    mem_error("allocating CHAR/VARCHAR");
                break;
            case SQL_TYP_DATE:             /* DATE */
            case SQL_TYP_NDATE:
                if ((sqlda->sqlvar[loopvar].sqldata=
                    (TPCDBATCH_CHAR *)calloc(13,sizeof(char))) == NULL)

```

```

                mem_error("allocating DATE");
                break;
            case SQL_TYP_TIME:              /* TIME */
            case SQL_TYP_NTIME:
                if ((sqlda->sqlvar[loopvar].sqldata=
                    (TPCDBATCH_CHAR *)calloc(11,sizeof(char))) == NULL)
                    mem_error("allocating TIME");
                break;
            case SQL_TYP_STAMP:             /* TIMESTAMP */
            case SQL_TYP_NSTAMP:
                if ((sqlda->sqlvar[loopvar].sqldata=
                    (TPCDBATCH_CHAR *)calloc(29,sizeof(char))) == NULL)
                    mem_error("allocating TIMESTAMP");
                break;
        }
        if ((sqlda->sqlvar[loopvar].sqlind=
            (short *)calloc(1,sizeof(short))) == NULL)
            mem_error("allocating indicator");
    }
    sqlda_allocated = 1; /* fix free() problem on NT
                        wlc 090597 */
    return; /* allocate_sqlda */
}

```

```

/*****
*****
/* echo_sqlda -- This routine displays the contents of an SQLDA. */
*****
*****

```

```

void echo_sqlda(struct sqlda *sqlda, int *col_lengths)
{
    int col;          /* Column counter */

    int col_type;     /* Type of column */

    char temp_string[100] = "\0"; /* Temporary string */
    char decimal_string[100] = "\0"; /* String holding decimals */
    char *temp_ptr;

    TPCDBATCH_CHAR m,n; /* precision and accuracy
                        for decimal conversion */

    for (col=0; col<sqlda->sqld; col++) /* Loop through column count */
    {
        col_type=sqlda->sqlvar[col].sqltype; /* @d22817 tjg */

        if (*sqlda->sqlvar[col].sqlind) /* @d30369 tjg */
            fprintf(outstream, "%* n/a ",(col_lengths[col]-3));
        else
            switch (col_type)
            {
                case SQL_TYP_INTEGER:
                case SQL_TYP_NINTEGER:

                    fprintf(outstream, "%*ld ",col_lengths[col],
                        *(sqlint32 *)sqlda->sqlvar[col].sqldata);
                    break;

                case SQL_TYP_BIGINT: /*kmwBIGINT*/
                case SQL_TYP_NBIGINT:
                /*#ifdef SQLWINT*/
                /* fprintf(outstream, "%*I64d ",col_lengths[col],*/
                /* *(__int64 *)sqlda->sqlvar[col].sqldata);*/
                /*#else*/
                fprintf(outstream, "%*lld ",col_lengths[col],
                    *(sqlint64 *)sqlda->sqlvar[col].sqldata);
                /*#endif*/
                break;
            }
    }
}

```

```

case SQL_TYP_CHAR:
case SQL_TYP_NCHAR:

    fprintf(outstream, "%-*s ", col_lengths[col], sqlda->sqlvar[col].sqldata);
    break;
case SQL_TYP_VARCHAR:
case SQL_TYP_NVARCHAR:
case SQL_TYP_LONG:
case SQL_TYP_NLONG: /* @d30369 tlg */
    ((struct sqlchar *)sqlda->sqlvar[col].sqldata)->
        data[((struct sqlchar *)sqlda->sqlvar[col].sqldata)->length] = '\0';
    fprintf(outstream, "%-*s ",
        col_lengths[col],
        ((struct sqlchar *)sqlda->sqlvar[col].sqldata)->data);
    break;
case SQL_TYP_FLOAT:
case SQL_TYP_NFLOAT:
{ /* kmw */
    if ( fabs(*(double *) (sqlda->sqlvar[col].sqldata))
        < TPCDBATCH_PRINT_FLOAT_MAX )
        fprintf(outstream, "%#.3f ", col_lengths[col],
            *(double *) (sqlda->sqlvar[col].sqldata));
    else
        fprintf(outstream, "%*e ", col_lengths[col],
            *(double *) (sqlda->sqlvar[col].sqldata));
    break;
}

case SQL_TYP_SMALL:
case SQL_TYP_NSMAIL:

    fprintf(outstream, "%*hd ", col_lengths[col],
        *(short *) (sqlda->sqlvar[col].sqldata));
    break;
case SQL_TYP_DECIMAL:
case SQL_TYP_NDECIMAL:

    m=(*(struct declen *)&sqlda->sqlvar[col].sqlen).m;
    n=(*(struct declen *)&sqlda->sqlvar[col].sqlen).n;
    if (sqlrxd2a((char *)sqlda->sqlvar[col].sqldata, temp_string, m, n) != 0)
    {
        fprintf(stderr, "\nThe decimal value could not be converted.\n");
        exit (-1);
    }
    else {

        temp_ptr = temp_string;

        if (*temp_ptr == '-')
            strcpy(decimal_string, "-");

        else
            strcpy(decimal_string, "");

        for (temp_ptr = temp_string + 1; *temp_ptr == '0'; temp_ptr++)
            ;

        strcat(decimal_string, temp_ptr);
        fprintf(outstream, "%*s ", col_lengths[col], decimal_string);
    }

    break;

case SQL_TYP_CSTR:
case SQL_TYP_NCSTR:
case SQL_TYP_DATE:
case SQL_TYP_NDATE:
case SQL_TYP_TIME:
case SQL_TYP_NTIME:
case SQL_TYP_STAMP:
case SQL_TYP_NSTAMP:
    sqlda->sqlvar[col].sqldata[sqlda->sqlvar[col].sqlen+1]='\0';
    strcpy(temp_string, (char *)sqlda->sqlvar[col].sqldata);
    fprintf(outstream, "%-*s ", (col_lengths[col]), temp_string);

```

```

        break;

        default:
            fprintf(stderr, "--Unknown column type (%d). Aborting.\n", col_type);
            break;
    }
}

fprintf(outstream, "\n");

return;
}

/*****
/* Calculate the elapsed time. */
*****/

void get_start_time(Timer_struct *start_time)
{
    int rc = 0;

#ifdef (SQLOS2) || defined (SQLWINT) || defined (SQLWIN) || defined (SQLDOS)
    /*@d33143aha*/
    ftime(start_time);
#elif defined (SQLSNI)
    rc = gettimeofday(start_time);
#elif defined (SQLPTX)
    gettimeofday_mapped(start_time);
    rc = 0; /* gettimeofday_mapped returns void */
#elif defined (SQLUNIX) || defined (SQLAIX) /*TIMER jen*/
    rc = gettimeofday(start_time, NULL);
#else
#error Unknown operating system
#endif

    if (rc != 0) {
        fprintf(stderr, "Timer call failed, aborting test\nExiting tpcdbatch..\n");
        exit(-1);
    }
}

/*****
*****/
/* Calculate and return the elapsed time given a starting time. */
/*****
*****/

double get_elapsed_time ( Timer_struct *start_time)
{
    int status = 0;
    Timer_struct end_time;
    double result = -1.0;
#ifdef SQLWINT
    long int result_sec;
    long int result_usec;
#endif

#ifdef (SQLSNI)
    status = gettimeofday(&end_time);
#elif defined (SQLPTX)
    gettimeofday_mapped(&end_time);
    status = 0; /* gettimeofday_mapped returns void */
#elif defined (SQLUNIX) || defined (SQLAIX)
    status = gettimeofday(&end_time, NULL); /*TIMER jen*/
#elif defined (SQLOS2) || defined (SQLWINT) || defined (SQLWIN) || defined (SQLDOS)
    ftime(&end_time);
#else
    /** If another operating system **/
#error Unknown operating system
#endif

```

```

if (status != 0)
    fprintf(stderr, "Bad return from gettimeofday, don't trust timer results...\n");

else
{
#ifdef defined (SQLUNIX) || defined (SQLAIX)
    result_sec = end_time.tv_sec - start_time->tv_sec;
    result = (double) result_sec;
    /* TIMER used micro seconds with timeval (not nanoseconds) */
    if ((start_time->tv_usec > 0) && \
        (start_time->tv_usec < 1000000) && \
        (end_time.tv_usec > 0) && \
        (end_time.tv_usec < 1000000))
    {
        result_usec = end_time.tv_usec - start_time->tv_usec;
        result = (double) result_sec + ((double) result_usec/1000000);
    }
#elif defined (SQLOS2) || defined (SQLWINT) || defined (SQLWIN) ||
defined (SQLDOS))
    result = (double) (end_time.time - start_time->time);
    result = result * 1000 + (end_time.millitm - start_time->millitm);
    result = result/1000;
#else
#error Unknown operating system
#endif

}

/*
 * translate the time to that rounded to the CLOSEST 0.1 seconds as
 * required by the TPC-D spec.  ROUNDING
 */
/* result = (double)((long)((result + 0.099999) * 10))/10.0; */
result = (double)((long)((result + 0.05) * 10))/10.0;
return (result);
}

void dumpCa(struct sqlca *ca)
{
    int i;
    fprintf(outstream, "***** DUMP OF SQLCA\n");
    fprintf(outstream, "SQLCAID   : %.8s\n", ca->sqlcaid);
    fprintf(outstream, "SQLCABC   : %d\n", ca->sqlcabc);
    fprintf(outstream, "SQLCODE   : %d\n", ca->sqlcode);
    fprintf(outstream, "SQLERRML  : %d\n", ca->sqlerrml);
    fprintf(outstream, "SQLERRMC  : %.8s\n", ca->sqlerrmc);
    fprintf(outstream, "SQLERRP   : %.8s\n", ca->sqlerrp);

    for (i = 0; i < 6; i++)
    {
        fprintf(outstream, "SQLERRD[%d]: %d\n", i, ca->sqlerrd[i]);
    }
    fprintf(outstream, "SQLWARN   : %.11s\n", ca->sqlwarn);
    fprintf(outstream, "SQLSTATE  : %.5s\n", ca->sqlstate);
    fprintf(outstream, "***** END OF SQLCA DUMP\n");
    return;
}

/* *****
 * error_check
 * This function prints the contents of the sqlca error information
 * structure.
 * *****
long error_check(void)
{
    char    buffer[512]="\0";
    unsigned short i;

```

```

struct sqlca temp_sqlca; /* temporary sqlca */ /* @d30369 tjt */

temp_sqlca.sqlcode = 0; /* initialize the temporary sqlca to
                          avoid any memory problems */

if (sqlca.sqlcode != 0) {
    sqlaintp(buffer, sizeof(buffer), 80, &sqlca);
    fprintf(stderr, "\n%0.200s\n", buffer);
    fprintf(outstream, "\n%0.200s\n", buffer);

    /* Decode the SQLCA in more detail  KBS 98/09/28 */
    if ((sqlca.sqlerrml) /* there's one or more tokens */
        && (sqlca.sqlerrml < sizeof(sqlca.sqlerrmc))) /* and field not full */
    {
        char *tokptr;
        int tokl;
        *(sqlca.sqlerrmc + sqlca.sqlerrml) = '\0'; /* prevent strtok from scanning
        beyond end */
        fprintf(stderr, "\n SQLCA: tokens:\n");
        fprintf(outstream, "\n SQLCA: tokens:\n");
        tokptr=strtok(sqlca.sqlerrmc, "\xff");
        while ( tokptr &&
            ((tokl = (sizeof(sqlca.sqlerrmc) - (tokptr-sqlca.sqlerrmc))) > 0)
        )
        {
            fprintf(stderr, "%.8s\n", tokl, tokptr);
            fprintf(outstream, "%.8s\n", tokl, tokptr);
            tokptr=strtok(NULL, "\xff");
        }
        fprintf(stderr, "\n SQLCA: errp= %.8s, errd 1-6= %d %d %d %d %d %d\n",
            sqlca.sqlerrp, sqlca.sqlerrd[0], sqlca.sqlerrd[1], sqlca.sqlerrd[2],
            sqlca.sqlerrd[3], sqlca.sqlerrd[4], sqlca.sqlerrd[5]);
        fprintf(outstream, "\n SQLCA: errp= %.8s, errd 1-6= %d %d %d %d %d %d\n",
            sqlca.sqlerrp, sqlca.sqlerrd[0], sqlca.sqlerrd[1], sqlca.sqlerrd[2],
            sqlca.sqlerrd[3], sqlca.sqlerrd[4], sqlca.sqlerrd[5]);

        temp_sqlca = sqlca; /* Make a copy of sqlca in case it gets changed
                             in the next statement below */ /* @d30369 tjt */

        /** Determine if the error is critical or a connection can be made **/

        EXEC SQL CONNECT ; /* @d28763 tjt */

        if (sqlca.sqlcode == SQLE_RC_NOSUDB ) /* no connection exists */

            /*Print out header for DUMP*/
            fprintf(outstream, "*****\n");
            fprintf(outstream, "* CONTENTS OF SQLCA *\n");
            fprintf(outstream, "*****\n\n");

            /*Print out contents of SQLCA variables*/
            fprintf(outstream, "SQLCABC = %ld\n", temp_sqlca.sqlcabc);
            fprintf(outstream, "SQLCODE = %ld\n", temp_sqlca.sqlcode);
            fprintf(outstream, "SQLERRMC = %0.70s\n", temp_sqlca.sqlerrmc);
            fprintf(outstream, "SQLERRP = %0.8s\n", temp_sqlca.sqlerrp);

            for (i = 0; i < 6; i++)
            {
                fprintf(outstream, "sqlerrd[%d] = %lu \n", i, temp_sqlca.sqlerrd[i]);
            }

            fprintf(outstream, "SQLWARN = %0.11s\n", temp_sqlca.sqlwarn);
            fprintf(outstream, "SQLSTATE = %0.5s\n", temp_sqlca.sqlstate);

            fprintf(stderr, "\nCritical SQLCODE. Exiting TPCDBATCH\n");
            exit(-1);
        }
    }
    return (temp_sqlca.sqlcode);
}

```



```

} /* error_check */

/*****
/* Displays a help screen
*****/
void display_usage()
{
    printf("\ntpcdbatch -- version %s",TPCDBATCH_VERSION);
    printf("\n\nSyntax is:\n");
    printf("\ntpcdbatch [-d dbname] [-l file_name] [-r on/off]");
    printf("\n      [-v on/off] [-b on/off] [-u p/t/t1/t2]");
    printf("\n      [-s scale_factor] [-n stream_num] [-m inlistmax] [-h]\n");
    printf("\n where: -d Database name");
    printf("\n      Default - dbname set in $DB2DBDFT");
    printf("\n      -f Input file containing SQL statements");
    printf("\n      Default - stdin");
    printf("\n      -r Create set of output files containing query results");
    printf("\n      Default - off");
    printf("\n      -v Verbose. Sends information to stderr during");
    printf("\n      query processing");
    printf("\n      Default - off");
    printf("\n      -b Process groups of statements as blocks");
    printf("\n      instead of individually.");
    printf("\n      Default - off");
    printf("\n      -u Update streams: p - for power test");
    printf("\n      t - for throughput test without");
    printf("\n      UFs (run this instead of t2)");
    printf("\n      t1 - for throughput test step 1");
    printf("\n      only running queries");
    printf("\n      t2 - for throughput test step 2");
    printf("\n      running update functions");
    printf("\n      -s Scale factor");
    printf("\n      Default - 0.1");
    printf("\n      -n Stream number");
    printf("\n      Default - 0");
    printf("\n      Qualification - -1");
    printf("\n      Power - 0");
    printf("\n      Throughput - >= 1 (actual number depends on the current");
    printf("\n      query stream)");
    printf("\n      -m Maximum number of keys to delete at a time");
    printf("\n      Default - 400");
    printf("\n      -h Display this help screen");
    printf("\n      -p turns smeaphores on or off");
    printf("\n      Default - off");

    printf("\n\nControl statements specifying output and performance details");
    printf("\nncan be included before SQL statements; they will apply for");
    printf("\nthat and subsequent statements until updated.");

    printf("\n\nSyntax: --SET <control option> <value>");
    printf("\n option value default");
    printf("\nROWS_FETCH -1 to n -1 (all rows fetched from answer set)");
    printf("\nROWS_OUT -1 to n -1 (all fetched rows sent to output)");
    printf("\n\n--TAG tag (user specified tag name for sequence#)");
    printf("\n\n--COMMENT comment (user specified comments for");
    printf("\n      output)");
    printf("\n\nNote: All statements executed with ISOLATION LEVEL RR");
    printf("\n      and must be terminated with semi-colons.\n");
    exit (1);
}

/*****
/* Converts a string to upper case characters
*****/
char *uppercase( char *string )
{
    char *c; /* temp char used to convert word to upper case */

    for ( c = string; *c != '\0'; c++)
        *c = (char) toupper( (int) *c );
}

```

```

    return (string);
}

/*****
/* Converts a string to lower case characters
*****/
char *lowercase( char *string )
{
    char *c; /* temp char used to convert word to lower case */

    for ( c = string; *c != '\0'; c++)
        *c = (char) tolower( (int) *c );

    return (string);
}

/*****
/* Parses and processes command line options.
*****/
void comm_line_parse(int argc, char *argv[], struct global_struct *g_struct)
{
    char authent_info[40] = "\0";
    char *testptr;
    int loopvar = 0;

    int comm_opt = 0;
#ifdef PARALLEL_UPDATES
    int running_updates=0;
    int updatePair=-1;
    int updateStream=-1;
    int function;
    int copyOnOrOff;
    int deleteChunk=0; /*DELjen */
#endif

    while ((loopvar < argc) && (argc != 1)) {

        if (*argv[loopvar] == '-') {

            switch(*(argv[loopvar]+1)) {

                case 'f': /* @d26350 tjg */
                case 'F':
                    strcpy(g_struct->c_l_opt->infile,argv[++loopvar]);
                    break;

                /* kjd715 */
                case 'l':
                case 'L': loopvar+=1;
                    /*
                    strcpy(g_struct->c_l_opt->str_file_name,argv[++loopvar]);
                    */
                    break;

                /* kjd715 */
                case 'r': /* @d26350 tjg */
                case 'R':
                    if (!strcmp(uppercase(argv[++loopvar]),"ON"))
                        g_struct->c_l_opt->outfile=1;
                    else
                        g_struct->c_l_opt->outfile=0;
                    break;

                case 'd': /* @d26350 tjg */
                case 'D':
                    strcpy(dbname,argv[++loopvar]);
                    break;

                case 'v': /* @d26350 tjg */
                case 'V':
                    if (!strcmp(uppercase(argv[++loopvar]),"ON"))
                        verbose=1;
                    else

```

```

        verbose=0;
        break;

case 'u' :                /* @d26350 tlg */
case 'U' :
    g_struct->c_l_opt->update=-1; /* init to invalid number */
    if (!strcmp(uppercase(argv[++loopvar]), "P1"))
        g_struct->c_l_opt->update=1; /* power query stream */
    if (!strcmp(uppercase(argv[loopvar]), "P2"))
        g_struct->c_l_opt->update=3; /* power update with updates */
    if (!strcmp(uppercase(argv[loopvar]), "P"))
        g_struct->c_l_opt->update=4; /* power update without updates */
    if (!strcmp(uppercase(argv[loopvar]), "T1"))
        g_struct->c_l_opt->update=0; /* throughput query stream */
    if (!strcmp(uppercase(argv[loopvar]), "T2"))
        g_struct->c_l_opt->update=2; /* throughput update with updates */
    if (!strcmp(uppercase(argv[loopvar]), "T"))
        g_struct->c_l_opt->update=5; /* throughput update without updates */

    break;

case 'b' :                /* @d26350 tlg */
case 'B' :
    if (!strcmp(uppercase(argv[++loopvar]), "ON"))
        g_struct->s_info_ptr->query_block=1;
    else
        g_struct->s_info_ptr->query_block=0;
    break;

case 'n' :                /* @d26350 tlg */
case 'N' :
    g_struct->c_l_opt->intStreamNum = atoi(argv[++loopvar]);
    break;

case 's' :                /* @d26350 tlg */
case 'S' :    g_struct->scale_factor=atof(argv[++loopvar]); break;

case 'h':
case 'H' :                /* @d26350 tlg */
    display_usage();
    break;

case 'm' :
case 'M' :
    inlistmax = atoi(argv[++loopvar]); /* wlc 081897 */
    break;

case 'p' :
case 'P' :
    if (!strcmp(uppercase(argv[++loopvar]), "ON")) /* bbe 072599 */
        semcontrol = 1;
    else
        semcontrol = 0;
    break;

#ifdef PARALLEL_UPDATES
case 'i':
    updatePair = atoi(argv[++loopvar]);
#endif
#ifdef UF2DEBUG
    fprintf(stderr, "updatePair = %d\n", updatePair);
    fflush(stderr);
#endif
    break;

case 'j':
    function = atoi(argv[++loopvar]);
#ifdef UF2DEBUG
    fprintf(stderr, "function = %d\n", function);
    fflush(stderr);
#endif
    break;

case 'k':

```

```

        updateStream = atoi(argv[++loopvar]);
#ifdef UF2DEBUG
    fprintf(stderr, "updateStream = %d\n", updateStream);
    fflush(stderr);
#endif
    break;

case 'x':                /* DEL jen -x is chunk */
    deleteChunk = atoi(argv[++loopvar]); /* to delete for this */
#ifdef UF2DEBUG
    fprintf(stderr, "DelChunk = %d\n", deleteChunk);
    fflush(stderr);
#endif
    break;                /* invocation */

case 'z':
    running_updates = 1;
    break;
#endif

default :
    fprintf(stderr, "An invalid option has been set\n");
    display_usage();
    break;

} /* end switch */
} /* end if */

loopvar++;
} /* end while */

/* checking if -u option is set */
if (g_struct->c_l_opt->update == -1) {
    fprintf(stderr, "-u option is not set, exiting ...\n");
    exit(-1);
}

#ifdef PARALLEL_UPDATES
if (running_updates) {
    if (updatePair == -1) {
        fprintf(stderr, "The parameters to tpcedbatch have not been passed correctly\n");
        exit(-1);
    }
    else {
        /* check to see if we are to use copy on for the load */
        if ((getenv("TPCD_LOG") != NULL) &&
            (!strcmp(uppercase(getenv("TPCD_LOG")), "YES")))
        {
            /* okay, we have set LOG_RETAIN on so we need to use copy directory
            */
            copyOnOrOff = TRUE;
        }
        else
        {
            /* log retain off don't use copy directory */
            copyOnOrOff = FALSE;
        }
    }

    if (function == 1)
        /* runUF1_fn (updatePair, updateStream); aph 981205 */
        runUF1_fn (updatePair, updateStream, dbname, userid, passwd);
    else
        if (function == 2) {
            //DJD fprintf(stderr, "A-Calling runUF2_fn %d %d %d...\n",
            //DJD updatePair, updateStream, deleteChunk);
            /* runUF2_fn (updatePair, updateStream, deleteChunk); aph 981205 */
            runUF2_fn (updatePair, updateStream, deleteChunk, dbname, userid,
            passwd);
        }
        else {
            fprintf(stderr, "Wrong function to tpcedbatch\n");
            exit(-1);
        }
    }
}

```

