Teradata
a division of NCR

TPC Benchmark ä H (Decision Support) 3000 GB Full Disclosure Report

NCR 5350
Using Teradata DBS V2R5.0

Submitted for Review
January 6, 2003

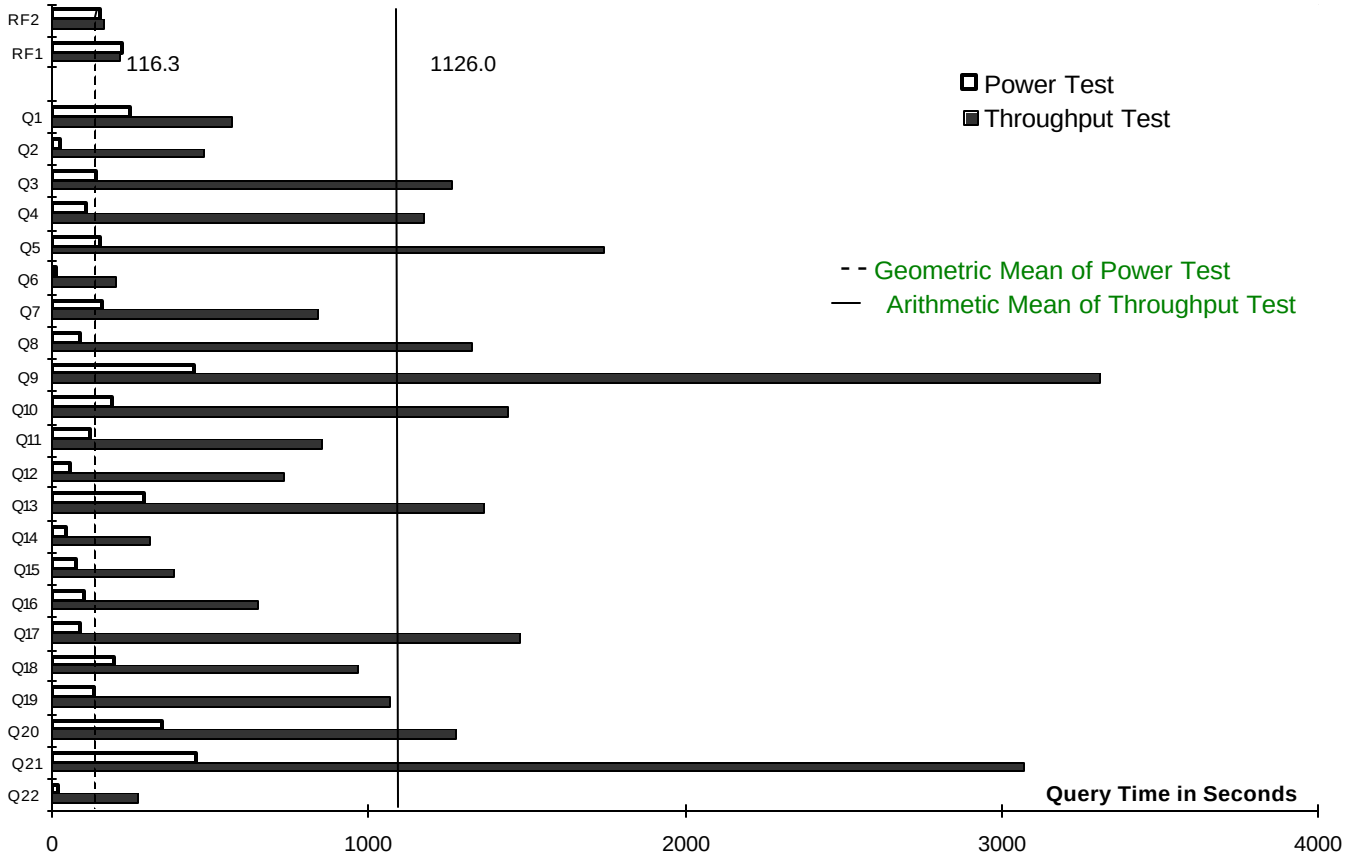
NCR 5350
Using Teradata V2R5.0

TPC-H Rev 2.0.0

Report Date: January 6, 2003

Total System Cost	Composite Query Per Hour Rating	Price/Performance
$ 16,937,451	**79,528.0** QphH@3000GB	**$213** per QphH@3000GB