```

        exit (0);
    }
}
#endif /* PARALLEL_UPDATES */

/* If no database name is given, then use the one specified in the
environment variable DB2DBDFT, otherwise error */
if (!strcmp(dbname,"0")) {
    testptr = getenv("DB2DBDFT");
    if (testptr == NULL) {
        fprintf(stderr, "\nNo database name has been specified on command ");
        fprintf(stderr, "line\n\nin environment variable DB2DBDFT.");
        display_usage();
    }
    else
        strcpy(dbname,testptr);
}

/* kjd715 */
/*
if (g_struct->c_l_opt->outfile) &&
!strcmp(g_struct->c_l_opt->str_file_name,"0")) {
    fprintf(stderr, "\nMust specify input file for statement list.\n");
    display_usage();
}
*/
/* kjd715 */
}

/*****
/* Converts DECIMAL values to ASCII text */
/*****
int sqlrxd2a(
/*kmw*/
/* C++ */char *decptr,
/* C++ */char *asciiptr,
short prec,
short scal)
{
/* */
int allzero = TRUE;
/* C++ */char *srcptr;
unsigned char sign;
/* C++ */char *targptr, decimal_point = '.';
int rc = 0; /*kmw*/
int tmpint, src_nibble;
int count, j, limit[3];

targptr = &asciiptr[ prec + 1];
*(1 + targptr) = '\0';
srcptr = decptr + prec/2;

/* Validity check sign nibble */
if (((sign = sqlrx_get_right_nibble( *srcptr )) < 0x0a)
|| (prec > SQL_MAXDECIMAL) || (prec < scal ))
{
    goto exit;
}
/** end end if invalid sign value */

limit[ 0 ] = scal; limit[ 1 ] = prec - scal; limit[ 2 ] = 0;
src_nibble = LEFT;
for(j = 0 ; j < 2 ; j++)
{
    for( count = limit[ j ] ; count > 0 ; count-- )
    {
        tmpint = ( (src_nibble == LEFT)?
            sqlrx_get_left_nibble( *srcptr-- ) :
            sqlrx_get_right_nibble( *srcptr ) );
        if( tmpint > 9 )
        {
            goto exit;
        }
    }
}

```

```

    else
        *targptr-- = (/* C++ */char)tmpint + '0';
    src_nibble = ((src_nibble == LEFT) ? RIGHT : LEFT);
    if ( tmpint != 0 ) allzero = FALSE;
} /** end for scal > 0 */

if( j == 0 )
    *targptr-- = decimal_point;
else
    *targptr = (/* C++ */char)((allzero
        || (sign == SQLRX_PREFERRED_PLUS)
        || (sign == 0x0a)
        || (sign == 0x0e)
        || (sign == 0x0f)) ?
        '+' : '-' );
} /** end for limit[ j++ ] > 0 */

exit :
if( rc < 0 )
{
    printf ("The decimal conversion has failed\n");
    exit (-1);
}

return(rc);
} /** sqlrxd2a */

/*****
/
/* Does some setup and initialization like parsing command line */
/* and connecting to database. Returns process id of agent. */
/*****
void init_setup(int argc, char *argv[], struct global_struct *g_struct)
{
    int connect=0;
#ifdef SQLWINT
    char *pid;
#endif
    char temparray[256]="\0";
    int loopvar=0;
    FILE *updateFP;
    FILE *fpSeed;
    char file_name[256] = "\0";
    short seedEntry;
    long lSeed;
    int i;

    /** Parse and process command line options */
    comm_line_parse (argc,argv,g_struct);

/*****
*****/
/* Start the mainline report processing. */
/*****
*****/
if (!strcmp(g_struct->c_l_opt->infile,"0")) {
    instream=stdin;
}
else {
    instream=NULL;
    if ( ( instream = fopen(g_struct->c_l_opt->infile, READMODE)) == NULL ) {
        /* kjd715 */
        fprintf(outstream, "XXThe input file could not be opened.\n\n");
        /* kjd715 */
        fprintf(stdout,"Make sure that the filename is correct.\n");
        fprintf(stdout,"filename = %s\n",g_struct->c_l_opt->infile);
        exit(-1);
    }
    /** open the input file if specified */
}
}

```

```

/* IMPORT (begin) - determine whether we should use the IMPORT api or */
/* LOAD api for loading into the staging tables, default is load */
if (env_tpcd_update_import != NULL)
{
    if (!strcmp(uppercase(env_tpcd_update_import),"TRUE"))
    {
        iImportStagingTbl = 1; /* use import */
    }
    /* DJD */
    else if (!strcmp(uppercase(env_tpcd_update_import),"TF"))
    {
        iImportStagingTbl = 2; /* Table Functions */
    }
}

/* IMPORT (end) */

/* we want to print the seed in the output files to show what seed was */
/* used to generate the queries. */
/* if intStreamNum is -1 then we are running a qualification database */
/* and the default seed has been used so skip this section */
if (g_struct->c_l_opt->intStreamNum >= 0)
{
    /* check to make sure the TPCD_RUNNUMBER environment variable is set.
We */
    /* use this and the stream number to determine which seed was used to */
    /* generate the current set of queries */
    if (getenv("TPCD_RUNNUMBER") == NULL)
    {
        fprintf(stderr,"nThe TPCD_RUNNUMBER environment variable is not
set");
        fprintf(stderr,"....exiting\n");
        exit(-1);
    }
    if (getenv("TPCD_NUMSTREAM") == NULL)
    {
        fprintf(stderr,"nThe TPCD_NUMSTREAM environment variable is not
set");
        fprintf(stderr,"....exiting\n");
        exit(-1);
    }
}

/******
*****
* SEED jen
* we want to print the seed used in the output files. For the seed usage
* we can now reuse the seeds from run to run, therefore all the power runs
* will use the 1st seed in the file, and the throughput streams will use
* the 2nd to #streams+1 seeds.
* determine the seed to use...e.g. given 3 streams will have the following:
*
* Entry in seed file
* TEST      Stream Number  Run 1  Run 2
* power      0              1      1
* throughput 1              2      2
*            2              3      3
*            3              4      4
*
*****
*****/

seedEntry = g_struct->c_l_opt->intStreamNum + 1;
/* end SEED jen */
/* open the generated seed file...if not there, try the default */

sprintf(file_name, "%s%sauditruns%sseedme", env_tpcd_audit_dir,
env_tpcd_path_delim, env_tpcd_path_delim);

if ((fpSeed = fopen(file_name,READMODE)) == NULL )
{
    fprintf(stderr,"nCannot open the seed file, please ensure that\n");
    fprintf(stderr,"the file exists. filename = %s\n",file_name);

```

```

    exit(-1);
}
for (i = 1; i <= seedEntry; i++)
{
    if (feof(fpSeed))
    {
        lSeed = -1; /* seed not available for some reason */
    }
    fscanf(fpSeed,"%ld\n",&lSeed);
}
g_struct->lSeed = lSeed;
fclose(fpSeed);
}

/* check to see if we are to use copy on for the load */
if ((getenv("TPCD_LOG") != NULL ) &&
(!strcmp(uppercase(getenv("TPCD_LOG")), "YES")))
{
    /* okay, we have set LOG_RETAIN on so we need to use copy directory */
    g_struct->copy_on_load = TRUE;
}
else
{
    /* log retain off don't use copy directory */
    g_struct->copy_on_load = FALSE;
}

/******
/*
/* Make sure that DB2 is started. */
/* CONNECT now unless this is a UF stream for a Throughput test. */
/* (aph 98/12/22) */
/******
/

if (g_struct->c_l_opt->update > 1)
{
    /* This is an update function stream in a throughput run. */
    /* Just make sure that DB2 is started. Each UF child will CONNECT itself. */
    if (verbose) fprintf(stderr,"nStarting the DB2 Database Manager Now\n");
    sqlstar ();
}
else
{
    /* In all other cases, CONNECT to the target database. */
    do
    {
        if (!strcmp(userid,"0")) /* No authentication provided */
            EXEC SQL CONNECT TO :dbname;
        else EXEC SQL CONNECT TO :dbname USER :userid USING :passwd;
        if (sqlca.sqlcode == SQLE_RC_NOSTARTG) {
            if (verbose)
                fprintf(stderr,"nStarting the DB2 Database Manager Now\n");
            sqlstar ();
            connect=0;
        }
        else connect=1;
    } while (!connect);
    error_check();
}

/******
*****
* All session initialization is performed at connect time or immediately *
* following and is complete before starting the stream. *
*****
*****/

/* Get start timestamp for stream */
get_start_time(&(g_struct->stream_start_time)); /* TIME_ACC jen*/
strcpy(g_struct->file_time_stamp,
get_time_stamp(T_STAMP_FORM_2,&(g_struct->stream_start_time))); /*
TIME_ACC jen*/

```

```

if (getenv("TPCD_RUN_DIR") != NULL)
    strcpy(g_struct->run_dir, getenv("TPCD_RUN_DIR"));
else
    strcpy(g_struct->run_dir, ".");

/* if we are running a throughput test, then we must report the */
/* stream count information...we will report one file per stream */
/* and amalgamate them after all streams have completed */
/* if the number of streams is greater than 0 then this is a throughput test */
switch (g_struct->c_l_opt->update)
{
    case (2):
    case (5):
        /* update throughput function stream */
        sprintf(file_name, "%s%sstrentuf.%s", g_struct->run_dir,
            env_tpcd_path_delim, g_struct->file_time_stamp);
        break;
    case (3):
    case (4):
        /* update power function stream */
        sprintf(file_name, "%s%spstrentuf.%s", g_struct->run_dir,
            env_tpcd_path_delim, g_struct->file_time_stamp);
        break;
    case (1):
        /* power query stream */
        sprintf(file_name, "%s%spstrentuf.%s", g_struct->run_dir,
            env_tpcd_path_delim,
            g_struct->c_l_opt->intStreamNum, g_struct->file_time_stamp);
        break;
    case (0):
        /* throughput query stream */
        sprintf(file_name, "%s%ssstrentuf.%s", g_struct->run_dir,
            env_tpcd_path_delim,
            g_struct->c_l_opt->intStreamNum, g_struct->file_time_stamp);
        break;
}

if ((g_struct->stream_report_file = fopen(file_name, WRTMODE)) == NULL)
{
    fprintf(stderr, "\nThe output file for the stream count information\n");
    fprintf(stderr, "could not be opened, make sure the filename is correct\n");
    fprintf(stderr, "filename = %s\n", file_name);
    exit(-1);
}

if (g_struct->c_l_opt->update > 1)
{
    /* update function stream */
    fprintf(g_struct->stream_report_file,
        "Update function stream starting at %*. *s\n",
        T_STAMP_3LEN, T_STAMP_3LEN, /* TIME_ACC jen */
        get_time_stamp(T_STAMP_FORM_3, &(g_struct->stream_start_time)));
    /* TIME_ACC jen */
}
else
{
    /* query stream */
    fprintf(g_struct->stream_report_file,
        "Stream number %d starting at %*. *s\n",
        g_struct->c_l_opt->intStreamNum,
        T_STAMP_3LEN, T_STAMP_3LEN, /* TIME_ACC jen */
        get_time_stamp(T_STAMP_FORM_3, &(g_struct->stream_start_time)));
    /* TIME_ACC jen */
}

#ifdef LINUX

    fclose(g_struct->stream_report_file);

#endif

/* set up the update_num_file name so that if we do use semaphores, */
/* we will have a filename to generate the semkey */

```

```

    sprintf(g_struct->update_num_file, "%s%s%s.%s.update.pair.num",
        env_tpcd_audit_dir,
        env_tpcd_path_delim, uppercase(env_tpcd_dbname),
        lowercase(env_user));
    sprintf(g_struct->sem_file, "%s.%s.semfile", env_tpcd_dbname, env_user);
    if (g_struct->c_l_opt->intStreamNum == 0)
    {
        sprintf(g_struct->sem_file2, "%s.%s.semfile2", env_tpcd_dbname, env_user);
    }
    if (verbose) { /* print out the update pair number file for debugging */
        fprintf(stderr, "\n init_setup: stream %d update pair num file = %s\n",
            g_struct->c_l_opt->intStreamNum, g_struct->update_num_file);
    }

    /* update the
$TPCD_AUDIT_DIR/$TPCD_DBNAME.$USER.update.pair.num file */
    /* update pairs have been run */
    if ((g_struct->c_l_opt->update >= 1) && (g_struct->c_l_opt->update < 4))
        /* on or onl, but not */ /* bbe or > 1 */
    {
        updateFP = fopen(g_struct->update_num_file, "r");
        if (updateFP != NULL)
        {
            fscanf(updateFP, "%d", &updatePairStart);
            fclose(updateFP);
            if (g_struct->c_l_opt->intStreamNum == 0) /* on, 1 update pair */
                updatePairStop = updatePairStart + 1;
            else /* only, multiple update pairs, stream number will be total */
                updatePairStop = updatePairStart + g_struct->c_l_opt->intStreamNum;
            currentUpdatePair = updatePairStart;

            if (updatePairStart <= 0)
            {
                fprintf(stderr, "updatePairStart is bogus!");
                exit(-1);
            }
        }
        else
        {
            fprintf(stderr, "\n %s not set up, set this \n", g_struct->update_num_file);
            fprintf(stderr, "file to contain the number of the update pair to \n");
            fprintf(stderr, "run and resubmit\n");
            exit(-1);
        }
    }

    return ;
}

/*****
*****/
/* A function to print out the column titles for a returned set */
/*****
*****/
void print_headings (struct sqllda *sqllda, int *col_lengths)
{
    int col = 0; /* Column number */
    int col_width = 0; /* width of column */
    int max_col_width = 0; /* maximum column width */
    int col_name_length = 0; /* sizeof column name string */
    int col_type = 0; /* column type */

    int total_length = 0; /* accumulator var. for
length of column headings */

    int loopvar = 0;

    char col_name[256] = "\0";
    unsigned char m, n; /* precision and accuracy
for decimal conversion */

    fprintf (outstream, "\n");

```

```

/** loop through for each column in solution set
and determine the maximum column width */

for (col = 0; col < sqlda->sqlvar[0].sqlname.length; col++) {
    col_name_length=sqllda->sqlvar[col].sqlname.length;
    col_type = sqllda->sqlvar[col].sqltype;
    col_width = sqllda->sqlvar[col].sqlllen;
    strncpy(col_name,(char *)sqllda->sqlvar[col].sqlname.data,col_name_length) ;

    switch (col_type)
    {
        case SQL_TYP_SMALL:
        case SQL_TYP_NSMALL: /* @d30369 tlg */
            col_lengths[col] = TPCDBATCH_MAX (col_name_length,6);
            break;
        case SQL_TYP_INTEGER:
        case SQL_TYP_NINTEGER:
            col_lengths[col] = TPCDBATCH_MAX (col_name_length,11);
            break;
        case SQL_TYP_BIGINT: /*kmwBIGINT*/
        case SQL_TYP_NBIGINT:
            col_lengths[col] = TPCDBATCH_MAX (col_name_length,19);
            break;
        case SQL_TYP_CSTR:
        case SQL_TYP_NCSTR:
        case SQL_TYP_DATE:
        case SQL_TYP_NDATE:
        case SQL_TYP_TIME:
        case SQL_TYP_NTIME:
        case SQL_TYP_STAMP:
        case SQL_TYP_NSTAMP:
        case SQL_TYP_CHAR:
        case SQL_TYP_NCHAR:
        case SQL_TYP_VARCHAR:
        case SQL_TYP_NVARCHAR:
        case SQL_TYP_LONG:
        case SQL_TYP_NLONG:
            col_lengths[col] = TPCDBATCH_MAX (col_name_length,col_width);
            break;

        case SQL_TYP_FLOAT:
        case SQL_TYP_NFLOAT:
            /* kmw - note: TPCDBATCH_PRINT_FLOAT_WIDTH > max long
            identifier */
            col_lengths[col] = TPCDBATCH_PRINT_FLOAT_WIDTH;
            break;

        case SQL_TYP_DECIMAL:
        case SQL_TYP_NDECIMAL:

            m=*(struct declen *)&sqllda->sqlvar[col].sqlllen).m;
            n=*(struct declen *)&sqllda->sqlvar[col].sqlllen).n;

            col_lengths[col] = TPCDBATCH_MAX ((int)(m+n), col_name_length);
            /* Special handling for DECIMAL */ /* @d26350 tlg */
            break;

        default:
            fprintf(stderr,"--Unknown column type (%d). Aborting.\n",col_type);
            break;
    }

    fprintf(outstream,"%-*s ",col_lengths[col],col_name_length,col_name);

    total_length += (col_lengths[col] + 2); /* 2 is from padding spaces */
}

fprintf(outstream,"\n");
for (loopvar=0; loopvar < total_length; loopvar++)
    fprintf(outstream,"-");
fprintf(outstream,"\n");
}

```

```

/*****
**/
/* Gets the current system time and prints it out */
/*****
**/
char *get_time_stamp(int form, Timer_struct *time_pointer)
{
    Timer_struct temp_stamp; /* TIME_ACC jen */
    struct tm *tp;
    size_t timeLength = 0;

    /* TIME_ACC jen start */
    if (time_pointer == (Timer_struct *)NULL)
        get_start_time(&temp_stamp);
    else
        temp_stamp = *time_pointer;

    #if defined (SQLUNIX) || defined (SQLAIX)
        tp = localtime((time_t *)&(temp_stamp.tv_sec));
    #elif (defined (SQLOS2) || defined (SQLWINT) || defined (SQLWIN) ||
    defined (SQLDOS))
        tp = localtime(&(temp_stamp.time));
    #else
    #error Unknown operating system
    #endif
    /* TIME_ACC jen stop*/

    if ((form == T_STAMP_FORM_1) || (form == T_STAMP_FORM_3))
    {
        /* SUN fix bbe start */
        #if (defined (SQLWINT) || defined (SQLWIN) || defined (SQLOS2) ||
        defined (SQLDOS))
            timeLength = strftime(newtime,50,"%x %X",tp);
        #elif (defined (SQLUNIX) || defined (SQLAIX))
            timeLength = strftime(newtime,50,"%D %T",tp); /* SUN ...test this */
        #else
        #error Unknown operating system
        #endif
        /* SUN fix bbe stop */
        /* TIME_ACC jen start*/
        if (form == T_STAMP_FORM_3)
        {
            /* concatenate the microsecond/milliseconds on the end of the */
            /* timestamp jen1006 */
            #if defined (SQLUNIX) || defined (SQLAIX)
                sprintf(newtime+timeLength,"%0.6d",temp_stamp.tv_usec);
            #elif (defined (SQLOS2) || defined (SQLWINT) || defined (SQLWIN) ||
            defined (SQLDOS))
                sprintf(newtime+timeLength,"%0.3d",temp_stamp.millitm);
            #else
            #error Unknown operating system
            #endif
            /* TIME_ACC jen stop*/
        }
    }
    else
    {
        if (form == T_STAMP_FORM_2)
            strftime(newtime,50,"%y%m%d-%H%M%S",tp);

        return (newtime);
    }
}

/*****
**/
/* Handle all the processing for the summary table */
/*****
**/

void summary_table (struct global_struct *g_struct)
{

```

```

double arith_mean = 0;
double geo_mean = 0;
int num_stmt = 0;
int num_stmt_for_geo_mean = 0;

double adjusted_a_mean = 0;
double adjusted_g_mean = 0;
double adjusted_g_mean_intern;
double adjusted_max_time = 0;

double Ts = 0; /* different TPC-D metrics */
double Ts1;
double Ts2;
/* double QppD = 0; MARK
double QthD = 0;
double QphD = 0; */

double db_size_frac_part = 0; /* stores the fractional part of db size */
double db_size = 0; /* size in numbers */
char db_size_qualifier[3] = "0"; /* MB, GB or TB */

struct stmt_info
*s_info_ptr,
*s_info_head_ptr,
*max,
*min;

/* Determine the size of the database from the scale factor (1 SF = 1GB) */
if (g_struct->scale_factor < 1.0) {
    db_size = g_struct->scale_factor * 1000;
    strcpy(db_size_qualifier, "MB");
} else if (g_struct->scale_factor >= 1000.0) {
    db_size = g_struct->scale_factor / 1000;
    strcpy(db_size_qualifier, "TB");
} else {
    db_size = g_struct->scale_factor;
    strcpy(db_size_qualifier, "GB");
}

/* computes the fractional part of db_size */
db_size_frac_part = db_size - (int) db_size;

s_info_ptr = g_struct->s_info_ptr; /* Just use a local copy */
s_info_head_ptr = s_info_ptr;

max = s_info_head_ptr;
/* ensure that we are not already setting max to the UF timings */
while ( strstr(max->tag, "UF") != NULL )
    max = max->next;
min = max;

if (g_struct->c_1_opt->outfile) /* create the appropriate output file */
    output_file(g_struct);

/* write the seed used for this run unless it is a qualification run */
/* (qualification runs use the default seed for their queries) or */
/* unless it is the update function stream (no seeds used for this) */
/* (this is an update stream iff update is 2) */
if ((g_struct->c_1_opt->intStreamNum >= 0) &&
    (g_struct->c_1_opt->update != 2)) {
    {
        if (g_struct->lSeed == -1)
        {
            fprintf( ostream, "\nUsing default qgen seed file");
        }
        else
            fprintf( ostream, "\nSeed used for current run = %ld", g_struct->lSeed);
        fprintf( ostream, "\n");
    }

/* print out the stream number if we are in a throughput stream and if */
/* this is not the update stream portion of the throughput test */

```

```

if ( (g_struct->c_1_opt->intStreamNum > 0) &&
    (g_struct->c_1_opt->update != 2) )
{
    fprintf( ostream, "Stream number =
%d\n", g_struct->c_1_opt->intStreamNum);
}
/* print the stream start timestamp to the inter file */
fprintf( ostream, "Stream start time stamp %*.*s\n",
    T_STAMP_3LEN, T_STAMP_3LEN, /* TIME_ACC jen*/
    get_time_stamp(T_STAMP_FORM_3, &(g_struct->stream_start_time)));
/* TIME_ACC jen*/
/* print the stream stop timestamp to the inter file */
fprintf( ostream, "Stream stop time stamp %*.*s\n",
    T_STAMP_3LEN, T_STAMP_3LEN, /* TIME_ACC jen*/
    get_time_stamp(T_STAMP_FORM_3, &(g_struct->stream_end_time)));
/* TIME_ACC jen*/

fprintf( ostream, "\n\nSummary of Results\n===== \n");
fprintf( ostream,
    "\nSequence # Elapsed Time Adjusted Time Start Timestamp End
Timestamp\n\n");

/* Go through the linked list and determine which statement had the
highest and lowest elapsed times */
while ( (s_info_ptr != NULL) && (s_info_ptr != g_struct->s_info_stop_ptr) ) {

    /* check if we are in an update function...if so, we do not want to */
    /* consider the update function times as the min or max time */
    if ( strstr(s_info_ptr->tag, "UF") == NULL )
    {
        /* we are not in an update function */
        if (s_info_ptr->elapsed_time > max->elapsed_time)
            max = s_info_ptr;
        else
            if ((s_info_ptr->elapsed_time < min->elapsed_time)
                && (s_info_ptr->elapsed_time > -1))
                min = s_info_ptr;
    }

    s_info_ptr = s_info_ptr->next;
}

s_info_ptr = s_info_head_ptr;

/** Start from the first structure and go through until the stop
pointer is reached **/
while ( (s_info_ptr != NULL) && (s_info_ptr != g_struct->s_info_stop_ptr) ) {

    if (s_info_ptr->elapsed_time != -1) {
        s_info_ptr->adjusted_time = s_info_ptr->elapsed_time;
        /* determine whether the elapsed times have to be adjusted or not */
        /* if this is an update function, we do not adjust the elapsed time */
        if ( strstr(s_info_ptr->tag, "UF") == NULL )
        {
            /* this is not an update function, adjust time if necessary */
            if (max->elapsed_time/min->elapsed_time > 1000)
            {
                /* jmc fix geo_mean calculation...round adjusted time properly
ROUNDING*/
                adjusted_max_time = max->elapsed_time/1000;
                if (s_info_ptr->elapsed_time < adjusted_max_time)
                {
                    s_info_ptr->adjusted_time =
                        (double)((long)((adjusted_max_time + 0.05) * 10))/10.0;
                    if (s_info_ptr->adjusted_time < 0.1)
                        s_info_ptr->adjusted_time = 0.1;
                }
                /* jmc fix geo_mean calculation...round adjusted time properly
ROUNDING end*/
            }
        }
    }

/* a value was calculated */

```

```

fprintf (outstream,
        "%-5d %-5.5s %15.1f %15.1f %*.*s %*.*s\n",
        s_info_ptr->stmt_num,s_info_ptr->tag,
        s_info_ptr->elapsed_time,s_info_ptr->adjusted_time,
        T_STAMP_1LEN,T_STAMP_1LEN,s_info_ptr->start_stamp, /*
TIME_ACC jen*/
        T_STAMP_1LEN,T_STAMP_1LEN,s_info_ptr->end_stamp); /*
TIME_ACC jen*/

/* Only update arithmetic mean for queries not update functions */
if ( strstr(s_info_ptr->tag,"UF") == NULL )
{
    arith_mean += s_info_ptr->elapsed_time;
    adjusted_a_mean += s_info_ptr->adjusted_time;
}

if(s_info_ptr->elapsed_time > 0) { /* don't bother finding log of
    numbers < 0 */
    geo_mean += log(s_info_ptr->elapsed_time);
    adjusted_g_mean += log(s_info_ptr->adjusted_time);
}

/* Only update num_stmt for queries not update functions */
if ( strstr(s_info_ptr->tag,"UF") == NULL )
    num_stmt ++;
num_stmt_for_geo_mean++;
}

else
    fprintf (outstream,"%-5d %-5.5s %-15s %-15s\n",
        s_info_ptr->stmt_num,
        s_info_ptr->tag,"Not Collected", "Not Collected");

if(s_info_ptr != g_struct->s_info_stop_ptr)
    s_info_ptr=s_info_ptr->next;
}

fprintf(outstream, "\n\nNumber of statements: %d\n\n", s_info_ptr->stmt_num -
1);
/* Calculate the arithmetic and geometric means */

if (geo_mean != 0) { /*Used to test if arith_mean != 0
    Don't bother doing any of this if the
    elapsed time mean is 0 */
    arith_mean = arith_mean / num_stmt;
    adjusted_a_mean = adjusted_a_mean / num_stmt;
    geo_mean = exp(geo_mean / num_stmt_for_geo_mean);
    adjusted_g_mean_intern = adjusted_g_mean; /*MARK*/
    adjusted_g_mean = exp(adjusted_g_mean / num_stmt_for_geo_mean);
}

/* print out all the appropriate information including the
different TPC-D metrics */
/* do not bother with this if we are in an update only stream */
fprintf (outstream, "\nGeom. mean queries %7.3f %15.3f\n",\
    geo_mean,adjusted_g_mean);
if (g_struct->c_l_opt->update < 2)
{
    fprintf (outstream, "Arith. mean queries %7.3f %15.3f\n",\
        arith_mean,adjusted_a_mean);

    fprintf (outstream,
        "\n\nMax Qry %-3.3s %15.1f %15.1f %*.*s %*.*s\n",
        max->tag,max->elapsed_time,max->adjusted_time,
        T_STAMP_1LEN,T_STAMP_1LEN,max->start_stamp, /* TIME_ACC
jen*/
        T_STAMP_1LEN,T_STAMP_1LEN,max->end_stamp); /* TIME_ACC
jen*/
    fprintf (outstream,

```

```

        "Min Qry %-3.3s %15.1f %15.1f %*.*s %*.*s\n",
        min->tag,min->elapsed_time,min->adjusted_time,
        T_STAMP_1LEN,T_STAMP_1LEN,min->start_stamp, /* TIME_ACC
jen*/
        T_STAMP_1LEN,T_STAMP_1LEN,min->end_stamp); /* TIME_ACC
jen*/
    }

if (g_struct->c_l_opt->intStreamNum == 0) {
    /* fprintf (outstream, "\n\nMetrics\n=====\n\n"); */

    /* Increase the Ts measurement by one second since the accuracy of our */
    /* timestamps is only to 1 second and if the start was at 1.01 seconds, */
    /* and the end was at 5.99 seconds, we get a free second ... this will */
    /* be made explicit in the upcoming revision of the spec (after 1.0.1) */
    /* TIME_ACC jen start*/
    /* NOTE this can probably be better coded by changing get_elapsed_time */
    /* to just calculate the elapsed time give a start and an end time, and */
    /* to also give a precision for the calculation (sec, 10ths....). The */
    /* call then will grab a timestamp before calling. Then we can get rid */
    /* of the if def...and just call get_elapsed_time (whcih can handle the */
    /* os differences on its own */

#ifdef (SQLUNIX) || defined (SQLAIX)
    Ts = g_struct->stream_end_time.tv_sec - g_struct->stream_start_time.tv_sec +
1;
    Ts1 = (double)g_struct->stream_start_time.tv_sec +
((double)g_struct->stream_start_time.tv_usec/1000000);
    Ts2 = (double)g_struct->stream_end_time.tv_sec +
((double)g_struct->stream_end_time.tv_usec/1000000);

#elif (defined (SQLOS2) || defined (SQLWINT) || defined (SQLWIN) ||
defined (SQLDOS))
    Ts = g_struct->stream_end_time.time - g_struct->stream_start_time.time + 1;
    Ts1 = (double)g_struct->stream_start_time.time +
((double)g_struct->stream_start_time.millitm/1000);
    Ts2 = (double)g_struct->stream_end_time.time +
((double)g_struct->stream_end_time.millitm/1000);

#else
#error Unknown operating system
#endif

    /* TIME_ACC jen stop*/

    /* MARK
    ##Now do in calcmetrics.pl##
    QppD = (3600 * g_struct->scale_factor) / adjusted_g_mean;
    QthD = (num_stmt * 3600 * g_struct->scale_factor) / Ts;
    QphD = sqrt(QppD*QthD);
    */
    /* if the decimal part has some meaningful value then print the database size
    with decimal part; otherwise just print the integer part */

    fprintf (outstream,
        "\nGeometric mean interim value = %10.3f\n\nStream Ts %11 =
%10.0f\n\nStream start int representation %11 = %f\n\nStream stop int
representation %11 = %f",
        adjusted_g_mean_intern,Ts,Ts1,Ts2);
    }
}

/*****
/* free up all the elements of the sqlda after done processing */
*****/
void free_sqlda (struct sqlda *sqlda, int select_status) /* @d30369 tlg */
{
    int loopvar;

    if (select_status == TPCDBATCH_SELECT)
        for (loopvar=0; loopvar<sqlda->sqld; loopvar++) {
            free(sqlda->sqlvar[loopvar].sqldata);

```



```

    free(sqlda->sqlvar[loopvar].sqlind);
}

free(sqlda);
sqlda_allocated = 0; /* fix free() problem on NT
                    wlc 090597 */
}

/*****
/* processing to run the insert update function */
*****/
void runUF1 ( struct global_struct *g_struct, int updatePair )
{
    char statement[3000];
    char sourcedir[256];

    int split_updates = 2; /* no. of ways update records are split */
    int concurrent_inserts = 2; /* jenCI no of concurrent updates to be */
    /* jenCI run at once */
    int loop_updates = 1; /* jenCI no of updates to be run in one */
    /* jenCI "concurrent" invocation. should */
    /* jenCI be split_updates / concurrent_inserts */

    int i;
    int streamNum;
#ifdef SQLWINT
    /* PROCESS_INFORMATION childprocess[100]; */
    char commandline[256];
    HANDLE su_hSem;
    char UF1_semfile[256];
#else
    int childpid[100];
    int su_semid; /* semaphore for controlling split updates */
    key_t su_semkey; /* key to generate semid */
#endif
    if (g_struct->c_l_opt->intStreamNum == 0)
        streamNum = 0;
    else
        streamNum = currentUpdatePair - updatePairStart + 1;

    fprintf( outstream, "UF1 for update pair %d, stream %d, starting\n", updatePair,
streamNum);

    /* Start by loading the data into the staging table at each node */
    /* The orderkeys were split earlier by the split_updates program */
    if (env_tpcd_audit_dir != NULL)
        strcpy(sourcedir, env_tpcd_audit_dir);
    else
        strcpy(sourcedir, ".");

    /* Load the orderkeys into the staging table */
    /* In SMP environments one could use a load command but by using a */
    /* script we can keep the code common */
#ifdef SQLWINT
    sprintf (statement, "perl %s\\tools\\ploaduf1 %d\n", sourcedir, updatePair);
#else
    sprintf (statement, "perl %s/tools/ploaduf1 %d 1", sourcedir, updatePair);
#endif
    if (system(statement))
    {
        fprintf (stderr, "ploaduf1 failed for UF1, examine UF1.log for cause.
Exiting.\n");
        if (verbose)
            fprintf (stderr,
                "ploaduf1 failed for UF1, examine UF1.log for cause. Exiting.\n");
        exit (-1);
    }

    fprintf (outstream, "load_update finished for UF1.\n");

    if (getenv ("TPCD_SPLIT_UPDATES") != NULL)
        split_updates = atoi (getenv ("TPCD_SPLIT_UPDATES"));

```

```

    if (getenv ("TPCD_CONCURRENT_INSERTS") != NULL)
/*jenCI*/
        concurrent_inserts = atoi (getenv ("TPCD_CONCURRENT_INSERTS"));
/*jenCI*/
    loop_updates = split_updates / concurrent_inserts; /*jenCI*/

#ifdef SQLWINT
    /* we will use the tpcd.setup file to generate the semaphore key */
    if (getenv ("TPCD_AUDIT_DIR") != NULL) /*begin SEMA */
    {
        /* this is assuming that you will be running this from 0th node */
        sprintf(sourcefile, "%s%ctools%ctpcd.setup",
            getenv("TPCD_AUDIT_DIR"), PATH_DELIM, PATH_DELIM);
    }
    else
    {
        fprintf (stderr, "runUF1 Can't open UF1 semaphore file,TPCD_AUDIT_DIR
is not defined.\n");
        exit (-1);
    }
/*end SEMA */
    su_semkey = ftok (sourcefile, 'J');
    if ((su_semid = semget (su_semkey, 1, IPC_CREAT|S_IRUSR|S_IWUSR)) <
0)
    {
        fprintf (stderr, "Cannot get semaphore! semget failed: errno = %d\n", errno);
        exit (-1);
    }
#else /* SQLWINT */
    sprintf (UF1_semfile, "%s.%s.UF1.semfile", env_tpcd_dbname, env_user);
    su_hSem = CreateSemaphore(NULL, 0,
        concurrent_inserts, /*jenCI*/
        (LPCTSTR)(UF1_semfile));
    if (su_hSem == NULL)
    {
        fprintf(stderr,
            "CreateSemaphore (ready semaphore) failed, GetLastError: %d,
quitting\n",
            GetLastError());
        exit(-1);
    }
#endif /* SQLWINT */
    if (verbose) fprintf(stderr, "Semaphore created successfully!\n");

    fclose(outstream); /* to prevent multiple header caused by forking
                    wlc 081397 */

    for (i=0; i < concurrent_inserts; i++) /*jenCI*/
    {
#ifdef SQLWINT
        if ((childpid[i] = fork()) == 0)
        {
            /* runUF1_fn (updatePair, i); aph 981205 */
            runUF1_fn (updatePair, i, dbname, userid, passwd);
        }
        else
        {
            /* This is the parent */
            if (verbose)
                fprintf (stderr, "stream #%d started with pid %d\n", i, childpid[i]);
        }
#else /* SQLWINT */
        sprintf (commandline,
            "start /b %s\\auditruns\\tpcdbatch.exe -z -d %s -i %d -j 1 -k %d",
            env_tpcd_audit_dir, dbname, updatePair, i ); /* aph 082797 */

        system (commandline);
#endif /* SQLWINT */
        //DJD 021004 sleep (UF1_SLEEP);
    }

    /* All children have been created, now wait for them to finish */
#ifdef SQLWINT
    if (sem_op (su_semid, 0, concurrent_inserts * -1) != 0) /*jenCI*/

```

```

        /*jenSEM*/
        fprintf(stderr,
            "Failure to wait on insert semaphore with %d of children\n",
            concurrent_inserts);
        exit(1);
    } /*jenSEM*/
    semctl(su_sem, 0, IPC_RMID, 0);
#else
    for (i = 0; i < concurrent_inserts; i++) /*jenCI*/
    {
        if (verbose)
        {
            fprintf(stderr, "About to wait again ...Sets to wait for %d\n",
                concurrent_inserts - i); /*jenCI*/
        }
        if (WaitForSingleObject(su_hSem, INFINITE) == WAIT_FAILED)
        {
            fprintf(stderr,
                "WaitForSingleObject (su_hSem) failed in runUF1 on set %d, error:
%d, quitting\n",
                i, GetLastError());
            exit(-1);
        }
    }
    if (!CloseHandle(su_hSem))
    {
        fprintf(stderr,
            "RunUF1 Close Sem failed - Last Error: %d\n", GetLastError());
        /* no exit here */
    }
#endif

    if ( (outstream = fopen(outstreamfilename, APPENDMODE)) == NULL )
    {
        fprintf(stderr, "\nThe output file could not be opened. ");
        fprintf(stderr, "Make sure that the filename is correct.\n");
        fprintf(stderr, "filename = %s\n", outstreamfilename);
        exit(-1);
    }

    fprintf(outstream, "UF1 for update pair %d complete\n", updatePair);
}

/* runUF1_fn() moved to another SQC file          aph 981205 */

/*****
/* processing to run the delete update function */
*****/
void runUF2 ( struct global_struct *g_struct, int updatePair )
{
    char statement[3000];
    char sourcedir[256];

    int split_deletes = 1; /* no. of ways update records are split @dxxxxxhar */
    int concurrent_deletes = 1; /* number of database partitions DELjen */
    int chunks_per_concurrent_delete = 1;

    int i;
    int streamNum;
#ifdef SQLWINT
    char commandline[256];
    HANDLE su_hSem;
    char UF2_semfile[256];
#else
    int childpid[100];
    char sourcefile[256];
    int su_sem; /* semaphore for controlling split updates */
    key_t su_semkey; /* key to generate semid */
#endif
    if (g_struct->c_1_opt->intStreamNum == 0)
        streamNum = 0;
    else

```

```

        streamNum = currentUpdatePair - updatePairStart + 1;

    fprintf(outstream, "UF2 for update pair %d, stream %d, starting\n", updatePair,
        streamNum);

    /* We need to know both how many chunks there are and how many chunks */
    /* are to be executed by each concurrent UF2 process. More chunks means */
    /* both smaller transactions (less deadlock) and more potential concurrency */

    /* How many "chunks" have the orderkeys been divided into? */
    if (getenv("TPCD_SPLIT_DELETES") != NULL)
        split_deletes = atoi(getenv("TPCD_SPLIT_DELETES"));
    /* How many deletes should run concurrently */
    if (getenv("TPCD_CONCURRENT_DELETES") != NULL)
        concurrent_deletes = atoi(getenv("TPCD_CONCURRENT_DELETES"));
    /* How many chunks in each concurrently running delete process */
    chunks_per_concurrent_delete = split_deletes / concurrent_deletes;

    /* Start by loading the data into the staging table at each node */
    /* The orderkeys were split earlier by the split_updates program */
    if (env_tpcd_audit_dir != NULL)
        strcpy(sourcedir, env_tpcd_audit_dir);
    else
        strcpy(sourcedir, ".");

    /* Load the orderkeys into the staging table */
    /* In SMP environments one could use a load command but by using a */
    /* script we can keep the code common */

#ifdef SQLWINT
    sprintf(statement, "perl %s\\tools\\ploaduf2 %d\n", sourcedir, updatePair);
#else
    sprintf(statement, "perl %s/tools/ploaduf2 %d 2", sourcedir, updatePair);
#endif
    if (system(statement))
    {
        fprintf(stderr, "ploaduf2 failed for UF2, examine UF2.log for cause.
Exiting.\n");
        exit(-1);
    }
    fprintf(outstream, "ploaduf2 finished for UF2.\n");

    fclose(outstream); /* to prevent multiple header caused by forking
                        wlc 081397 */

    /* Next we need to get ready to launch a bunch of concurrent processes */
#ifdef SQLWINT
    /* we will use the tpcd.setup file to generate the semaphore key begin
SEMA */
    if (getenv("TPCD_AUDIT_DIR") != NULL)
    {
        sprintf(sourcefile, "%s\\tools\\ctpcd.setup",
            getenv("TPCD_AUDIT_DIR"), PATH_DELIM, PATH_DELIM);
    }
    else
    {
        fprintf(stderr, "runUF2 Can't open UF2 semaphore file, TPCD_AUDIT_DIR
is not defined.\n");
        exit(-1);
    }

    su_semkey = ftok(sourcefile, 'D'); /* use D for deletes */
    /* end SEMA */
    if ( (su_sem = semget(su_semkey, 1, IPC_CREAT | S_IRUSR | S_IWUSR)) <
0)
    {
        fprintf(stderr, "UF2 Can't get semaphore! semget failed: errno = %d\n",
            errno);
        exit(-1);
    }
#else
    sprintf(UF2_semfile, "%s.%s.UF2.semfile", env_tpcd_dbname, env_user);

```

```

//DJD fprintf(stderr,"UF2 semfile = %s\n",UF2_semfile);
su_hSem = CreateSemaphore(NULL, 0,
    concurrent_deletes,
    (LPCTSTR)(UF2_semfile));
if (su_hSem == NULL)
{
    fprintf(stderr,
        "CreateSemaphore (ready semaphore) failed, GetLastError: %d,
quitting\n",
        GetLastError());
    exit(-1);
}
fprintf(stderr,"Semaphore created successfully!\n");
#endif

for (i=0; i < concurrent_deletes; i++)
{
#ifdef SQLWINT
    if ((childpid[i] = fork()) == 0)
    {
        fprintf(stderr, "B-Calling runUF2_fn %d %d %d ...n",
            updatePair, i, chunks_per_concurrent_delete);
        /* runUF2_fn (updatePair, i, chunks_per_concurrent_delete);  aph 981205
*/
        runUF2_fn (updatePair, i, chunks_per_concurrent_delete, dbname, userid,
passwd);
    }
    else
    {
        /* This is the parent */
        if (verbose)
            fprintf (stderr, "stream #%d started with pid %d\n", i, childpid[i]);
    }
}
#else
{
    /* SECURITY_ATTRIBUTES sec_process;
    SECURITY_ATTRIBUTES sec_thread; */
    /* NEED TO FIX THIS UP - KBS 98/10/20 */

    sprintf (commandline,
        "start /b %s\\auditruns\\tpcdbatch.exe -z -d %s -i %d -j 2 -k %d -x %d",
        env_tpcd_audit_dir, dbname, updatePair, i,
chunks_per_concurrent_delete ); /* aph */
    /* the -x parm should be passed at 0...not 100% sure of this jen */
    //DJD fprintf(stderr, "commandline= %s\n", commandline);
    system (commandline);
    //DJD 021004 sleep (UF2_SLEEP);
}
#endif
}

/* All children have been created, now wait for them to finish */
#ifdef SQLWINT
    fprintf(stderr, "About to wait on the semaphore...\n");
    if (sem_op (su_semid, 0, concurrent_deletes * -1) != 0) /*jenSEM*/
    {
        /*jenSEM*/
        fprintf(stderr,
            "Failure to update wait on delete semaphore with %d children\n",
concurrent_deletes);
        exit(1);
    }
    /*jenSEM*/
    semctl (su_semid, 0, IPC_RMID, 0);
#else
    // for (i = 0; i < split_deletes; i++) //DJD Waits forever.....
    for (i = 0; i < concurrent_deletes; i++)
    {
        if (verbose)
        {
            fprintf(stderr,"About to wait again ...Sets to wait for %d\n",
split_deletes - i);
            fprintf(stderr,"About to wait again ...Sets to wait for %d\n",
concurrent_deletes - i);
        }
    }
    if (WaitForSingleObject(su_hSem, INFINITE) == WAIT_FAILED)

```

```

{
    fprintf(stderr,
        "WaitForSingleObject (su_hSem) failed on set %d, error: %d,
quitting\n",
        i, GetLastError());
    exit(-1);
}
}
if (! CloseHandle(su_hSem))
{
    fprintf(stderr, "Close Sem failed - Last Error: %d\n", GetLastError());
    /* no exit here */
}
}
#endif

if( (outstream = fopen(outstreamfilename, APPENDMODE)) == NULL )
{
    fprintf(stderr,"The output file could not be opened. ");
    fprintf(stderr,"Make sure that the filename is correct.\n");
    fprintf(stderr,"filename = %s\n",outstreamfilename);
    exit(-1);
}

fprintf(ostream,"UF2 for update pair %d complete\n",updatePair);
}

/* runUF2_fn() moved to another SQC file          aph 981205 */

/*-----*/
/*    General semaphore function.                */
/*-----*/
#ifdef SQLWINT
int sem_op (int semid, int semnum, int value)
{
    struct sembuf sembuf; /* = {semnum, value, 0}; */
    sembuf.sem_num = semnum;
    sembuf.sem_op = value;
    sembuf.sem_flg = 0;

    if (semop(semid,&sembuf,1) < 0)
    {
        fprintf(stderr,"ERROR*** sem_op errorno = %d\n", errno);
        return(-1);
        /* exit(1); */
    }
    return (0); /* successful return jenSEM */
}
}
#endif

/*****
*/
/* Determines the proper name for the output file to
be generated for a particular TPC-D query, update function, or
interval summary */
/*****
*/
void output_file(struct global_struct *g_struct)
{
    char file_name[256] = "\0";
    char run_dir[150] = "\0";
    char time_stamp[50] = "\0";
    char delim[2] = "\0";
    int qnum=0, found=0; /* kjd715 */
    char input_ln[256] = "\0"; /* kjd715 */
    char tag[128] = "\0"; /* kjd715 */

    strcpy(run_dir,g_struct->run_dir);
    sprintf(delim,"%s",env_tpcd_path_delim);
    strcpy(time_stamp,g_struct->file_time_stamp);
    /* kjd715 */
    if (g_struct->stream_list == NULL)

```

```

{
    if((g_struct->stream_list =
        fopen(g_struct->c_l_opt->infile, READMODE)) == NULL)
    {
        fprintf(stderr, "\nThe input file could not be opened.");
        fprintf(stderr, "Make sure that the filename is correct.\n");
        exit(-1);
    }
}
found = 0;
do {
    fscanf(g_struct->stream_list, "%n%[\n]\n", input_ln);
    if (strstr(input_ln, "--#TAG") == input_ln)
    {
        found = 1;
        strcpy(tag, (input_ln + sizeof("--#TAG")));
        if (strcmp(tag, "UF", 2) == 0)
            qnum = atoi(tag + 2) * (-1);
        else if (strcmp(tag, "Q", 1) == 0)
        {
            /* for query 15a the 'a' must be trimmed */
            /* off before converting to integer */
            if (strlen(tag) > 3)
                tag[3] = '\0';
            qnum = atoi(tag + 1);
        }
    }

    if (feof(g_struct->stream_list))
        found = 1;

} while (!found);
/*
if ((g_struct->stream_list =
    fopen(g_struct->c_l_opt->str_file_name, READMODE)) == NULL)
{
    fprintf(stderr, "\nThe stream list file could not be opened.");
    fprintf(stderr, "Make sure that the filename is correct.\n");
    exit(-1);
}

fscanf(g_struct->stream_list, "%d", &qnum);
*/
/* kjd715 */

switch (g_struct->c_l_opt->intStreamNum)
{
case -1: /* qualifying */
    sprintf(file_name, "%s%sqryqual%02d.%s", run_dir, delim, qnum, time_stamp);
    break;
case 0: /* power tests */
    if (qnum < 0) /* update functions */
        sprintf(file_name, "%s%smps00uf%d.%02d.%s", run_dir, delim, abs(qnum), \
            currentUpdatePair, time_stamp);
    else
        sprintf(file_name, "%s%smpqry%02d.%s", run_dir, delim, qnum, time_stamp);
    break;

default:
    /* if (qnum < 0) - replaced by berni 96/03/26 */
    if (g_struct->c_l_opt->update == 2 ||
        g_struct->c_l_opt->update == 5)
        sprintf(file_name, "%s%smts%02duf%d.%02d.%s", run_dir, delim, \
            currentUpdatePair - updatePairStart + 1, abs(qnum), \
            currentUpdatePair, time_stamp);
    else
        sprintf(file_name, "%s%smts%dqry%02d.%s", run_dir, delim, \
            g_struct->c_l_opt->intStreamNum, qnum, time_stamp);
    break;
}

if (g_struct->c_flags->eo_infile)

```

```

if (g_struct->c_l_opt->update == 2 ||
    g_struct->c_l_opt->update == 5)
    sprintf(file_name, "%s%smtufinter.%s", run_dir, delim, time_stamp);
else
    switch (g_struct->c_l_opt->intStreamNum) {
        case -1:
            sprintf(file_name, "%s%sqryqualinter.%s", run_dir, delim, time_stamp);
            break;
        case 0:
            /* sprintf(file_name, "%s%smpinter.%s", run_dir, delim, time_stamp); */
            if (g_struct->c_l_opt->update == 1)
                sprintf(file_name, "%s%smpqinter.%s", run_dir, delim, time_stamp);
            else
                sprintf(file_name, "%s%smpufinter.%s", run_dir, delim, time_stamp);
            break;
        default:
            if (g_struct->c_l_opt->intStreamNum > 0)
                sprintf(file_name, "%s%smts%dinter.%s", run_dir, delim, g_struct->c_l_opt->intStreamNum, time_stamp);
            else
                fprintf(stderr, "Invalid stream number specified\n");
            break;
    }

strcpy(outstreamfilename, file_name); /* wlc 081397 */

if (!feof(instream) || g_struct->c_flags->eo_infile)
    /* Only create an output file if there are input
    statements left to process, or if we're all done
    and want to print out the summary table file */
    if (outstream = fopen(file_name, WRITEMODE)) == NULL ) {
        fprintf(stderr, "\nThe output file could not be opened. ");
        fprintf(stderr, "Make sure that the filename is correct.\n");
        fprintf(stderr, "filename = %s\n", file_name);
        exit(-1);
    }

return;
}

/*****
*/
/* Determine whether or not we should break out of the block loop
because of an end of file, end of block, or update function.
Also handle some semaphore stuff for update functions */
/*****
*/
int PreSQLprocess(struct global_struct *g_struct, Timer_struct *start_time)
{
    int rc = 1;
    FILE *updateFP;
#ifdef SQLWINT
    int semid; /* semaphore for controlling UFs */
    key_t semkey; /* key to generate semid */
#else
    int SemTimeout = 600000; /* Des time out period of 1 minute */
#endif

    switch (g_struct->c_flags->select_status)
    {
        case TPCDBATCH_NONSQL:
            g_struct->s_info_stop_ptr = g_struct->s_info_ptr;
            /* if we're at the end of the input file, set the stop
            pointer to this structure */
            rc = FALSE;
            break;
        case TPCDBATCH_EOBLOCK:
            rc = FALSE;
            break;
        case TPCDBATCH_INSERT:
            /* we have to check whether or not this is a throughput */
            /* test, and if it is, we have to set up a semaphore to */

```

```

/* control when the update functions are run. We want */
/* them to be run after all the query streams have finished. */
/* What we do is set up the semaphore here, decrement it */
/* in the query streams, and wait for it to get cleared */
/* before we allow the UFs to run. */
/* Note: we only set up the semaphore if: */
/* 1. we are running the throughput test (num of */
/* streams > 0) */
/* 2. we are at the first UF1 (i.e. this is the */
/* case where currentUpdatePair = updatePairStart */
/* we also want to check the sem_on element in the global */
/* structure to see if we want to use semaphores or let */
/* the calling script do the synchronization of the update */
/* stream */
if ( semcontrol == 1 )
{
/* yes we are to be using semaphores */
/* is this the 1st time into update function 1 (uf1)? */
if (currentUpdatePair == updatePairStart )
{
/* create the semaphores */
create_semaphores(g_struct);
if (g_struct->c_l_opt->intStreamNum != 0)
/* wait period for runthroughput updates */
throughput_wait(g_struct);
}
/* otherwise continue to run*/
}
if ((g_struct->c_l_opt->update == 3) || (g_struct->c_l_opt->update == 4))
{
get_start_time(start_time);
strcpy(g_struct->s_info_ptr->start_stamp,
get_time_stamp(T_STAMP_FORM_3,start_time)); /* TIME_ACC
jen*/
/* write the start timestamp to the file...if this is not a qualification */
/* run, then write the seed used as well */
fprintf( outstream,"Start timestamp %*.s \n",
T_STAMP_3LEN,T_STAMP_3LEN, /* TIME_ACC jen*/
g_struct->s_info_ptr->start_stamp);
if (g_struct->c_l_opt->intStreamNum >= 0)
{
if (g_struct->lSeed == -1)
{
fprintf( outstream,"Using default qgen seed file");
}
else
fprintf( outstream,"Seed used = %ld",g_struct->lSeed);
fprintf( outstream,"\n");
}
}
if (g_struct->c_l_opt->update < 4){
/* run only if updates are enabled */
runUF1(g_struct, currentUpdatePair);
}

rc = FALSE;
if ((g_struct->c_l_opt->intStreamNum == 0) && (semcontrol == 1))
/* RUNPOWER: release first semaphore so the queries can run */
release_semaphore(g_struct, INSERT_POWER_SEM);
break;
case TPCDBATCH_DELETE:
if ((g_struct->c_l_opt->intStreamNum == 0) && (semcontrol == 1))
{
/* RUNPOWER: wait for queries to finish */
/* waiting on QUERY_POWER_SEM semaphore */
runpower_wait(g_struct, QUERY_POWER_SEM);
}
if ((g_struct->c_l_opt->update == 3) || (g_struct->c_l_opt->update == 4))
{
get_start_time(start_time);
strcpy(g_struct->s_info_ptr->start_stamp,
get_time_stamp(T_STAMP_FORM_3,start_time)); /* TIME_ACC
jen*/
/* write the start timestamp to the file...if this is not a qualification */

```

```

/* run, then write the seed used as well */
fprintf( outstream,"Start timestamp %*.s \n",
T_STAMP_3LEN,T_STAMP_3LEN, /* TIME_ACC jen*/
g_struct->s_info_ptr->start_stamp);
if (g_struct->c_l_opt->intStreamNum >= 0)
{
if (g_struct->lSeed == -1)
{
fprintf( outstream,"Using default qgen seed file");
}
else
fprintf( outstream,"Seed used = %ld",g_struct->lSeed);
fprintf( outstream,"\n");
}
}
if (g_struct->c_l_opt->update < 4){
/* run only if updates are enabled */
runUF2(g_struct, currentUpdatePair);
if (g_struct->c_l_opt->intStreamNum == 0)
/* RUNPOWER */
fprintf(stderr, "UF2 completed\n");
}
currentUpdatePair += 1;
/* update the update.pair.num file to reflect the successfully completed */
/* update pair */
if (g_struct->c_l_opt->update < 4)
{ /*jen*/
#ifdef NO_INCREMENT
/* don't update the pair, only for my testing - Haider */
updateFP = fopen(g_struct->update_num_file,"w");
fprintf(updateFP,"%d\n",currentUpdatePair);
fclose(updateFP);
#endif
} /*jen*/
rc = FALSE;
break;
}
return(rc);
}

/*****
*****/
/* Handles actual processing of SQL statement. Initializes the SQLDA
for returned rows, does PREPARE, DECLARE, and OPEN statements and
executed multiple FETCHes as needed. If not a SELECT statement,
goes into EXECUTE IMMEDIATE section */
/*****
*****/
void SQLprocess(struct global_struct *g_struct)
{
int rc = 0; /* 912RETRY */
int rows_fetch = 0;
long sqlcode = SQL_RC_E911; /* Temporary sqlcode to test
for deadlocks */
int max_wait = 1; /* Maximum number of retries
for deadlock scenario */

int col_lengths[TPCDBATCH_MAX_COLS]; /* array containing widths of
columns in returned set */
struct stmt_info *s_info_ptr;

s_info_ptr = g_struct->s_info_ptr;
/*****
*****/
/* grab storage for the SQLDA */
/*****
*****/
if ((sqlda=(struct sqlda *)malloc(SQLDASIZE(100))) == NULL)
mem_error("allocating sqlda");

sqlda->sqln = TPCDBATCH_MAX_COLS; /* @d30369 tlg */

```

```

/* Error-recovery code for errors resulting from multi-stream errors */

while (((sqlcode == SQL_RC_E911) ||
      (sqlcode == SQL_RC_E912) ||
      (sqlcode == SQL_RC_E901)) &&
      (max_wait < MAXWAIT) &&
      (rc==0))
{

    sqlcode = 0;      /* Re-initialize sqlcode to avoid infinite-loop */
    if (g_struct->c_flags->select_status == TPCDBATCH_SELECT)
    {
        /* Enter this loop if SQL stmt is a SELECT */
        EXEC SQL PREPARE STMT1 INTO :sqllda FROM :stmt_str;

        sqlcode = error_check();
        if (sqlcode < 0)
        {
            fprintf(stderr, "\nPrepare failed. Stopping this query.\n");
            rc = -1;
        }
        else /* print out the column headings for the answer set */
        {
            print_headings(sqllda, col_lengths);      /* @d22817 tlg */

            allocate_sqllda(sqllda); /* This is where we set storage for the */
                                     /* SQLDA based on the column types in */
                                     /* the answer set table. */

            EXEC SQL DECLARE DYNCUR CURSOR FOR STMT1;

            EXEC SQL OPEN DYNCUR;
            sqlcode = error_check();

            if (sqlcode < 0) /* we ran into an error of some kind KBS 98/09/28 */
            {
                max_wait++;
                fprintf(stderr, "\nAn error has been detected on open...Retrying...\n");
                SleepSome(10);
            }
            else
            {

                /* Fetch appropriate number of rows and determine whether or not to
                */

                /* send them to file. */

                /* Fetch appropriate number of rows and determine whether or not to
                */

                rows_fetch = 0;

                do
                {
                    /* Keep fetching as long as we haven't finished reading
                    all the rows and we haven't gone past the limits set
                    in the control string */

                    EXEC SQL FETCH DYNCUR USING DESCRIPTOR :sqllda;
                    if (sqlca.sqlcode == 100)
                    {
                        sqlcode = sqlca.sqlcode;
                    }
                    else
                    {
                        sqlcode = error_check();
                    }
                }
                if (sqlcode == 0)
                {
                    rows_fetch++;
                }
            }
        }
    }
}

```

```

        if ((rows_fetch <= s_info_ptr->max_rows_out) ||
            (s_info_ptr->max_rows_out == -1))
            echo_sqllda(sqllda, col_lengths);
    }
    else if (sqlcode < 0)
    {
        max_wait++;
        fprintf(stderr, "\nAn error has been detected on
fetch...Retrying...\n");
        SleepSome(10);
    }
    } while ((sqlcode == 0) && \
            ((s_info_ptr->max_rows_fetch == -1) || \
             (rows_fetch < s_info_ptr->max_rows_fetch))) );
    /* end of successful open */
    /* end of successful prepare */
} /* End of block for handling SELECT statements */

else
{
    /* SQL statement is not a SELECT */
    EXEC SQL EXECUTE IMMEDIATE :stmt_str;
    sqlcode = error_check();

    if (sqlcode < 0)
    {
        max_wait++;
        fprintf(stderr, "\nAn error has been detected on execute
immediate...Retrying...\n");
        SleepSome(10);
    }
} /* end of block for handling NON-select statements */

if ((sqlcode >= 0) &&
    (g_struct->c_flags->select_status == TPCDBATCH_SELECT))
{
    /* we opened a cursor before */
    EXEC SQL CLOSE DYNCUR;
    sqlcode = error_check();

    if ((s_info_ptr->max_rows_fetch == -1) ||
        (rows_fetch < s_info_ptr->max_rows_fetch))
    #ifndef SQLPTX
        fprintf(outstream, "\n\nNumber of rows retrieved is: %6d",
            rows_fetch);
    else
        fprintf(outstream, "\n\nNumber of rows retrieved is: %6d",
            s_info_ptr->max_rows_fetch);
    #else
        fprintf(outstream, "\n\nNumber of rows retrieved is: %6d",
            rows_fetch);
    else
        fprintf(outstream, "\n\nNumber of rows retrieved is: %6d",
            s_info_ptr->max_rows_fetch);
    #endif
} /* @d28763 tlg */

if (s_info_ptr->query_block == FALSE) /* if block is off don't loop */
    g_struct->c_flags->eo_block = TRUE;

} /* end of while loop to retry if needed */

} /* end of SQLprocess */

/* performs some operations after a statement has been processed,
including doing a COMMIT if necessary, and calculating the
elapsed time. Also initializes a new stmt_info structure
for the next block of statements */

int PostSQLprocess(struct global_struct *g_struct, Timer_struct *start_time)
{
    struct stmt_info *s_info_ptr;

```

```

Timer_struct    end_t;    /* end point for elapsed time */

#if DEBUG
    fprintf(outstream, "In PostgreSQLprocess\n");
#endif

s_info_ptr = g_struct->s_info_ptr;

if(g_struct->c_flags->select_status == TPCDBATCH_NONSQL)
    return FALSE; /* get out if we've reached the end of input file */

if(g_struct->c_l_opt->update > 1)
{
    /* This is an update function stream. There is no need to COMMIT. */
    /* Each UF child will COMMIT its own transactions. */
    ;
}
else
{
    /* For non-UF cases, COMMIT now. */
    if(g_struct->c_l_opt->a_commit) {
        EXEC SQL COMMIT WORK;
        error_check();          /* @d22275 tlg */
    }
}

fflush(outstream);

s_info_ptr->elapse_time = get_elapsed_time(start_time);

if(g_struct->c_flags->time_stamp == TRUE)          /* @d25594 tlg */
    get_start_time(&end_t); /* Get the end time */
    strcpy(s_info_ptr->end_stamp,
        get_time_stamp(T_STAMP_FORM_3, &end_t));
    /*get_time_stamp(T_STAMP_FORM_3, (time_t) NULL));*/

/* BBE: Pass on time stamp values for the next query */
temp_time_struct = end_t;
strcpy(temp_time_stamp, s_info_ptr->end_stamp);

/* write the start timestamp to the file */
fprintf(outstream, "\n\nStop timestamp %*.s\n",
    T_STAMP_3LEN, T_STAMP_3LEN, /* TIME_ACC jen */
    s_info_ptr->end_stamp);

/* DJD print elapsed time in seconds */
fprintf(outstream, "Query Time = %15.1f secs\n", s_info_ptr->elapse_time);

/** Allocate space for a new stmt_info structure */ /* @d24993 tlg */
s_info_ptr->next =
    (struct stmt_info *) malloc(sizeof(struct stmt_info));
if(s_info_ptr->next != NULL) {
    memset(s_info_ptr->next, '0', sizeof(struct stmt_info));
    /** Transfer details from one structure to another for
        to apply for the next statement */
    s_info_ptr->next->stmt_num = s_info_ptr->stmt_num + 1;
    s_info_ptr->next->max_rows_fetch = s_info_ptr->max_rows_fetch;
    s_info_ptr->next->max_rows_out = s_info_ptr->max_rows_out;

    s_info_ptr->next->query_block = s_info_ptr->query_block;
    s_info_ptr->next->elapse_time = -1;

    s_info_ptr = s_info_ptr->next;
}
else {
    mem_error("allocating next stmt structure. Exiting\n");
    exit(-1);
}

/** Set the stop and travelling pointer to the current info structure */
g_struct->s_info_stop_ptr = g_struct->s_info_ptr = s_info_ptr;

```

```

if(sqlda_allocated)
    free_sqlda(sqlda, g_struct->c_flags->select_status);
/* fix free() problem on NT
wlc 090597 */

if(g_struct->c_l_opt->outfile != 0)
    fclose(outstream);

return(TRUE);
}

/*****
*****
*/
/* Does some cleaning up once all the statements are processed. Disconnects
from the database, cleans up some semaphore stuff from the update functions,
prints out the summary table, and closes all file handles. */
/*****
*****
*/
int cleanup(struct global_struct *g_struct)
{
#ifdef SQLWINT
    int semid;          /* semaphore for controlling UFs */
    key_t semkey;       /* key to generate semid */
#endif
    char file_name[256] = "\0";

    /** End timestamp for stream */
    /*g_struct->stream_end_time = time(NULL);*/
    get_start_time(&(g_struct->stream_end_time)); /* TIME_ACC jen */

    switch(g_struct->c_l_opt->update)
    {
        case (2):
        case (5):
            /* update throughput function stream */
            sprintf(file_name, "%s%sstrcntuf.%s", g_struct->run_dir,
                env_tpcd_path_delim, g_struct->file_time_stamp);
            break;
        case (3):
        case (4):
            /* update power function stream */
            sprintf(file_name, "%s%spsptrentuf.%s", g_struct->run_dir,
                env_tpcd_path_delim, g_struct->file_time_stamp);
            break;
        case (1):
            /* power query stream */
            sprintf(file_name, "%s%spsptrent%d.%s", g_struct->run_dir,
                env_tpcd_path_delim,
                g_struct->c_l_opt->intStreamNum, g_struct->file_time_stamp);
            break;
        case (0):
            /* throughput query stream */
            sprintf(file_name, "%s%sstrent%d.%s", g_struct->run_dir,
                env_tpcd_path_delim,
                g_struct->c_l_opt->intStreamNum, g_struct->file_time_stamp);
            break;
    }

#ifdef LINUX

    if(g_struct->stream_report_file = fopen(file_name, APPENDMODE)) ==
        NULL )
    {
        fprintf(stderr, "\n\nThe output file for the stream count information\n");
        fprintf(stderr, "could not be opened, make sure the filename is correct\n");
        fprintf(stderr, "filename = %s\n", file_name);
        exit(-1);
    }

#endif

    /* print out the stream stop time in the stream count information file */
    if(g_struct->c_l_opt->update > 1)
    {

```

```

/* update function stream */
fprintf(g_struct->stream_report_file,
        "Update function stream stopping at %s.*s\n",
        T_STAMP_3LEN,T_STAMP_3LEN, /* TIME_ACC jen*/
        get_time_stamp(T_STAMP_FORM_3,&(g_struct->stream_end_time)));
/* TIME_ACC jen*/
}
else
{
/* query stream(s) */
fprintf(g_struct->stream_report_file,
        "Stream number %d stopping at %s.*s\n",
        g_struct->c_l_opt->intStreamNum,
        T_STAMP_3LEN,T_STAMP_3LEN, /* TIME_ACC jen*/
        get_time_stamp(T_STAMP_FORM_3,&(g_struct->stream_end_time)));
/* TIME_ACC jen*/
}
fclose(g_struct->stream_report_file);

/* No need to check for errors here.
Also, the UF stream in a Throughput run
has no connection in tpcdbatch.sqc.      aph 98/12/26
error_check();
*/

/* if we are in a query stream AND this is a throughput test, then need */
/* do to some semaphore stuff (0 implies update functions are off) */
/* AND we are supposed to be using semaphores */

if ( ( semcontrol == 1 ) &&
    ( g_struct->c_l_opt->update < 2))
/* only queries need to release the semaphore at this point */
{
    if (g_struct->c_l_opt->intStreamNum == 0)
        release_semaphore(g_struct, QUERY_POWER_SEM); /* power stream */
    else
        release_semaphore(g_struct, THROUGHPUT_SEM); /* throughput stream
*/

EXEC SQL CONNECT RESET;
#ifdef SQLWINT
    if (verbose)
    {
        fprintf(stderr,
            "cleanup: semkey = %ld, semid = %d, file = %s, stream = %d\n",
            semkey,semid,g_struct->update_num_file,
            g_struct->c_l_opt->intStreamNum);
    }
#endif
}

/** Summary table processing **/          /* @d24993 tjc */
summary_table(g_struct);

fprintf (outstream, "\n\n");

fclose(outstream); /* Close the output data stream. */
fclose(instream); /* Close the SQL input stream. */

return (TRUE);
}

void create_semaphores(struct global_struct *g_struct)
{
#ifdef SQLWINT
    int      semid; /* semaphore for controlling UFs*/
    key_t    semkey; /* key to generate semid */
#else
    HANDLE    hSem;
    HANDLE    hSem2;

```

```

    int      SemTimeout = 600000; /* Des time out period of 1 minute */
#endif
    fprintf(stderr,"numstreams = %d\n",g_struct->c_l_opt->intStreamNum);
    fprintf(stderr,"Update stream creating semaphore(s) for update and query
sequencing\n");
#ifdef SQLWINT

    fprintf(stderr,"semfile = %s\n",g_struct->sem_file);
    if (g_struct->c_l_opt->intStreamNum == 0)
/*RUNPOWER*/
    {
        fprintf(stderr,"semfile2 = %s\n",g_struct->sem_file2);
        hSem = CreateSemaphore(NULL,
0,1,(LPCTSTR)(g_struct->sem_file));
        hSem2 = CreateSemaphore(NULL,
0,1,(LPCTSTR)(g_struct->sem_file2));
        if ((hSem == NULL) || (hSem2 == NULL))
        {
            fprintf(stderr,
                "CreateSemaphores (ready semaphore) failed, GetLastError: %d,
quitting\n",
                GetLastError());
            exit(-1);
        }
        fprintf(stderr,"Semaphores created successfully!\n");
    }
    else
    {
/* RUNTHROUGHPUT creates semaphores based on the number of query
streams while the number of streams for runpower is constant */
        hSem = CreateSemaphore(NULL, 0,
            g_struct->c_l_opt->intStreamNum,
            (LPCTSTR)(g_struct->sem_file));

        if (hSem == NULL)
        {
            fprintf(stderr,
                "CreateSemaphore (ready semaphore) failed, GetLastError: %d,
quitting\n",
                GetLastError());
            exit(-1);
        }
        fprintf(stderr,"Semaphore created successfully!\n");
    }
}
#else /* AIX, SUN, etc. */
/* create a semaphore key...use the name of a file that */
/* you know exists */
fprintf(stderr,"semfile = %s\n", g_struct->update_num_file);
semkey = ftok(g_struct->update_num_file,'J');
if (g_struct->c_l_opt->intStreamNum == 0)
/* RUNPOWER */
{
    if ( ( semid = semget(semkey,2,IPC_CREAT|S_IRUSR|S_IWUSR)) < 0)
    {
        fprintf(stderr,
            "Throughput can't get initial semaphore! semget failed errno =
%d\n",
            errno);
        exit(1);
    }
}
else
/* THROUGHPUT */
{
    if ( ( semid = semget(semkey,1,IPC_CREAT|S_IRUSR|S_IWUSR)) < 0)
    {
        fprintf(stderr,
            "Throughput can't get initial semaphore! semget failed errno =
%d\n",
            errno);
        exit(1);
    }
}

```



```

    }
    if (verbose)
    {
        fprintf(stderr,
            "insert: semkey = %ld, semid = %d, file = %s, value = %d\n",
            semkey, semid, g_struct->update_num_file,
            (g_struct->c_l_opt->intStreamNum * -1));
    }
}

#endif

/*throughput update */
void throughput_wait(struct global_struct *g_struct)
{
#ifdef SQLWINT
    int      semid;          /* semaphore for controlling UFs*/
    key_t     semkey;        /* key to generate semid */
#else
    HANDLE     hSem;
    int        j;
    int        SemTimeout = 600000; /* Des time out period of 1 minute */
#endif

#ifdef SQLWINT
    hSem = open_semaphore(g_struct, THROUGHPUT_SEM);
    for (j = 0; j < g_struct->c_l_opt->intStreamNum; j++)
    {
        if (verbose)
            fprintf(stderr, "About to wait again ...\n");
        if (WaitForSingleObject(hSem, INFINITE) == WAIT_FAILED)
        {
            fprintf(stderr,
                "WaitForSingleObject (hSem) failed on stream %d, error: %d,
quitting\n",
                j, GetLastError());
            exit(-1);
        }
        if (verbose)
            fprintf(stderr, "Streams to wait for %d\n", j);
    }
    fprintf(stderr, "finished waiting on stream semaphore! Ready to run
updates!\n");
    /* close the semaphore handle */
    if (! CloseHandle(hSem)) {
        fprintf(stderr, "Close Sem failed - Last Error: %d\n", GetLastError());
        /* no exit here */
    }
#else
    semid = open_semaphore(g_struct);
    /* call the sem_op routine to decrement the semaphore by */
    /* however many streams .... by calling this function with*/
    /* a negative number, this stream is forced to wait until */
    /* the semaphore gets back to 0 */
    if (sem_op(semid, 0, (g_struct->c_l_opt->intStreamNum * -1)) != 0)
    {
        /*jenSEM*/
        fprintf(stderr,
            "Failure to wait on throughput semaphore for %d streams\n",
            g_struct->c_l_opt->intStreamNum);
        exit(1);
    }
    /*jenSEM*/
    fprintf(stderr, "finished waiting on stream semaphore! Ready to run
updates!\n");
    semctl(semid, 0, IPC_RMID, 0); /* we've finished waiting, now */
    /* remove the semaphore */
#endif

void runpower_wait(struct global_struct *g_struct, int sem_num)
{
    char semfile[150];
#ifdef SQLWINT

```

```

    HANDLE hSem;

    if (sem_num == 1)
        strcpy (semfile, g_struct->sem_file);
    else
        strcpy (semfile, g_struct->sem_file2);

#else /* AIX */
    int      semid;          /* semaphore for controlling UFs*/
    key_t     semkey;        /* key to generate semid */

    strcpy (semfile, g_struct->update_num_file);

#endif

    if (g_struct->c_l_opt->update == 1)
        fprintf(stderr, "querystream waiting for update stream (UF1) to signal
semaphore based on %s\n", semfile);
    else
        fprintf(stderr, "updatestream (UF2) waiting on querystream semaphore to signal
semaphore based on %s\n", semfile);

#ifdef SQLWINT
    hSem = open_semaphore(g_struct, sem_num);
    if (verbose)
        fprintf(stderr, "Runpower queries about to wait ...\n");
    if (WaitForSingleObject(hSem, INFINITE) == WAIT_FAILED)
    {
        fprintf(stderr,
            "WaitForSingleObject (hSem) failed on stream 0, error: %d, quitting\n",
            GetLastError());
        exit(-1);
    }
    if (! CloseHandle(hSem))
    {
        fprintf(stderr, "Close Sem failed - Last Error: %d\n", GetLastError());
        /* no exit here */
    }
#else
    semid = open_semaphore(g_struct);

    /* call the sem_op routine to decrement the semaphore by */
    /* however many streams .... by calling this function with*/
    /* a negative number, this stream is forced to wait until */
    /* the semaphore gets back to 0 */
    /* aix semaphores start at 0, not 1, so sem_num -1 is used */
    if (sem_op(semid, sem_num - 1, -1) != 0)
    {
        /*jenSEM*/
        fprintf(stderr,
            "Failure to wait on runpower semaphore for %d streams\n",
            g_struct->c_l_opt->intStreamNum);
        exit(1);
    }
    /*jenSEM*/
#endif

    if (g_struct->c_l_opt->update == 1)
        fprintf(stderr, "querystream finished waiting on updatestream semaphore\n");
    else
        fprintf(stderr, "updatestream finished waiting on querystream semaphore\n");
}

void release_semaphore(struct global_struct *g_struct, int sem_num)
{
#ifdef SQLWINT
    int      semid;          /* semaphore for controlling UFs*/
    key_t     semkey;        /* key to generate semid */
#else
    HANDLE     hSem;
    int        SemTimeout = 600000; /* Des time out period of 1 minute */
#endif

```

```

#ifdef SQLWINT
    hSem = open_semaphore(g_struct, sem_num); /* query */
    if (! ReleaseSemaphore(hSem,
        1,
        (LPLONG)(NULL)))
    {
        fprintf(stderr, "ReleaseSemaphore failed, Sem#: %d LastError: %d,
quit\n",
            sem_num, GetLastError());
        exit(-1);
    }
#else
    semid = open_semaphore(g_struct); /* query */
    /* aix semaphores start at 0, not 1, so sem_num - 1 is used */
    if (sem_op(semid, sem_num - 1, 1) != 0) /*jenSEM*/
    {
        /*jenSEM*/
        fprintf(stderr,
            "Failed to increment semaphore %d for throughput stream %d\n",
            sem_num, g_struct->c_l_opt->intStreamNum);
        fprintf(stderr,
            "file for generation of semaphore is: %s\n",
            g_struct->update_num_file);
        exit(1);
    }
#endif

if (g_struct->c_l_opt->intStreamNum == 0)
{
    /* RUNPOWER */
    if (sem_num == 1)
    {
        fprintf(stderr, "UF1 completed.\n");
    }
    else
    {
        fprintf(stderr, "query stream completed.\n");
    }
}

#ifdef SQLWINT /* Compile only in NT */
HANDLE open_semaphore(struct global_struct *g_struct, int num)
{
    HANDLE hSem;
    LPCTSTR semfile;

    if (num == 1)
        semfile = (LPCTSTR)g_struct->sem_file;
    else
        semfile = (LPCTSTR)g_struct->sem_file2;

    while ((hSem = OpenSemaphore(SEMAPHORE_ALL_ACCESS |
        SEMAPHORE_MODIFY_STATE |
        SYNCHRONIZE,
        TRUE,
        semfile))
        == (HANDLE)(NULL))
    {
        /*
        ** if cannot open the semaphore, wait for 0.1 second
        */
        fprintf(stderr, "Retry Open semaphore %s\n", semfile);

        Sleep(1000);
    }
    return hSem;
}

#else /* Compile only in non-NT (i.e. AIX) */
int open_semaphore(struct global_struct *g_struct)
{
    int semid; /* semaphore for controlling UFs */
    key_t semkey; /* key to generate semid */
    int num;

```

```

    if (g_struct->c_l_opt->intStreamNum == 0)
        num = 2;
    else
        num = 1;

    semkey = ftok(g_struct->update_num_file, 'J');
    while ((semid = semget(semkey, num, 0)) < 0)
    {
        if (errno == ENOENT)
        {
            sleep(2);
            fprintf(stderr, "cleanUp: looping for access to semaphore stream %d
",
                g_struct->c_l_opt->intStreamNum);
            fprintf(stderr, "semkey=%ld semid = %d file=%s\n", semkey, semid,
                g_struct->update_num_file);
        }
        else
        {
            fprintf(stderr, "query stream %d semget failed errno = %d\n",
                g_struct->c_l_opt->intStreamNum, errno);
            exit(1);
        }
    }
    return semid;
}
#endif

```

tpcdUF.sqc

```

/*****
*****
*
* TPCDUF.SQC
*
* Revision History:
*
* 05 dec 98 aph Created tpcdUF.sqc containing runUF1_fn() and runUF2_fn()
* so that it can be bound separately with a different isolation level.
* 15 may 99 bbe Added cast (short) for type conversion between a long and a
short.
* 16 jun 99 jen Added in proper connect reset code for UF functions (mistakenly
removed
* 17 jun 99 jen SEMA Changes semaphore file for update functions to look for
tpcd.setup
* not for the orders.*** update data file (AIX only )
* 21 jul 99 bbe Commented out conditions in SQL statments that searched on
fields
* other than app_id.
*
*****
*****/

#define UF1DEBUG
#define UF2DEBUG

#if (defined(SQLPTX) && defined(SQLSUN))
#define exit(rc) _exit(rc)
#else
#define exit(rc) exit(rc)
#endif /* SQLPTX & SQLSUN */

#include "tpcdbatch.h"
/* EXEC SQL INCLUDE SQLCA; */

#include "sqlca.h"
extern struct sqlca sqlca;

/*****
*****
*/
/* Function Prototypes
*/

```

```

/*****
*****/
extern int SleepSome( int amount );
extern long error_check(void); /* @d28763 tjc */
extern void dumpCa(struct sqlca*); /*kmw*/
extern int sem_op( int semid, int semnum, int value);
extern char *get_time_stamp(int form, Timer_struct *timer_pointer); /*
TIME_ACC jen */

/*****
*****/
/* Declare the SQL host variables. */
/*****
*****/
EXEC SQL BEGIN DECLARE SECTION;
char UF_dbname[9] = "\0";
char UF_userid[9] = "\0";
char UF_passwd[9] = "\0";
sqlint32 UF_chunk = 0;
short month = 0;
EXEC SQL END DECLARE SECTION;

/*****
*****/
/* Declare the global variables. */
/*****
*****/
extern char env_tpcd_tmp_dir[150];
extern FILE *instream, *outstream; /* File pointers */
extern char sourcefile[256]; /* Used for semaphores and table functions?*/
extern struct {
    short len;
    char data[32700];
} stmt_str; /* jen LONG */

/*****
*****/
/* UF1 child */
/* (i is the application number.) */
/*****
*****/
void runUF1_fn ( int updatePair, int i, char *dbname, char *userid, char *passwd )
{
    int rc = 0;
    int split_updates = 2; /* no. of ways update records are split */
    int concurrent_inserts = 2; /* jenCI no of concurrent updates to be */
    /* jenCI run at once*/
    int loop_updates = 1; /* jenCI no of updates to be run in one */
    /* jenCI "concurrent" invocation. should*/
    /* jenCI be split_updates / concurrent_inserts*/
    int startChunk = 0; /* jenCI number of first chunk to insert for */
    /* jenCI this child */
    int stopChunk = 0; /* jenCI number of last chunk to insert for */
    /* jenCI this child */
    long insertedLineitem = 0; /*kmw*/
    long insertedOrders = 0; /*kmw*/
    long saveInsertedOrders = 0; /*kbs*/

    long sqlcode;
    int maxwait;

#ifdef SQLWINT
    int su_semId;
    key_t su_semkey;
#else
    HANDLE su_hSem;
    char UF1_semfile[256];
#endif

    char myoutstreamfile[256];
    FILE *myoutstream;

    strcpy(UF_dbname, dbname);

```

```

    strcpy(UF_userid, userid);
    strcpy(UF_passwd, passwd);

    /* Get ready to start logging diagnostic output */
    sprintf(myoutstreamfile, UF1OUTSTREAMPATTERN, env_tpcd_tmp_dir,
    PATH_DELIM,
        updatePair, i);
    if ( (myoutstream = fopen (myoutstreamfile, WRITEMODE)) == NULL)
    {
        fprintf(stderr, "\nThe output file '%s' for update pair %d set %d could not be
opened. runUF1_fn\n",
            myoutstreamfile, updatePair, i);
        rc=-1;
        goto UF1_exit;
    }
    outstream=myoutstream; /* initialize outstream for error_check dxxxxhar*/

    fprintf( myoutstream, "\nUF1 for update pair %d set %d starting at %*.s\n",
        updatePair, i,
        T_STAMP_1LEN, T_STAMP_1LEN, /* TIME_ACC jen*/
        get_time_stamp(T_STAMP_FORM_1, (Timer_struct *)NULL)); /*
TIME_ACC jen*/

    if (getenv ("TPCD_SPLIT_UPDATES") != NULL)
        split_updates = atoi (getenv ("TPCD_SPLIT_UPDATES"));
    if (getenv ("TPCD_CONCURRENT_INSERTS") != NULL)
/*jenCI*/
        concurrent_inserts = atoi (getenv ("TPCD_CONCURRENT_INSERTS"));
/*jenCI*/
        loop_updates = split_updates / concurrent_inserts; /*jenCI*/

    /* determine the starting and stopping point of the chunks that this jenCI*/
    /* invocation will apply. i is starting chunk number with range 0 jenCI*/
    /* through (concurrent_inserts -1) jenCI*/
    startChunk = i * loop_updates; /*jenCI*/
    stopChunk = startChunk + (loop_updates - 1); /*jenCI*/

    /* Establish a connection to the database */
    if (!strcmp(userid, "\0")) /* No authentication provided */
        EXEC SQL CONNECT TO :UF_dbname;
    else
        EXEC SQL CONNECT TO :UF_dbname USER :UF_userid USING
:UF_passwd;
    error_check();
    if (sqlca.sqlcode < 0)
    {
        rc=-1;
        goto UF1_exit;
    }

    /* Start processing each chunk in my range */
#ifdef UF1DEBUG
    fprintf(myoutstream, "Before loop_a startChunk = %d, stopChunk = %d\n",
startChunk, stopChunk);
    fflush(myoutstream);
#endif
    for ( UF_chunk = startChunk; UF_chunk <= stopChunk; UF_chunk++ )
/*jenCI*/
    {
        /* wlc 062797 */
        sqlcode = SQL_RC_E911;
        month = (short)UF_chunk; /* Cast 'short' added bbe */
        maxwait = 1;
        rc = 0;

#ifdef UF1DEBUG
        fprintf(myoutstream, "Before While_a Chunk= %d\n", UF_chunk);
        fflush(myoutstream);
#endif
        /* Loop to handle any deadlocks */
        while (sqlcode == SQL_RC_E911 && maxwait <= MAXWAIT && rc==0)
        {

```

```

        sqlcode = 0;
#ifdef UF1DEBUG
        fprintf(myostream, "in loop before orders exec sql\n");
        fflush(myostream);
#endif
        EXEC SQL INSERT INTO TPCD.ORDERS
            SELECT
O_ORDERKEY,O_CUSTKEY,O_ORDERSTATUS,O_TOTALPRICE,

O_ORDERDATE,O_ORDERPRIORITY,O_CLERK,O_SHIPPRIORITY,O_CO
MMENT
            FROM TPCDTEMP.ORDERS_NEW
            WHERE APP_ID = :UF_chunk;
/*AND
12*(YEAR(O_ORDERDATE)-1992)+MONTH(O_ORDERDATE)-01 =
:month;*/

        if (sqlca.sqlcode < 0)
            sqlcode = error_check();

        if (sqlcode == SQL_RC_E911)
        {
            /* we've hit a deadlock */
            fprintf(myostream,
                "\nDeadlock detected inserting from tpcdtemp.orders_new for chunk
%d for pair %d..Retrying...\n",UF_chunk,updatePair);
            SleepSome(UF_DEADLOCK_SLEEP);
            maxwait++;
            /* jen DEADLOCK */
        }
        else if (sqlcode < 0)
        {
            fprintf(myostream,
                "Insert into orders pair %d chunk %d failed sqlcode=%d\n",
                updatePair,UF_chunk,sqlcode);
            dumpCa(&sqlca);
            rc = -1;
        }
        else
        {
            /* Everything worked with ORDERS, proceed with LINEITEM */
            saveInsertedOrders = sqlca.sqlerrd[2];

            sqlcode = 0;
#ifdef UF1DEBUG
            fprintf(myostream, "in lineitem for update pair number %d set %d
chunk %d\n",
                updatePair, i,UF_chunk);
            fflush(myostream);
#endif

            EXEC SQL INSERT INTO TPCD.LINEITEM
            SELECT
L_ORDERKEY,L_PARTKEY,L_SUPPKEY,L_LINENUMBER,L_QUANTITY,
L_EXTENDEDPRISE,L_DISCOUNT,L_TAX,

L_RETURNFLAG,L_LINESTATUS,L_SHIPDATE,L_COMMITDATE,L_REC
EIPTDATE,
            L_SHIPINSTRUCT,L_SHIPMODE,L_COMMENT
            FROM TPCDTEMP.LINEITEM_NEW WHERE APP_ID = :UF_chunk;
/*(AND L_ORDERKEY IN
(SELECT O_ORDERKEY FROM TPCD.ORDERS
WHERE
12*(YEAR(O_ORDERDATE)-1992)+MONTH(O_ORDERDATE)-01 =
:month);*/

            if (sqlca.sqlcode < 0)
                sqlcode = error_check();

            if (sqlcode == SQL_RC_E911)
            {
                /* we've hit a deadlock */
                fprintf(myostream,
                    "\nA deadlock has been detected inserting from
tpcdtemp.lineitem%d_%d..Retrying...\n",
                    updatePair, UF_chunk);

```

```

            SleepSome(UF_DEADLOCK_SLEEP);
            maxwait++;
            /* jen DEADLOCK */
        }
        else if (sqlcode < 0)
        {
            fprintf(myostream,
                "Insert into lineitem pair %d chunk %d failed sqlcode=%d\n",
                updatePair,UF_chunk,sqlcode);
            dumpCa(&sqlca);
            rc = -1;
        }
        else
        {
            /*
#ifdef UF1DEBUG
            fprintf(myostream, "lineitem insert succeeded\n");
            fflush(myostream);
#endif
            */ accumulate the number of row inserted */
            /* Order count ONLY updated if both orders and lineitem */
            /* go through */
            insertedOrders += saveInsertedOrders;
            /* kbs */
            insertedLineitem += sqlca.sqlerrd[2];
            rc=0;
            EXEC SQL COMMIT WORK;
            error_check();

#ifdef UF1DEBUG
            /* report the number of row inserted */
            fprintf(myostream, " interim %ld rows for chunk %d into
TPCD.ORDERS at %*.s\n",
                insertedOrders,UF_chunk,T_STAMP_1LEN,T_STAMP_1LEN, /*
TIME_ACC jen*/
                get_time_stamp(T_STAMP_FORM_1,(Timer_struct *)NULL)); /*
TIME_ACC jen*/
            /* report the number of row deleted *s inserted */
            fprintf(myostream,
                " interim %ld rows for chunk %d into TPCD.LINEITEM at
%*.s\n",
                insertedLineitem,UF_chunk,
                T_STAMP_1LEN,T_STAMP_1LEN, /* TIME_ACC jen*/
                get_time_stamp(T_STAMP_FORM_1,
                    (Timer_struct *)NULL)); /* TIME_ACC jen*/

            fprintf(myostream,
                " inserts for update pair %d chunk %d complete at %*.s\n\n",
                updatePair, UF_chunk,
                T_STAMP_1LEN,T_STAMP_1LEN, /* TIME_ACC jen*/
                get_time_stamp(T_STAMP_FORM_1,
                    (Timer_struct *)NULL)); /* TIME_ACC jen*/

#endif
        }
        /* process lineitem INSERTs */
        /* while loop for deadlocks */
        /* while processing chunks */

        /* report the number of row deleted */
        fprintf(myostream, "%ld rows inserted into TPCD.ORDERS at %*.s\n",
            insertedOrders,T_STAMP_1LEN,T_STAMP_1LEN, /* TIME_ACC jen*/
            get_time_stamp(T_STAMP_FORM_1,(Timer_struct *)NULL)); /*
TIME_ACC jen*/
        fprintf(myostream, "%ld rows inserted into TPCD.LINEITEM at %*.s\n",
            insertedLineitem,T_STAMP_1LEN,T_STAMP_1LEN, /* TIME_ACC
jen*/
            get_time_stamp(T_STAMP_FORM_1,(Timer_struct *)NULL)); /*
TIME_ACC jen*/

        if (sqlcode < 0)
        {
            if (sqlcode == SQL_RC_E911)
            {
                fprintf(myostream, "# of deadlocks exceeds %i\n", MAXWAIT);
            }
            rc=-1;

```

```

EXEC SQL ROLLBACK WORK;
error_check();          /* @d22275 tlg */

goto UF1_exit;
}

/* UF1_conn_reset: */
EXEC SQL CONNECT RESET;
error_check();          /* @d22275 tlg */

UF1_exit:
fclose (myostream);
/* exiting, increment the semaphore */

/* we used the first flat file to generate the semaphore key */

#ifdef SQLWINT
/* we will use the tpcd.setup file to generate the semaphore key begin SEMA
*/
if (getenv("TPCD_AUDIT_DIR") != NULL)
{
/* this is assuming that you will be running this from 0th node */
sprintf(sourcefile, "%s%ctools%ctpcd.setup",
getenv("TPCD_AUDIT_DIR"), PATH_DELIM, PATH_DELIM);
}
else
{
fprintf(stderr, "Can't open UF1 semaphore file TPCD_AUDIT_DIR is not
defined.\n");
exit (-1);
}
/* end SEMA */

su_semkey = ftok (sourcefile, 'J');
while ( (su_sem_id = semget (su_semkey, 1, 0)) < 0)
{
if (errno == ENOENT) {
sleep(2);
}
else {
fprintf(stderr, "update set %d: semget failed errno = %d\n",
i, errno);
exit(1);
}
}
if (sem_op (su_sem_id, 0, 1) != 0)          /*jen SEM*/
{
fprintf(stderr, "Failure to increment semaphore UF1 set %d\n", i);
fprintf(stderr, " semaphore sourcefile = %s su_sem_id =
su_sem_id\n", sourcefile);
exit(1);
}
/*jenSEM*/

#else /* SQLWINT */
sprintf (UF1_semfile, "%s.%s.UF1.semfile",
getenv("TPCD_DBNAME"), getenv("USER"));
//DJD fprintf(stderr, "UF1 semfile = %s\n", UF1_semfile);
while ((su_hSem = OpenSemaphore(SEMAPHORE_ALL_ACCESS |
SEMAPHORE_MODIFY_STATE |
SYNCHRONIZE,
TRUE,
UF1_semfile))
== (HANDLE)(NULL))
{
/*
** if cannot open the semaphore, wait for 0.1 second
*/
fprintf(stderr, "Retry Open semaphore %s\n", UF1_semfile);

sleep(1);
}

if (! ReleaseSemaphore(su_hSem,

```

```

1,
(LPLONG)(NULL)))
{
fprintf(stderr, "ReleaseSemaphore failed, LastError: %d, quit\n",
GetLastError());
exit(-1);
}
#endif /* SQLWINT */
exit(rc);          /* child exiting after finishing up */
}

/*****
**/
/* UF2 child */
/*****
**/
void runUF2_fn ( int updatePair, int thisConcurrentDelete, int numChunks, char
*dbname, char *userid, char *passwd )
{
int rc = 0;
long sqlcode;
int maxwait;
int startChunk = thisConcurrentDelete*numChunks; /* where do we start? */
long deletedLineitems = 0; /*kmw*/
long deletedOrders = 0; /*kmw*/
long savedDeletedLineitems = 0; /*kbs*/

#ifdef SQLWINT
int su_sem_id; /* semaphore for controlling split updates*/
key_t su_semkey; /* key to generate semid */
#else
HANDLE su_hSem;
char UF2_semfile[256];
#endif

char myostreamfile[256];
FILE *myostream, *src_fh=NULL;

strcpy(UF2_dbname, dbname);
strcpy(UF2_userid, userid);
strcpy(UF2_passwd, passwd);

/* Generate the unique filename for this concurrent delete process */
sprintf (myostreamfile, UF2OUTSTREAMPATTERN, env_tpcd_tmp_dir,
PATH_DELIM,
updatePair, thisConcurrentDelete);
if ( (myostream = fopen (myostreamfile, WRITEMODE)) == NULL)
{
fprintf (stderr,
"\n\nThe output file '%s' for update pair %d set %d could not be opened
runUF2_fn.\n",
myostreamfile, updatePair, thisConcurrentDelete);
rc=-1;
goto UF2_exit;
}

outstream=myostream; /* initialize outstream for error_check dxxxxhar*/

#ifdef UF2DEBUG
fprintf (myostream, "RunUF2 Called %d %d %d\n",
updatePair, thisConcurrentDelete, numChunks );
fflush(myostream);
#endif
fprintf( myostream,
"\nUF2 for update pair %d set %d starting at %*.s\n",
updatePair, thisConcurrentDelete, T_STAMP_1LEN, T_STAMP_1LEN,
/* TIME_ACC jen*/
get_time_stamp(T_STAMP_FORM_1, (Timer_struct *)NULL)); /*
TIME_ACC jen*/

#ifdef UF2DEBUG

```

```

fprintf(myostream, "before connect\n");
fflush(myostream);
#endif

if (!strcmp(userid, "\0")) /** No authentication provided **/
    EXEC SQL CONNECT TO :UF_dbname;
else
    EXEC SQL CONNECT TO :UF_dbname USER :UF_userid USING
:UF_passwd;
    error_check();

#ifdef UF2DEBUG
    fprintf(myostream, "after connect startchunk= %d, EndChunk = %d\n",
        startChunk, startChunk+numChunks);
    fflush(myostream);
#endif

    /* Start processing each chunk in my range */
    for ( UF_chunk = startChunk; UF_chunk < startChunk+numChunks;
UF_chunk++)
    {

        /* Set things up for the loop which will retry if there is a deadlock */
        sqlcode = SQL_RC_E911;
        month = (short)UF_chunk;
        maxwait = 1;
        rc = 0;

#ifdef UF2DEBUG
        fprintf(myostream, "Chunk = %d\n", UF_chunk);
        fflush(myostream);
#endif
        while (sqlcode == SQL_RC_E911 && maxwait <= MAXWAIT && rc == 0)
        {

#ifdef UF2DEBUG
            fprintf(myostream, "in loop before orders exec sql\n");
            fflush(myostream);
#endif
            sqlcode = 0;

            EXEC SQL DELETE FROM TPCD.LINEITEM
            WHERE L_ORDERKEY IN
            (SELECT O_ORDERKEY FROM TPCDTEMP.ORDERS_DEL
            WHERE APP_ID = :UF_chunk);
            /*AND O_ORDERKEY IN
            (SELECT O_ORDERKEY FROM TPCD.ORDERS
            WHERE
            12*(YEAR(O_ORDERDATE)-1992)+MONTH(O_ORDERDATE)-01 =
:month));*/
            if (sqlca.sqlcode < 0)
                sqlcode = error_check();

            if (sqlcode == SQL_RC_E911)
            {
                /* we've hit a deadlock */
                fprintf(myostream,
                    "\nA deadlock detected while deleting from LINEITEM: update pair %d
set %d chunk %d. Retrying.\n",
                    updatePair, thisConcurrentDelete, UF_chunk);
                dumpCa(&sqlca);
                SleepSome(UF_DEADLOCK_SLEEP);
                maxwait++; /* jen DEADLOCK */
            }
            else if (sqlcode < 0)
            {
                fprintf(myostream, "\n%s\n", stmt_str.data);
                fprintf(myostream, "\nsqlcode %d occurred deleting from
TPCD.LINEITEM\n", sqlca.sqlcode);
                dumpCa(&sqlca);
                fprintf(myostream,
                    "for update pair number %d set %d chunk %d..Exiting\n",
                    updatePair, thisConcurrentDelete, UF_chunk);
                rc=-1;
            }
        }
    }

```

```

else
{
    /* accumulate the number of row deleted */
    savedDeletedLineitems = sqlca.sqlerrd[2]; /*kbs*/

#ifdef UF2DEBUG
    fprintf(myostream, "in loop for update pair number %d set %d chunk
%d\n",
        updatePair, thisConcurrentDelete, UF_chunk);
    fflush(myostream);
#endif

    /* delete the orders now */

    EXEC SQL DELETE FROM TPCD.ORDERS
    WHERE O_ORDERKEY IN
    (SELECT O_ORDERKEY FROM TPCDTEMP.ORDERS_DEL
    WHERE APP_ID = :UF_chunk);
    /*AND
    12*(YEAR(O_ORDERDATE)-1992)+MONTH(O_ORDERDATE)-01 =
:month;*/

    if (sqlca.sqlcode < 0)
        sqlcode = error_check();

    if (sqlcode == SQL_RC_E911)
    {
        /* we've hit a deadlock */
#ifdef UF2DEBUG
        fprintf(myostream, "orders deadlocked\n");
        fflush(myostream);
#endif
        fprintf(myostream,
            "\nA deadlock detected while deleting from ORDERS: update pair %d
set %d chunk %d. Retrying.\n",
            updatePair, thisConcurrentDelete, UF_chunk);
        dumpCa(&sqlca);
        SleepSome(UF_DEADLOCK_SLEEP);
        maxwait++; /* jen DEADLOCK */
    }
    else if (sqlcode < 0)
    {
#ifdef UF2DEBUG
        fprintf(myostream, "orders failed\n");
        fflush(myostream);
#endif
        fprintf(myostream, "\nAn error %d occurred deleting from
TPCD.ORDERS\n", sqlca.sqlcode);
        dumpCa(&sqlca);
        fprintf(myostream, "for update pair number %d set %d chunk
%d..Exiting\n",
            updatePair, thisConcurrentDelete, UF_chunk);
        rc=-1;
    }
    else
    {
#ifdef UF2DEBUG
        fprintf(myostream, "orders succeeded\n");
        fflush(myostream);
#endif
        /* accumulate the number of row deleted */
        /* Order count ONLY updated if both orders and lineitem */
        /* go through */
        deletedLineitems += savedDeletedLineitems; /* kbs */
        deletedOrders += sqlca.sqlerrd[2];
        rc=0;
        EXEC SQL COMMIT WORK;
        error_check();
#ifdef UF2DEBUG
        /* report the number of rows deleted */
        fprintf(myostream, " interim %ld rows for chunk %d from
TPCD.ORDERS at %*s\n",
            deletedOrders, UF_chunk, T_STAMP_1LEN, T_STAMP_1LEN, /*
TIME_ACC jen*/

```

```

        get_time_stamp(T_STAMP_FORM_1,(Timer_struct *)NULL)); /*
TIME_ACC jen*/
        fprintf(myostream, "    interim %ld rows for chunk %d from
TPCD.LINEITEM at %*.s\n",
        deletedLineitems,UF_chunk,T_STAMP_1LEN,T_STAMP_1LEN,
/* TIME_ACC jen*/
        get_time_stamp(T_STAMP_FORM_1,(Timer_struct *)NULL)); /*
TIME_ACC jen*/
        fprintf( myostream,
        "    deletes for update pair %d chunk %d complete at %*.s\n\n",
        updatePair, UF_chunk,
        T_STAMP_1LEN,T_STAMP_1LEN, /* TIME_ACC jen*/
        get_time_stamp(T_STAMP_FORM_1,
        (Timer_struct *)NULL)); /* TIME_ACC jen*/
#endif
    }
    } /* process orders deletes */
    } /* while trying to delete one chunk loop */
    } /* while there are more chunks */

#ifdef UF2DEBUG
    fprintf(myostream,"after loop\n");
    fflush(myostream);
#endif
    /* report the number of row deleted */
    fprintf(myostream, "%ld rows deleted from TPCD.ORDERS at %*.s\n",
    deletedOrders,T_STAMP_1LEN,T_STAMP_1LEN, /* TIME_ACC jen*/
    get_time_stamp(T_STAMP_FORM_1,(Timer_struct *)NULL)); /*
TIME_ACC jen*/
    fprintf(myostream, "%ld rows deleted from TPCD.LINEITEM at %*.s\n",
    deletedLineitems,T_STAMP_1LEN,T_STAMP_1LEN, /* TIME_ACC
jen*/
    get_time_stamp(T_STAMP_FORM_1,(Timer_struct *)NULL)); /*
TIME_ACC jen*/

    if (sqlca.sqlcode < 0)
    {
        fprintf(myostream,"# of deadlocks %d exceeds %i\n",
maxwait,MAXWAIT);
        rc=-1;
        EXEC SQL ROLLBACK WORK;
        error_check(); /* @d22275 tjg */
    }

/* UF2_conn_reset: */ /*971101jen*/
EXEC SQL CONNECT RESET;
error_check(); /* @d22275 tjg */

UF2_exit:
    fclose(myostream);

    /* exiting, increment the semaphore */
#ifdef SQLWINT
    /* we used the tpcd.setup file to generate the semaphore key begin SEMA */
    if (getenv("TPCD_AUDIT_DIR") != NULL)
    {
        sprintf(sourcefile, "%s%ctools%ctpcd.setup",
        getenv("TPCD_AUDIT_DIR"), PATH_DELIM, PATH_DELIM);
    }
    else
    {
        fprintf(stderr, "Can't open UF2 semaphore file TPCD_AUDIT_DIR is not
defined.\n");
        exit (-1);
    }

    su_semkey = ftok (sourcefile, 'D'); /* use D for deletes */
/* end SEMA */
    while ((su_semid = semget(su_semkey,1,0)) < 0)
    {
        if (errno == ENOENT)
            sleep(2);
        else {

```

```

        fprintf(stderr,"UF2 update stream %d: semget failed errno = %d\n",
        updatePair, errno);
        exit(1);
    }
}
if (sem_op (su_semid, 0, 1) != 0 ) /*jenSEM*/
{
    /*jenSEM*/
    fprintf(stderr,"Failure to increment semaphore UF2 set %d\n",
thisConcurrentDelete);
    exit(1);
} /*jenSEM*/

#else
    sprintf (UF2_semfile, "%s.%s.UF2.semfile",
    getenv("TPCD_DBNAME"), getenv("USER"));
    //DJD fprintf(stderr,"UF2 semfile = %s\n",UF2_semfile);
    while ((su_hSem = OpenSemaphore(SEMAPHORE_ALL_ACCESS |
        SEMAPHORE_MODIFY_STATE |
        SYNCHRONIZE,
        TRUE,
        UF2_semfile))
        == (HANDLE)(NULL)) {
        /*
        ** if cannot open the semaphore, wait for 0.1 second
        */
        fprintf(stderr,"Retry Open semaphore %s\n", UF2_semfile);

        SleepSome(1);
    }

    if (! ReleaseSemaphore(su_hSem,
        1,
        (LPLONG)(NULL)))
    {
        fprintf(stderr, "ReleaseSemaphore failed, GetLastError: %d, quit\n",
        GetLastError());
        exit(-1);
    }
#endif

    exit(rc); /* child exiting after finishing up */
}

```

Appendix E: ACID Transaction Source Code

acid.h

```
/*
*****
*/
/* File: acid.h */
/*
*****
*/

#include <stdio.h>
#include <stdlib.h>
#include <time.h>

#ifdef SQLWINT
#include <windows.h>
#include <sys\timeb.h>
#include <sys\stat.h>
#include <stdlib.h>
#include <io.h>
#else
#include <unistd.h>
#include <sys/time.h>
#include <sys/timeb.h>
#endif

#include <string.h>
#include <math.h>

#define acidtime(tvsec,tvusec) tvsec*1000+tvusec/1000
#define TSLEN 20

#if 0 /* needed on NT, not on AIX */
typedef struct timeval {
    long tv_sec; /* seconds */
    long tv_usec; /* and microseconds */
};
#endif

struct update_struct {
    int qnum;
};

struct acidQ_struct {
    int tag;
    long o_key;
    double l_extendedprice;
};

struct acidT_struct {
    int termination;
    int tag;
    int logging;
    long o_key;
    long l_key;
    long delta;
    long l_partkey;
    long l_suppkey;
    double l_quantity;
    double l_tax;
    double l_discount;
    double l_extendedprice;
    double o_totalprice;
};

/*
** in acid.sqc
*/

int updateQ (struct update_struct *us);
```

```
char del(void);
```

```
#ifdef SQLWINT
void sleep (int sec);
#endif
```

acid.sqc

```
/*
*****
*/
/* File: acid.sqc */
/*
*****
*/

/* changes:
*
* 961109 jel add EXEC SQL CLOSE for each cursor in acidT
*          to avoid bug in db2pe v1r2
* 980225 gav port to NT
* 981103 kal added ast_acidQ for isolation test 7
* 981103 kal changed ast query to be the same as that used in
*          consistency tests. Fixed so the long lEprice is
*          cast to a double. Changed so uses 3 decimal points of
*          precision.
*/

#include "acid.h"

#if (defined(SQLPTX) || defined(SQLWINT) || defined(SQLSUN) ||
defined(Linux))
double nearest(double);
#endif /* SQLPTX */

#define DEADLOCK -911

/*
#define TRUNC2(d) ((floor((d)*100.0))/100.0)
*/
/*
#define TRUNC2(d) ((floor(nearest((d)*100.0)))*0.01)
*/
/*
#define TRUNC2(d) ((floor(nearest((d)*1000.0)/10.0)/100.0))
*/
#define TRUNC2(d) ((floor(nearest((d)*100000.0)/1000.0)/100.0))

void sqlerror(char *, struct sqlca *);

EXEC SQL INCLUDE SQLCA;
EXEC SQL BEGIN DECLARE SECTION;
char dbname[8]; /* = "tpcd"; */
EXEC SQL END DECLARE SECTION;

#ifdef SQLWINT

/*
** redefine gettimeofday so I don't have to
** change too much aix-specific code
*/
/*#typedef struct timeval { unsigned tv_sec; unsigned tv_usec; };
typedef struct timezone { int dummy; };
struct timeb timer;

void gettimeofday( struct timeval *tv, struct timezone *tz)
{
    ftime(&timer);
    tv->tv_sec = timer.time;
    tv->tv_usec = timer.millitm * 1000;
    tz->dummy = 0;
}
```



```

#endif

/*-----*/
/*      acidQ                               */
/*-----*/
int acidQ (struct acidQ_struct *acid)
{
    time_t timeT;
    FILE *out;
    char out_fn[50];
    struct timeval tv;
    struct timezone tz;
    int mypid;
    int rc = 0;

    EXEC SQL BEGIN DECLARE SECTION;
    sqlint32  okey;
    sqlint32  lEprice;
    double  eprice;
    EXEC SQL END DECLARE SECTION;

    okey = acid->o_key;

    /* mypid = getpid(); */
    mypid = acid->tag;

    sprintf(out_fn, "%s%cacidQ.out.%d",getenv("TPCD_TMP_DIR"),del(),mypid);
    out=fopen(out_fn,"a");
    if (out == NULL)
    {
        fprintf(stderr, "ERROR input file %s could not be appended to!!\n",out_fn);
    }

    gettimeofday(&tv, &tz);
    time(&timeT);
    fprintf(out, "\n----- START of acidQ tag: %d ----- \n\n",mypid);
    fprintf(out, "acidQ tag: %d, begin transaction time: (%us %06uu) %s",
        mypid, tv.tv_sec, tv.tv_usec, ctime(&timeT));
    fprintf(out, "okey: %d\n", okey);

    gettimeofday(&tv, &tz);
    time(&timeT);
    fprintf(out, "acidQ tag: %d, before read of LINEITEM: (%us %06uu) %s",
        mypid, tv.tv_sec, tv.tv_usec, ctime(&timeT));

    /*
    ** use the same sql code as used in the consistsql.pl to
    ** run the consistency acid queries. Note we assign an long int
    ** to lEprice (we make it 10s of pennies by * 1000). Then divide
    ** by 1000.0 and cast it to a double (eprice) for printing
    */

    EXEC SQL
    SELECT
        INTEGER(DECIMAL(SUM(DECIMAL(INTEGER(INTEGER(DECIMAL
            (INTEGER(100*DECIMAL(L_EXTENDEDPRI,20,3)), 20,3) *
            (1-L_DISCOUNT)) * (1+L_TAX)),20,3)/100.0),20,3) * 1000)
        into :lEprice
    FROM
        TPCD.LINEITEM
    WHERE
        L_ORDERKEY = :okey;

    if (sqlca.sqlcode != 0) {
        rc = sqlca.sqlcode;
        fprintf(out, "acidQ **ERROR** sqlcode = %d\n", sqlca.sqlcode);
        sqlerror("acidQ: select sum(l_extendedprice)", &sqlca);
        goto Qerror;
    }
    eprice = (double)lEprice / 1000.0; /* translate to double for printout*/

    gettimeofday(&tv, &tz);
    time(&timeT);

    fprintf(out, "ACID tag: %d, after read of LINEITEM: (%us %06uu) %s",
        mypid, tv.tv_sec, tv.tv_usec, ctime(&timeT));
    fprintf(out, "okey: %d \t sum(l_extendedprice): %0.3f\n",
        okey, eprice);

    EXEC SQL COMMIT;
    if (sqlca.sqlcode != 0) {
        rc = sqlca.sqlcode;
        fprintf(out, "acidQ **ERROR** sqlcode = %d\n", sqlca.sqlcode);
        sqlerror("acidQ: COMMIT", &sqlca);
        goto Qerror;
    }
    acid->l_extendedprice = eprice;

    rc = 0;
    goto Qexit;

Qerror:
    EXEC SQL rollback work;
    if (sqlca.sqlcode != 0) sqlerror("acidQ: ROLLBACK FAILED", &sqlca);

Qexit:
    fprintf(out, "\n----- END of acidQ tag: %d ----- \n\n",mypid);
    fflush(out);fclose(out);
    return(rc);
}

/*-----*/
/*      ast_acidQ                               */
/*-----*/
int ast_acidQ (struct acidQ_struct *acid)
{
    time_t timeT;
    FILE *out;
    char out_fn[50];
    struct timeval tv;
    struct timezone tz;
    int mypid;
    int rc = 0;

    EXEC SQL BEGIN DECLARE SECTION;
    double  ast_lEprice;
    double  ast_eprice;
    EXEC SQL END DECLARE SECTION;

    /* mypid = getpid(); */
    mypid = acid->tag;

    sprintf(out_fn,
"%s%cast_acidQ.out.%d",getenv("TPCD_TMP_DIR"),del(),mypid);
    out=fopen(out_fn,"a");
    gettimeofday(&tv, &tz);
    time(&timeT);
    fprintf(out, "\n----- START of ast_acidQ tag: %d ----- \n\n",mypid);
    fprintf(out, "ast_acidQ tag: %d, begin transaction time: (%us %06uu) %s",
        mypid, tv.tv_sec, tv.tv_usec, ctime(&timeT));

    gettimeofday(&tv, &tz);
    time(&timeT);
    fprintf(out, "ast_acidQ tag: %d, before read of LINEITEM: (%us %06uu) %s",
        mypid, tv.tv_sec, tv.tv_usec, ctime(&timeT));

    /*
    ** use the same query acidQ except don't select for specific okey.
    ** this ensures that the ast will be used instead of the base table
    ** Have to use ast_lEprice as double since this sum is so big
    */

    EXEC SQL
    SELECT
        SUM ( L_EXTENDEDPRI*(1-L_DISCOUNT)*(1 + L_TAX))
        into :ast_lEprice
    FROM

```

```

TPCD.LINEITEM;

if (sqlca.sqlcode != 0) {
    rc = sqlca.sqlcode;
    fprintf(out, "ast_acidQ **ERROR** sqlcode = %d\n", sqlca.sqlcode);
    sqlerror("ast_acidQ: select sum(l_extendedprice)", &sqlca);
    goto Qerror;
}
ast_eprice = ast_IEprice; /* use ast_eprice for printout to be consistent*/

gettimeofday(&tv, &tz);
time(&timeT);
fprintf(out, "AST_ACID tag: %d, after read of LINEITEM: (%06u) %s",
    mypid, tv.tv_sec, tv.tv_usec, ctime(&timeT));
fprintf(out, "sum(l_extendedprice): %0.3f\n",
    ast_eprice);

EXEC SQL COMMIT;
if (sqlca.sqlcode != 0) {
    rc = sqlca.sqlcode;
    fprintf(out, "ast_acidQ **ERROR** sqlcode = %d\n", sqlca.sqlcode);
    sqlerror("ast_acidQ: COMMIT", &sqlca);
    goto Qerror;
}
acid->l_extendedprice = ast_eprice;

rc = 0;
goto Qexit;

Qerror:
EXEC SQL rollback work;
if (sqlca.sqlcode != 0) sqlerror("ast_acidQ: ROLLBACK FAILED", &sqlca);

Qexit:
fprintf(out, "\n----- END of ast_acidQ tag: %d ----- \n", mypid);
fflush(out); fclose(out);
return(rc);
}
/*-----*/
/*      acidT                                */
/*-----*/
int acidT (struct acidT_struct *acid)
{

    time_t timeT;
    FILE *out;
    char out_fn[50];
    struct timeval tv;
    struct timezone tz;
    int mypid;
    int rc = 0;

    EXEC SQL BEGIN DECLARE SECTION;
    sqlint32    o_key, l_key, delta;
    sqlint32    l_partkey, l_supkey;
    double      l_quantity, l_tax, l_discount, l_extendedprice;
    double      o_totalprice;
    double      new_quantity, rprice, cost, new_extprice, new_ototal, ototal;
    EXEC SQL END DECLARE SECTION;

    EXEC SQL DECLARE l_cursor CURSOR FOR
        SELECT l_partkey, l_supkey, l_quantity,
               l_tax, l_discount,
               l_extendedprice
        FROM tpcd.lineitem
        WHERE l_orderkey = :o_key
        AND l_linenum = :l_key
        FOR UPDATE OF l_extendedprice, l_quantity;

    EXEC SQL DECLARE o_cursor CURSOR FOR
        SELECT o_totalprice
        FROM tpcd.orders
        WHERE o_orderkey = :o_key
        FOR UPDATE OF o_totalprice;

```

```

if (acid->termination < 0 || acid->termination > 3) acid->termination = 0;
o_key = acid->o_key;
l_key = acid->l_key;
delta = acid->delta;

if (acid->logging) {
    /* mypid = getpid(); */
    mypid = acid->tag;
    sprintf(out_fn,
        "%s%06u%06u%06u", getenv("TPCD_TMP_DIR"), del(), mypid);
    out = fopen(out_fn, "a");
    gettimeofday(&tv, &tz);
    time(&timeT);
    fprintf(out, "\n----- START of acidT tag: %d ----- \n", mypid);
    fprintf(out, "acidT tag: %d, begin transaction time: (%06u) %s",
        mypid, tv.tv_sec, tv.tv_usec, ctime(&timeT));
    fprintf(out, "o_key: %d\tl_key: %d\tdelta: %d\n", o_key, l_key, delta);
}
#ifdef DEBUG
    printf("o_key: %d\tl_key: %d\tdelta: %d\n", o_key, l_key, delta);
#endif

retry_tran:

if (acid->logging) {
    gettimeofday(&tv, &tz);
    time(&timeT);
    fprintf(out, "acidT tag: %d, before read of LINEITEM: (%06u) %s",
        mypid, tv.tv_sec, tv.tv_usec, ctime(&timeT));
}

EXEC SQL OPEN l_cursor;
if (sqlca.sqlcode != 0) {
    if (sqlca.sqlcode == DEADLOCK) goto retry_tran;
    rc = sqlca.sqlcode;
    if (acid->logging) {
        fprintf(out, "acidT **ERROR** sqlcode = %d\n", sqlca.sqlcode);
    } else {
        fprintf(stderr, "acidT **ERROR** sqlcode = %d\n", sqlca.sqlcode);
    } /* endif */
    sqlerror("acidT: OPEN l_cursor", &sqlca);
    goto Terror;
}

EXEC SQL FETCH l_cursor INTO
    :l_partkey, :l_supkey, :l_quantity, :l_tax,
    :l_discount, :l_extendedprice;
if (sqlca.sqlcode != 0) {
    if (sqlca.sqlcode == DEADLOCK) goto retry_tran;
    rc = sqlca.sqlcode;
    if (acid->logging) {
        fprintf(out, "acidT **ERROR** sqlcode = %d\n", sqlca.sqlcode);
    } else {
        fprintf(stderr, "acidT **ERROR** sqlcode = %d\n", sqlca.sqlcode);
    } /* endif */
    sqlerror("acidT: FETCH l_cursor", &sqlca);
    goto Terror;
}

#ifdef DEBUG
    printf("l_quantity = %0.3f\n", l_quantity);
    printf("l_tax = %0.3f\n", l_tax);
    printf("l_discount = %0.3f\n", l_discount);
    printf("l_extendedprice = %0.3f\n", l_extendedprice);
#endif

if (acid->logging) {
    gettimeofday(&tv, &tz);
    time(&timeT);
    fprintf(out, "acidT tag: %d, after read of LINEITEM: (%06u) %s",
        mypid, tv.tv_sec, tv.tv_usec, ctime(&timeT));
    fprintf(out, "l_partkey: %d\tl_supkey: %d\tl_quantity: %0.3f\n\tl_tax: %0.3f\n\tl_discount: %0.3f\tl_extendedprice: %0.3f\n",

```

```

        l_partkey, l_supkey, l_quantity, l_tax, l_discount, l_extendedprice);
    }

    rprice = TRUNC2( l_extendedprice/l_quantity );
    cost = TRUNC2( rprice * delta );
    new_extprice = l_extendedprice + cost;
    new_quantity = l_quantity + delta;

#ifdef DEBUG
    printf("rprice = %0.3f\n", rprice );
    printf("cost = %0.3f\n", cost );
    printf("new_extprice = %0.3f\n", new_extprice );
    printf("new_quantity = %0.3f\n", new_quantity );
#endif

    EXEC SQL UPDATE tpcd.lineitem
        SET l_extendedprice = :new_extprice,
            l_quantity = :new_quantity
        WHERE CURRENT OF l_cursor;

    if (sqlca.sqlcode != 0) {
        if (sqlca.sqlcode == DEADLOCK) goto retry_tran;
        rc = sqlca.sqlcode;
        if (acid->logging) {
            fprintf(out, "acidT **ERROR** sqlcode = %d\n", sqlca.sqlcode);
        } else {
            fprintf(stderr, "acidT **ERROR** sqlcode = %d\n", sqlca.sqlcode);
        } /* endif */
        sqlerror("acidT: UPDATE l_cursor", &sqlca);
        goto Terror;
    }

    if (acid->logging) {
        gettimeofday(&tv, &tz);
        time(&timeT);
        fprintf(out, "acidT tag: %d, after update of LINEITEM: (%us %06uu) %s",
            mypid, tv.tv_sec, tv.tv_usec, ctime(&timeT));
        fprintf(out, "updated l_extendedprice: %0.3f\n", new_extprice );
        fprintf(out, "updated l_quantity: %0.3f\n", new_quantity );
    }

    /* if (acid->termination == 0) {
        EXEC SQL CLOSE l_cursor;
        EXEC SQL CLOSE o_cursor;
        EXEC SQL COMMIT;
        if (sqlca.sqlcode != 0) {
            if (sqlca.sqlcode == DEADLOCK) goto retry_tran;
            rc = sqlca.sqlcode;
            if (acid->logging) {
                fprintf(out, "acidT **ERROR** sqlcode = %d\n", sqlca.sqlcode);
            } else {
                fprintf(stderr, "acidT **ERROR** sqlcode = %d\n", sqlca.sqlcode);
            }
            sqlerror("acidT: COMMIT", &sqlca);
            goto Terror;
        }
    } */

    if (acid->logging) {
        gettimeofday(&tv, &tz);
        time(&timeT);
        fprintf(out, "acidT tag: %d, before read of ORDER: (%us %06uu) %s",
            mypid, tv.tv_sec, tv.tv_usec, ctime(&timeT));
    }

    EXEC SQL OPEN o_cursor;
    if (sqlca.sqlcode != 0) {
        if (sqlca.sqlcode == DEADLOCK) goto retry_tran;
        rc = sqlca.sqlcode;
        if (acid->logging) {
            fprintf(out, "acidT **ERROR** sqlcode = %d\n", sqlca.sqlcode);
        } else {
            fprintf(stderr, "acidT **ERROR** sqlcode = %d\n", sqlca.sqlcode);
        } /* endif */
    }

```

```

        sqlerror("acidT: OPEN o_cursor", &sqlca);
        goto Terror;
    }

    EXEC SQL FETCH o_cursor INTO :o_totalprice;
    if (sqlca.sqlcode != 0) {
        if (sqlca.sqlcode == DEADLOCK) goto retry_tran;
        rc = sqlca.sqlcode;
        if (acid->logging) {
            fprintf(out, "acidT **ERROR** sqlcode = %d\n", sqlca.sqlcode);
        } else {
            fprintf(stderr, "acidT **ERROR** sqlcode = %d\n", sqlca.sqlcode);
        }
        sqlerror("acidT: FETCH o_cursor", &sqlca);
        goto Terror;
    }

#ifdef DEBUG
    printf("o_totalprice = %0.3f\n", o_totalprice);
#endif

    if (acid->logging) {
        gettimeofday(&tv, &tz);
        time(&timeT);
        fprintf(out, "acidT tag: %d, after read of ORDER: (%us %06uu) %s",
            mypid, tv.tv_sec, tv.tv_usec, ctime(&timeT));
        fprintf(out, "o_totalprice: %0.3f\n", o_totalprice);
    }

#ifdef DEBUG
    {
        double zeroone = l_extendedprice * (1.0 - l_discount);
        double zeroonetimes = (l_extendedprice * (1.0 - l_discount)) * 100.0;
        double firstone = TRUNC2(l_extendedprice * (1.0 - l_discount));
        double notone = TRUNC2( l_extendedprice * (1.0 - l_discount) ) * (1.0 + l_tax);
        double secondone = TRUNC2( TRUNC2( l_extendedprice * (1.0 - l_discount) )
            * (1.0 + l_tax) );
        printf("firstone= %f\n", firstone);
        printf("zeroone= %f\n", zeroone);
        printf("zeroonetimes= %f\n", zeroonetimes);
        printf("notone= %f\n", notone);
        printf("secondone= %f\n", secondone);
    }
#endif

    ototal = o_totalprice -
        TRUNC2( TRUNC2( l_extendedprice * (1 - l_discount) ) * (1 + l_tax) );
    new_ototal = TRUNC2( new_extprice * (1.0 - l_discount) );
    new_ototal = TRUNC2( new_ototal * (1.0 + l_tax) );
    new_ototal = ototal + new_ototal;

#ifdef DEBUG
    printf("o_totalprice= %f\n", o_totalprice);
    printf("ototal= %0.3f\n", ototal);
    printf("ototal= %f\n", ototal);
    printf("new_ototal= %0.3f\n", new_ototal);
#endif

    EXEC SQL UPDATE tpcd.orders
        SET o_totalprice = :new_ototal
        WHERE CURRENT OF o_cursor;
    if (sqlca.sqlcode != 0) {
        if (sqlca.sqlcode == DEADLOCK) goto retry_tran;
        rc = sqlca.sqlcode;
        if (acid->logging) {
            fprintf(out, "acidT **ERROR** sqlcode = %d\n", sqlca.sqlcode);
        } else {
            fprintf(stderr, "acidT **ERROR** sqlcode = %d\n", sqlca.sqlcode);
        } /* endif */
        sqlerror("acidT: UPDATE o_cursor", &sqlca);
        goto Terror;
    }

```

```

if (acid->logging) {
    gettimeofday(&tv, &tz);
    time(&timeT);
    fprintf(out, "acidT tag: %d, after update of ORDER: (%us %06uu) %s",
        mypid, tv.tv_sec, tv.tv_usec, ctime(&timeT));
    fprintf(out, "updated o_totalprice: %0.3f\n", new_ototal);
}

/*
** why is this code in here? we don't want to
** commit until the history table has been updated as well
if (acid->termination == 0) {
    EXEC SQL CLOSE L_CURSOR;
    EXEC SQL CLOSE O_CURSOR;
    EXEC SQL COMMIT;
    if (sqlca.sqlcode != 0) {
        if (sqlca.sqlcode == DEADLOCK) goto retry_tran;
        rc = sqlca.sqlcode;
        if (acid->logging) {
            fprintf(out, "acidT **ERROR** sqlcode = %d\n", sqlca.sqlcode);
        } else {
            fprintf(stderr, "acidT **ERROR** sqlcode = %d\n", sqlca.sqlcode);
        }
        sqlerror("acidT: COMMIT", &sqlca);
        goto TError;
    }
}

if (acid->logging) {
    gettimeofday(&tv, &tz);
    time(&timeT);
    fprintf(out, "acidT tag: %d, before insert into HISTORY: (%us %06uu) %s",
        mypid, tv.tv_sec, tv.tv_usec, ctime(&timeT));
}

EXEC SQL INSERT INTO tpcd.history values
(:l_partkey, :l_supkey, :o_key, :l_key, :delta, CURRENT TIMESTAMP);
if (sqlca.sqlcode != 0) {
    if (sqlca.sqlcode == DEADLOCK) goto retry_tran;
    rc = sqlca.sqlcode;
    if (acid->logging) {
        fprintf(out, "acidT **ERROR** sqlcode = %d\n", sqlca.sqlcode);
    } else {
        fprintf(stderr, "acidT **ERROR** sqlcode = %d\n", sqlca.sqlcode);
    } /* endif */
    sqlerror("acidT: INSERT INTO history", &sqlca);
    goto TError;
}

if (acid->logging) {
    gettimeofday(&tv, &tz);
    time(&timeT);
    fprintf(out, "acidT tag: %d, after insert into HISTORY: (%us %06uu) %s",
        mypid, tv.tv_sec, tv.tv_usec, ctime(&timeT));
}

/* sleep for 1 second for 80% of the transactions */
#ifdef SQLWINT
    if ( ((rand() % (100)) + 1) < 80 ) sleep(1);
#else
    if ( ((random() % (100)) + 1) < 80 ) sleep(1);
#endif

switch (acid->termination) {
case 1:
    {
        if (acid->logging)
        {
            gettimeofday(&tv, &tz);
            time(&timeT);
            fprintf(out, "acidT tag: %d, wait before COMMIT: (%us %06uu) %s",
                mypid, tv.tv_sec, tv.tv_usec, ctime(&timeT));

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        }
    }
    sleep(60);
case 0:
    if (acid->logging) {
        gettimeofday(&tv, &tz);
        time(&timeT);
        fprintf(out, "acidT tag: %d, immediately before COMMIT: (%us %06uu) %s",
            mypid, tv.tv_sec, tv.tv_usec, ctime(&timeT));
    }
    EXEC SQL CLOSE L_CURSOR;
    EXEC SQL CLOSE O_CURSOR;
    EXEC SQL COMMIT;
    if (sqlca.sqlcode != 0) {
        if (sqlca.sqlcode == DEADLOCK) goto retry_tran;
        rc = sqlca.sqlcode;
        if (acid->logging) {
            fprintf(out, "acidT **ERROR** sqlcode = %d\n", sqlca.sqlcode);
        } else {
            fprintf(stderr, "acidT **ERROR** sqlcode = %d\n", sqlca.sqlcode);
        } /* endif */
        sqlerror("acidT: COMMIT", &sqlca);
        goto TError;
    }
    if (acid->logging) {
        gettimeofday(&tv, &tz);
        time(&timeT);
        fprintf(out, "acidT tag: %d, after COMMIT: (%us %06uu) %s",
            mypid, tv.tv_sec, tv.tv_usec, ctime(&timeT));
    }
    break;
case 3:
    if (acid->logging) {
        gettimeofday(&tv, &tz);
        time(&timeT);
        fprintf(out, "acidT tag: %d, wait before ROLLBACK: (%us %06uu) %s",
            mypid, tv.tv_sec, tv.tv_usec, ctime(&timeT));
    }
    sleep(60);
case 2:
    if (acid->logging) {
        gettimeofday(&tv, &tz);
        time(&timeT);
        fprintf(out, "acidT tag: %d, immediately before ROLLBACK: (%us %06uu) %s",
            mypid, tv.tv_sec, tv.tv_usec, ctime(&timeT));
    }
    EXEC SQL CLOSE L_CURSOR;
    EXEC SQL CLOSE O_CURSOR;
    EXEC SQL rollback work;
    if (sqlca.sqlcode != 0) {
        if (sqlca.sqlcode == DEADLOCK) goto retry_tran;
        rc = sqlca.sqlcode;
        if (acid->logging) {
            fprintf(out, "acidT **ERROR** sqlcode = %d\n", sqlca.sqlcode);
        } else {
            fprintf(stderr, "acidT **ERROR** sqlcode = %d\n", sqlca.sqlcode);
        } /* endif */
        sqlerror("acidT: ROLLBACK", &sqlca);
        goto TError;
    }
    if (acid->logging) {
        gettimeofday(&tv, &tz);
        time(&timeT);
        fprintf(out, "acidT tag: %d, after ROLLBACK: (%us %06uu) %s",
            mypid, tv.tv_sec, tv.tv_usec, ctime(&timeT));
    }
    break;
}

acid->l_partkey = l_partkey;
acid->l_supkey = l_supkey;
acid->l_quantity = l_quantity;

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acid->l_tax = l_tax;
acid->l_discount = l_discount;
acid->l_extendedprice = l_extendedprice;
acid->o_totalprice = o_totalprice;

rc = 0;
goto Texit;

Terror:
EXEC SQL CLOSE L_CURSOR;
EXEC SQL CLOSE O_CURSOR;
EXEC SQL rollback work;
if (sqlca.sqlcode != 0) sqlerror("acidT: ROLLBACK FAILED", &sqlca);

Texit:
if (acid->logging) {
    fprintf(out, "\n----- END of acidT tag: %d ----- \n\n", mypid);
    fflush(out); fclose(out);
}
return(rc);
}

/*-----*/
/*      updateQ      */
/*-----*/
int updateQ (struct update_struct *us)
{
    FILE *out;
    time_t timeT;
    struct timeval tv;
    struct timezone tz;
    int qnum;
    int rc = 0;
    int i;
    int secs2sleep;
    char buff[256];
    struct acidtype {int logging;} a, *acid;

EXEC SQL BEGIN DECLARE SECTION;
double  acctbal;
double  discount;
double  price;
sqlint32  availqty;
sqlint32  size;
EXEC SQL END DECLARE SECTION;

qnum = us->qnum;

acid = &a;
acid->logging = 1;

sprintf(buff, "%s%cupdate.out", getenv("TPCD_TMP_DIR"), del());
out = fopen(buff, "a");

gettimeofday(&tv, &tz);
time(&timeT);
fprintf(out, "\n----- START of update ----- \n\n");
fprintf(out, "update query number: %d, begin transaction time: (%us %06uu)
%s",
    qnum, tv.tv_sec, tv.tv_usec, ctime(&timeT));

sqlca.sqlcode = 0;
discount = 0.25;
price = 5000.50;
acctbal = 1000.00;
availqty = 10;
size = 5;

for (i=1; i <= 2; i++) {
    gettimeofday(&tv, &tz);
    time(&timeT);
    fprintf(out, "update query number: %d, pass %d, immediately before
UPDATE: (%us %06uu) %s",
        qnum, i, tv.tv_sec, tv.tv_usec, ctime(&timeT));

```

```

switch (qnum)
{
    case 1:
    {
        EXEC SQL
            UPDATE TPCD.LINEITEM set L_DISCOUNT = L_DISCOUNT +
:discount
            WHERE L_ORDERKEY IN (326,512,928,995);
        if (sqlca.sqlcode != 0) {
            rc = sqlca.sqlcode;
            if (acid->logging)
            {
                fprintf(out, "update query number: %d, pass %d, **ERROR** sqlcode =
%d\n",
                    qnum, i, sqlca.sqlcode);
            }
            else
            {
                fprintf(stderr, "update query number: %d, pass %d, **ERROR** sqlcode
= %d\n",
                    qnum, i, sqlca.sqlcode);
            }
            sqlerror("update query number 1", &sqlca);
            goto Uerror;
        }
        discount = discount * (-1);
        secs2sleep = 300;
        break;
    }
    case 2:
    {
        EXEC SQL
            UPDATE TPCD.SUPPLIER set S_ACCTBAL = S_ACCTBAL +
:acctbal
            WHERE S_NAME in
('Supplier#000000647','Supplier#000000070','Supplier#000000802');
        if (sqlca.sqlcode != 0) {
            rc = sqlca.sqlcode;
            if (acid->logging)
            {
                fprintf(out, "update query number: %d, pass %d, **ERROR** sqlcode =
%d\n",
                    qnum, i, sqlca.sqlcode);
            }
            else
            {
                fprintf(stderr, "update query number: %d, pass %d, **ERROR** sqlcode
= %d\n",
                    qnum, i, sqlca.sqlcode);
            }
            sqlerror("update query number 2", &sqlca);
            goto Uerror;
        }
        acctbal = acctbal * (-1);
        secs2sleep = 90;
        break;
    }
    case 3:
    {
        EXEC SQL
            UPDATE TPCD.LINEITEM set L_DISCOUNT = L_DISCOUNT +
:discount
            WHERE L_ORDERKEY IN (260930, 402497, 457859, 509889, 58117,
538311, 588421, 416167, 97830, 90276);
        if (sqlca.sqlcode != 0) {
            rc = sqlca.sqlcode;
            if (acid->logging)
            {
                fprintf(out, "update query number: %d, pass %d, **ERROR** sqlcode =
%d\n",
                    qnum, i, sqlca.sqlcode);
            }
            else

```

```

    {
        fprintf(stderr,"update query number: %d, pass %d, **ERROR** sqlcode
= %d\n",
            qnum, i, sqlca.sqlcode);
    }
    sqlerror("update query number 3", &sqlca);
    goto Uerror;
}
discount = discount * (-1);
secs2sleep = 300;
break;
}
case 4:
{
    if ( i == 1 ) {
        EXEC SQL
            UPDATE TPCD.ORDERS set O_ORDERDATE = O_ORDERDATE -
6 MONTHS
            WHERE O_ORDERKEY = 67461;
        /* WHERE O_ORDERKEY IN
(22400,28515,34338,46596,67461,92644,98307);*/
    } else {
        EXEC SQL
            UPDATE TPCD.ORDERS set O_ORDERDATE = O_ORDERDATE +
6 MONTHS
            WHERE O_ORDERKEY = 67461;
    }
    if (sqlca.sqlcode != 0) {
        rc = sqlca.sqlcode;
        if (acid->logging)
        {
            fprintf(out,"update query number: %d, pass %d, **ERROR** sqlcode =
%d\n",
                qnum, i, sqlca.sqlcode);
        }
        else
        {
            fprintf(stderr,"update query number: %d, pass %d, **ERROR** sqlcode
= %d\n",
                qnum, i, sqlca.sqlcode);
        }
        sqlerror("update query number 4", &sqlca);
        goto Uerror;
    }
    secs2sleep = 300;
    break;
}
case 5:
{
    EXEC SQL
        UPDATE TPCD.LINEITEM set L_DISCOUNT = L_DISCOUNT +
:discount
        WHERE L_ORDERKEY IN (70976,566279,152897,84226,232483);
    if (sqlca.sqlcode != 0) {
        rc = sqlca.sqlcode;
        if (acid->logging)
        {
            fprintf(out,"update query number: %d, pass %d, **ERROR** sqlcode =
%d\n",
                qnum, i, sqlca.sqlcode);
        }
        else
        {
            fprintf(stderr,"update query number: %d, pass %d, **ERROR** sqlcode
= %d\n",
                qnum, i, sqlca.sqlcode);
        }
        sqlerror("update query number 5", &sqlca);
        goto Uerror;
    }
    discount = discount * (-1);
    secs2sleep = 300;
    break;
}
}

```

```

case 6:
{
    EXEC SQL
        UPDATE TPCD.LINEITEM set L_DISCOUNT = L_DISCOUNT +
:discount
        WHERE L_ORDERKEY in (33,131,161,195,229,230,231,323,353,356);
    if (sqlca.sqlcode != 0) {
        rc = sqlca.sqlcode;
        if (acid->logging)
        {
            fprintf(out,"update query number: %d, pass %d, **ERROR** sqlcode =
%d\n",
                qnum, i, sqlca.sqlcode);
        }
        else
        {
            fprintf(stderr,"update query number: %d, pass %d, **ERROR** sqlcode
= %d\n",
                qnum, i, sqlca.sqlcode);
        }
        sqlerror("update query number 6", &sqlca);
        goto Uerror;
    }
    discount = discount * (-1);
    secs2sleep = 300;
    break;
}
case 7:
{
    EXEC SQL
        UPDATE TPCD.LINEITEM set L_DISCOUNT = L_DISCOUNT +
:discount
        WHERE L_ORDERKEY IN
(562917,410659,16550,398401,157634,429920,45411);
    if (sqlca.sqlcode != 0) {
        rc = sqlca.sqlcode;
        if (acid->logging)
        {
            fprintf(out,"update query number: %d, pass %d, **ERROR** sqlcode =
%d\n",
                qnum, i, sqlca.sqlcode);
        }
        else
        {
            fprintf(stderr,"update query number: %d, pass %d, **ERROR** sqlcode
= %d\n",
                qnum, i, sqlca.sqlcode);
        }
        sqlerror("update query number 7", &sqlca);
        goto Uerror;
    }
    discount = discount * (-1);
    secs2sleep = 300;
    break;
}
case 8:
{
    EXEC SQL
        UPDATE TPCD.LINEITEM set L_DISCOUNT = L_DISCOUNT +
:discount
        WHERE L_ORDERKEY IN
(129569,343591,270242,254983,98500,28963);
    if (sqlca.sqlcode != 0) {
        rc = sqlca.sqlcode;
        if (acid->logging)
        {
            fprintf(out,"update query number: %d, pass %d, **ERROR** sqlcode =
%d\n",
                qnum, i, sqlca.sqlcode);
        }
        else
        {
            fprintf(stderr,"update query number: %d, pass %d, **ERROR** sqlcode
= %d\n",
                qnum, i, sqlca.sqlcode);
        }
    }
}

```

```

        qnum, i, sqlca.sqlcode);
    }
    sqlerror("update query number 8", &sqlca);
    goto Uerror;
}
discount = discount * (-1);
secs2sleep = 300;
break;
}
case 9:
{
    EXEC SQL
        UPDATE TPCD.LINEITEM set L_DISCOUNT = L_DISCOUNT +
:discount
        WHERE L_ORDERKEY IN
(113509,232997,246691,379233,448162,32134);
    if (sqlca.sqlcode != 0) {
        rc = sqlca.sqlcode;
        if (acid->logging)
        {
            fprintf(out,"update query number: %d, pass %d, **ERROR** sqlcode =
%d\n",
                qnum, i, sqlca.sqlcode);
        }
        else
        {
            fprintf(stderr,"update query number: %d, pass %d, **ERROR** sqlcode
= %d\n",
                qnum, i, sqlca.sqlcode);
        }
        sqlerror("update query number 9", &sqlca);
        goto Uerror;
    }
    discount = discount * (-1);
    secs2sleep = 300;
    break;
}
case 10:
{
    EXEC SQL
        UPDATE TPCD.LINEITEM set L_DISCOUNT = L_DISCOUNT +
:discount
        WHERE L_ORDERKEY IN
(516487,245411,265799,253025,6914,562020);
    if (sqlca.sqlcode != 0) {
        rc = sqlca.sqlcode;
        if (acid->logging)
        {
            fprintf(out,"update query number: %d, pass %d, **ERROR** sqlcode =
%d\n",
                qnum, i, sqlca.sqlcode);
        }
        else
        {
            fprintf(stderr,"update query number: %d, pass %d, **ERROR** sqlcode
= %d\n",
                qnum, i, sqlca.sqlcode);
        }
        sqlerror("update query number 10", &sqlca);
        goto Uerror;
    }
    discount = discount * (-1);
    secs2sleep = 300;
    break;
}
case 11:
{
    EXEC SQL
        UPDATE TPCD.PARTSUPP set PS_AVAILQTY = PS_AVAILQTY +
:availqty
        WHERE PS_PARTKEY IN
(12098,5134,13334,17052,3452,12552,1084,5797);
    if (sqlca.sqlcode != 0) {
        rc = sqlca.sqlcode;

```

```

        if (acid->logging)
        {
            fprintf(out,"update query number: %d, pass %d, **ERROR** sqlcode =
%d\n",
                qnum, i, sqlca.sqlcode);
        }
        else
        {
            fprintf(stderr,"update query number: %d, pass %d, **ERROR** sqlcode
= %d\n",
                qnum, i, sqlca.sqlcode);
        }
        sqlerror("update query number 11", &sqlca);
        goto Uerror;
    }
    availqty = availqty * (-1);
    secs2sleep = 180;
    break;
}
case 12:
{
    if (i == 1) {
        EXEC SQL
            UPDATE TPCD.LINEITEM set L_RECEIPTDATE =
L_RECEIPTDATE - 3 YEARS
            WHERE L_ORDERKEY IN (33,70,195,355,677,837,960,962,1028);
    } else {
        EXEC SQL
            UPDATE TPCD.LINEITEM set L_RECEIPTDATE =
L_RECEIPTDATE + 3 YEARS
            WHERE L_ORDERKEY IN (33,70,195,355,677,837,960,962,1028);
    }
    if (sqlca.sqlcode != 0) {
        rc = sqlca.sqlcode;
        if (acid->logging)
        {
            fprintf(out,"update query number: %d, pass %d, **ERROR** sqlcode =
%d\n",
                qnum, i, sqlca.sqlcode);
        }
        else
        {
            fprintf(stderr,"update query number: %d, pass %d, **ERROR** sqlcode
= %d\n",
                qnum, i, sqlca.sqlcode);
        }
        sqlerror("update query number 12", &sqlca);
        goto Uerror;
    }
    secs2sleep = 300;
    break;
}
case 13:
{
    EXEC SQL
        UPDATE TPCD.LINEITEM set L_DISCOUNT = L_DISCOUNT +
:discount
        WHERE L_ORDERKEY IN (263,9476,32355,34854,53445,56901);
    if (sqlca.sqlcode != 0) {
        rc = sqlca.sqlcode;
        if (acid->logging)
        {
            fprintf(out,"update query number: %d, pass %d, **ERROR** sqlcode =
%d\n",
                qnum, i, sqlca.sqlcode);
        }
        else
        {
            fprintf(stderr,"update query number: %d, pass %d, **ERROR** sqlcode
= %d\n",
                qnum, i, sqlca.sqlcode);
        }
        sqlerror("update query number 13", &sqlca);
        goto Uerror;
    }

```

```

    }
    discount = discount * (-1);
    secs2sleep = 90;
    break;
}
case 14:
{
    EXEC SQL
        UPDATE TPCD.LINEITEM set L_DISCOUNT = L_DISCOUNT +
:discount
        WHERE L_ORDERKEY IN (32,225,326,448,449,483,512);
    if (sqlca.sqlcode != 0) {
        rc = sqlca.sqlcode;
        if (acid->logging)
        {
            fprintf(out,"update query number: %d, pass %d, **ERROR** sqlcode =
%d\n",
                qnum, i, sqlca.sqlcode);
        }
        else
        {
            fprintf(stderr,"update query number: %d, pass %d, **ERROR** sqlcode
= %d\n",
                qnum, i, sqlca.sqlcode);
        }
        sqlerror("update query number 14", &sqlca);
        goto Uerror;
    }
    discount = discount * (-1);
    secs2sleep = 180;
    break;
}
case 15:
{
    EXEC SQL
        UPDATE TPCD.LINEITEM set L_DISCOUNT = L_DISCOUNT +
:discount
        WHERE L_ORDERKEY IN (1,4,7,35,135,131300);
    if (sqlca.sqlcode != 0) {
        rc = sqlca.sqlcode;
        if (acid->logging)
        {
            fprintf(out,"update query number: %d, pass %d, **ERROR** sqlcode =
%d\n",
                qnum, i, sqlca.sqlcode);
        }
        else
        {
            fprintf(stderr,"update query number: %d, pass %d, **ERROR** sqlcode
= %d\n",
                qnum, i, sqlca.sqlcode);
        }
        sqlerror("update query number 15", &sqlca);
        goto Uerror;
    }
    discount = discount * (-1);
    secs2sleep = 180;
    break;
}
case 16:
{
    EXEC SQL
        UPDATE TPCD.PART set P_SIZE = P_SIZE + :size
        WHERE P_PARTKEY IN (4,7,15,1313);
    if (sqlca.sqlcode != 0) {
        rc = sqlca.sqlcode;
        if (acid->logging)
        {
            fprintf(out,"update query number: %d, pass %d, **ERROR** sqlcode =
%d\n",
                qnum, i, sqlca.sqlcode);
        }
        else
        {

```

```

            fprintf(stderr,"update query number: %d, pass %d, **ERROR** sqlcode
= %d\n",
                qnum, i, sqlca.sqlcode);
        }
        sqlerror("update query number 16", &sqlca);
        goto Uerror;
    }
    size = size * (-1);
    secs2sleep = 180;
    break;
}
case 17:
{
    EXEC SQL
        UPDATE TPCD.LINEITEM set L_EXTENDEDPRICE =
L_EXTENDEDPRICE + :price
        WHERE L_ORDERKEY IN (4065,110372,165061,265702,87138);
    if (sqlca.sqlcode != 0) {
        rc = sqlca.sqlcode;
        if (acid->logging)
        {
            fprintf(out,"update query number: %d, pass %d, **ERROR** sqlcode =
%d\n",
                qnum, i, sqlca.sqlcode);
        }
        else
        {
            fprintf(stderr,"update query number: %d, pass %d, **ERROR** sqlcode
= %d\n",
                qnum, i, sqlca.sqlcode);
        }
        sqlerror("update query number 17", &sqlca);
        goto Uerror;
    }
    price = price * (-1);
    secs2sleep = 90;
    break;
}
default:
{
    fprintf(out,"ERROR: Invalid query number specified %d\n", qnum);
    rc = 1;
    goto Uexit;
}
}

gettimeofday(&tv, &tz);
time(&timeT);

if (acid->logging)
    fprintf(out,"update query number: %d, pass %d, after UPDATE: (%us
%06uu) %s",
        qnum, i, tv.tv_sec, tv.tv_usec, ctime(&timeT));
else
    fprintf(stderr,"update query number: %d, pass %d, after UPDATE: (%us
%06uu) %s",
        qnum, i, tv.tv_sec, tv.tv_usec, ctime(&timeT));

if ( i == 2 ) {
    gettimeofday(&tv, &tz);
    time(&timeT);
    fprintf(out,"update query number: %d, pass %d, sleeping for %d seconds:
(%us %06uu) %s",
        qnum, i, secs2sleep, tv.tv_sec, tv.tv_usec, ctime(&timeT));
    fflush(out);
    system("touch /tmp/tpcd/update.sync.sleep");
    sleep(secs2sleep);
}

gettimeofday(&tv, &tz);
time(&timeT);
fprintf(out,"update query number: %d, pass %d, immediately before
COMMIT: (%us %06uu) %s",
    qnum, i, tv.tv_sec, tv.tv_usec, ctime(&timeT));

```



```

EXEC SQL COMMIT;
if (sqlca.sqlcode != 0) {
    rc = sqlca.sqlcode;
    fprintf(out,"update pass %d, **ERROR** sqlcode = %d\n", i,
sqlca.sqlcode);
    sqlerror("update: COMMIT", &sqlca);
    goto Uerror;
}
gettimeofday(&tv, &tz);
time(&timeT);
if (acid->logging)
    fprintf(out,"update query number: %d, pass %d, after COMMIT: (%us
%06uu) %s",
        qnum, i, tv.tv_sec, tv.tv_usec, ctime(&timeT));
else
    fprintf(stderr,"update query number: %d, pass %d, after COMMIT: (%us
%06uu) %s",
        qnum, i, tv.tv_sec, tv.tv_usec, ctime(&timeT));
}

rc = 0;
goto Uexit;

Uerror:
EXEC SQL rollback work;
if (sqlca.sqlcode != 0) sqlerror("update: ROLLBACK FAILED", &sqlca);
system("touch /tmp/tpcd/update.sync.sleep");

Uexit:
fprintf(out,"n----- END of update -----n\n");
fflush(out);fclose(out);
return(rc);
}

/*-----*/
/*    connect_to_TM                                */
/*-----*/

void connect_to_TM( void )
{
    char *dbname_ptr;
    if ((dbname_ptr = getenv("TPCD_QUAL_DBNAME")) != NULL) {
        fprintf(stderr,"***** %s *****n",dbname_ptr);
        strcpy (dbname, dbname_ptr);
    }

    EXEC SQL CONNECT TO :dbname IN SHARE MODE;
    if (sqlca.sqlcode < 0) {
        fprintf(stderr, "CONNECT TO %s failed SQLCODE = %d\n", dbname,
sqlca.sqlcode);
        exit(-1);
    }
    return;
}

/*-----*/
/*    disconnect_from_TM                            */
/*-----*/

void disconnect_from_TM ( void )
{
    EXEC SQL CONNECT RESET;
    if (sqlca.sqlcode < 0) {
        fprintf(stderr, "DISCONNECT failed SQLCODE = %d\n", sqlca.sqlcode);
        exit(-1);
    }
    return;
}

/*-----*/
/*    sqlerror                                      */
/*-----*/

void sqlerror(char *msg, struct sqlca *psqlca)
{
    FILE *err_fp;

```

```

char err_fn[256];

int j,k;

sprintf(err_fn, "%s%cacid.sqlerrors",getenv("TPCD_TMP_DIR"),del());
err_fp=fopen(err_fn,"a");
fprintf(err_fp,"acid: sqlcode: %4d %s\n", psqlca->sqlcode, msg);
fprintf(stderr,"acid: sqlcode: %4d %s\n", psqlca->sqlcode, msg);
fflush(stderr);
if (psqlca->sqlerrmc[0] != ' ' || psqlca->sqlerrmc[1] != ' ') {
    fprintf(err_fp,"acid: slerrmc: ");
    for(j = 0; j < 5; j++)
    {
        for(k = 0; k < 14; k++) fprintf(err_fp,"%x ", psqlca->sqlerrmc[j*10+k]);
        fprintf(err_fp," ");
        for(k = 0; k < 14; k++) fprintf(err_fp,"%c", psqlca->sqlerrmc[j*10+k]);
        fprintf(err_fp,"n");
        if (j < 4) fprintf(err_fp," ");
    }
}

fprintf(err_fp,"acid: sqlerrp: ");
for(j = 0; j < 8; j++) fprintf(err_fp,"%c", psqlca->sqlerrp[j]);
fprintf(err_fp,"n");

fprintf(err_fp,"acid: sqlerrd: ");
for(j = 0; j < 6; j++) fprintf(err_fp,"%d", psqlca->sqlerrd[j]);
fprintf(err_fp,"n");

if (psqlca->sqlwarn[0] != ' ') {
    fprintf(err_fp,"acid: sqlwarn: ");
    for(j = 0; j < 8; j++) fprintf(err_fp,"%c ", psqlca->sqlwarn[j]);
    fprintf(err_fp,"n");
}

fprintf(err_fp,"n");
fflush(err_fp);fclose(err_fp);
}

#ifdef SQLWINT
void sleep(int sec)
{
    Sleep(sec * 1000);
}
#endif

char del(void)
{
#ifdef SQLWINT
    return '\\';
#else
    return '/';
#endif
}

#ifdef defined(SQLPTX) || defined(SQLWINT) || defined(SQLSUN) ||
defined(Linux)
/* added fot PTX as this one is not there in libm */
double nearest(double x)
{
    double y, z;

    y = x;
    if (x < 0)
        y = -x;
    z = y - (int)y;
    if (z == 0.5) {
        if (((int)floor(y) % 2) {
            return((x < 0) ? -ceil(y) : ceil(y));
        } else {

```

```

        return((x < 0) ? -floor(y) : floor(y));
    }
} else if (z < 0.5)
    return((x < 0) ? -floor(y) : floor(y));
else
    return((x < 0) ? -ceil(y) : ceil(y));
}
#endif /* SQLPTX */

```

makefile

```

DBNAME =          $(TPCD_QUAL_DBNAME)

INCLUDE =          $(HOME)/sqllib/include

#CFLAGS =          -I$(INCLUDE) -g -Dpascal= -DLINT_ARGS \
#                  -Dfar= -D_loadds= -DSQLA_NOLINES -qflag=i:i -qlanglvl=ansi

#LFLAGS =          -lm -lcurses -ls -ll -ly -liconv -lbsd
CFLAGS =           -I$(INCLUDE) -g -Dpascal= -DLINT_ARGS \
                   -DSQLA_NOLINES -qflag=i:i -qlanglvl=ansi
# .. sun          -DSQLA_NOLINES

LFLAGS =           -lm -lbsd
# sun .... LFLAGS = -lm

LIB =              -L$(HOME)/sqllib/lib -ldb2

CC =               cc

HDR =              acid.h
C =                mainacid.c
SQC =              acid.sqc
SRC =              $(HDR)          $(C)          $(SQC)
OBJ =              acid.o
EXEC =             mainacid

TARGET =           $(EXEC) tsec

.SUFFIXES: .o .c .sqc .bnd

.c.o:
    $(CC) -c $< $(CFLAGS)

all:               $(TARGET)

mainacid: $(SRC) $(OBJ) mainacid.o
    $(CC) -o $@ $(CFLAGS) $(OBJ) mainacid.o $(LIB) $(LFLAGS)

acid.c: acid.sqc $(HDR)
    - db2 connect to $(DBNAME); \
    db2 prep acid.sqc BINDFILE ISOLATION RR NOLINEMACRO
PACKAGE; \
    db2 bind acid.bnd GRANT PUBLIC; \
    db2 connect reset; \
    db2 terminate

acid.o: acid.c
    $(CC) $(CFLAGS) -c acid.c -o acid.o

tsec: tsec.c
    $(CC) $(CFLAGS) $(LFLAGS) -o tsec tsec.c

clean:
    rm -f *.o *.bnd $(EXEC) tsec
    rm -f acid.c

```

Appendix F: Price Quotations



Protect Your Data - Grow Your Business

To:
Attention:
Phone:
Fax:
Email:

From: Alan Powers
Phone: (248)223-1020 x344
Fax: (248)223-1026
Email: apowers@compsat.com

QUOTE # : 8WHES445_030104
DATE: March 1, 2004

IBM x445 Configuration

		List Price		Compsat Discounted Price		
Part No.	Description	Qty	(per unit)	(quantity x unit price)	(per unit)	(quantity x unit price)
			US Dollar	US Dollar	US Dollar	US Dollar
x445 SERVER(s)						
887042X	x445, 4xXeon MP 3.0GHz/400MHz, 4MB, 2GB, O/Bay, 2x1050W p/s, Rack	1	\$ 40,799.00	\$ 40,799.00	\$34,271.16	\$34,271.16
96P1894	3 YR onsite repair 24x7x4 hour (x445)	1	\$ 3,221.00	\$ 3,221.00	\$2,834.48	\$2,834.48
13N0721	Xeon MP 3.0GHz/400MHz	4	\$ 6,599.00	\$ 26,396.00	\$5,939.10	\$23,756.40
02R1870	x445 SMP Expansion Module	1	\$ 4,849.00	\$ 4,849.00	\$4,364.10	\$4,364.10
33L5038	512GB PC2100 DDR ECC SDRAM RDIMM	28	\$ 249.00	\$ 6,972.00	\$224.10	\$6,274.80
32P0734	IBM 36.4GB 15K Ultra320 SCSI Hot-Swap SL HDD	2	\$ 495.00	\$ 990.00	\$445.50	\$891.00
633147N	E54 15" Colour Monitor (Stealth Grey)/MPRII	1	\$ 119.00	\$ 119.00	\$107.10	\$107.10
30L9183	3 YR onsite exch. 24x7x4 hour (E54 Monitor)	1	\$ 90.00	\$ 90.00	\$79.20	\$79.20
31P7415	IBM Preferred Pro Full-size Keyboard PS/2	1	\$ 29.00	\$ 29.00	\$26.10	\$26.10
28L3673	IBM Sleek 2-Button Mouse	1	\$ 14.95	\$ 14.95	\$13.46	\$13.46
32P0033	IBM ServeRAID-6M Ultra320 SCSI Adapter	5	\$ 999.00	\$ 4,995.00	\$899.10	\$4,495.50
03K9311	4.2M Ultra2 SCSI Cable	10	\$ 105.00	\$ 1,050.00	\$94.50	\$945.00
EXP400(s)						
17331RU	IBM EXP400 Storage Expansion Unit	10	\$ 3,099.00	\$ 30,990.00	\$2,603.16	\$26,031.60
41L2768	3 YR onsite repair 24x7x4 hour (EXP400)	10	\$ 760.00	\$ 7,600.00	\$668.80	\$6,688.00
32P0734	IBM 36.4 GB 15K Ultra320 SCSI Hot-Swap HDD	136	\$ 495.00	\$ 67,320.00	\$445.50	\$60,588.00
RACK and OPTIONS						
9306421	NetBAY42 SX Standard Expansion Rack Cabinet - includes Perforated front doc	1	\$ 1,439.00	\$ 1,439.00	\$1,208.76	\$1,208.76
41L2758	3 YR onsite repair 24x7x4 hour (NetBAY Rack)	1	\$ 168.00	\$ 168.00	\$147.84	\$147.84
32P1020	APC Smart-UPS Model 1400	1	\$ 855.00	\$ 855.00	\$769.50	\$769.50
TOTAL =			\$197,896.95		TOTAL =	\$173,492.00
						12.33%

12.33%

25330 Telegraph Road / Suite 200 Raleigh Officentre / Southfield, Michigan 48034
Phone: 248-223-1020 / Fax: 248-223-1026 / www.compsat.com

NOTE:

- This quote may include Compsat Technology consulting and configuration charges.
- Mfg. pricing is out of our control and could change without notice.
- Pricing good for 30 Days from date quoted.

Microsoft Corporation
One Microsoft Way
Redmond, WA 98052-6399

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

Microsoft

February 27, 2004

IBM Corporation
Chris King
3039 Cornwallis Road
Research Triangle Park,
NC 27709

Ms. King:

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
P72-00264	Windows Server 2003, Enterprise Edition <i>Server license only - No CALs</i> <i>Discount Schedule: Open Program - No Level</i> <i>Unit Price reflects a 40% discount from the</i> <i>retail unit price of \$3,999.</i>	\$2,399	1	\$2,399
PRO-PRORS-16U-01	Database Server Support Package <i>1 Year Term</i>	\$1,950	3	\$5,850

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

This quote is valid for the next 90 days.

If we can be of any further assistance, please contact Jamie Reding at (425) 703-0510 or jamiere@microsoft.com.

Reference ID: PHchki0427022087

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

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