Database Size	Database Manager	Operating System	Other Software	Availability Date
3000GB	**Teradata V2R5.0**	**UNIX MP-RAS 3.02.00**	**None**	**HW: Now SW: Now**



Database Load Time = 6Hrs 48 Mins	**Load included backup: N**	**Total Data Storage / Database Size = 16.6**
RAID (base tables):	**RAID (Base tables & Auxiliary Data Structures) =**	**RAID (All): Y**

System Configuration

Processors:	64 x 2 Intel Xeon 2.8 GHz CPUs w/512 KB Cache
Memory (per node):	4 GB Memory
Disk Drives (per **four** nodes):	3 Dual Controller Array each w/56 X 18GB 15K drives 16 18GB internal drives (4 per node)
BYNET interconnect support with 2 64-port BYNET switches	

Total GB of Storage = 49813 GB

* Database size includes only raw data (e.g. no temp, index, redundant storage space, etc.)

PRODUCT ID	DESCRIPTION	QTY	EXT PRICE	3 -YR MAINT
Server Hardware				
9130-5354-8090	NCR 5350 QUAD NODE SYSTEM CABINET	1	$456,000	$44,100
9130-5358-8090	NCR 5350 QUAD NODE EXPANSION CABINET	15	$6,840,000	$661,941
9102-5301-8090	64 NODES BYNET V2 SWITCH CABINET, 5M CABLES BUNDLED	2	$0	$65,033
9130-F117	MEMORY DIMM SDRAM - 1GB	64	$115,200	$0
9130-F118	MEMORY DIMM SDRAM - 2GB	64	$345,600	$0
9130-F242	LSI QUAD FIBRE CHANNEL STORAGE ADAPTER, 2GB	128	$153,408	$0
2300-1602-8090	A16 AWS W2K 20+ NODES	1	$8,700	$772
2020-1021-8090	MONITOR 22IN	1	$479	$207
9130-F432	TAPE - DDS-4 SCSI SGT 20/40GB	1	$1,560	$0
2300-K770	POWER CORD- US	1	$21	$0
2300-K800	KEYBOARD (US ENGLISH)	1	$15	$0
2020-K841	MODEM- EXTERNAL 56K USA	1	$240	$0
9130-K936	SIDE PANELS, STABILIZERS, MANUALS & ACCESSORIES	1	$900	$0
	Server Subtotal		**$ 7,922,123**	**$ 772,052**
Storage Devices				
6000-0000-8090	WES CABINET FOR BUNDLED ARRAYS	24	$501,600	$76,440
6840-0000-8900	DUAL CONTROLLER BUNDLED ARRAY WITH 56 18GB 15K DRIVES	48	$4,620,000	$524,790
6000-F262	INSTALL FEATURE 6840-1456	48	$0	$0
6000-K932	WES 5.0 ACCESSORIES KIT	3	$0	$0
6000-F951	12 METER FC CABLE WITH LC-LC	192	$38,400	$0
	Storage Devices Subtotal		**$ 5,160,000**	**$ 601,230**
Software Licenses				
F601-7730-0000	SW;EOE/MPP 8 NODES	8	$123,600	$98,235
F601-7811-0000	SW;OLTP AWS OP ENV	1	$2,472	$4,558
F7A4-1010-0000	TERADATA FASTLOAD FOR MPP UNIX NODE LICENSE	1	$4,326	$3,164
F7A4-0970-0000	TERADATA UTILITY PAK FOR MPP UNIX NODE LICENSE	1	$4,326	$836
F785-1760-0000	TERADATA/DB V2R5.0 WM 5350 MP-RAS 0 - 3 TB OF USER DATA LICENSE	1	$1,764,000	$441,829
	Software Subtotal		**$ 1,898,724**	**$ 548,622**
	TOTAL		**$ 14,980,847**	**$ 1,921,904**
	3-YEAR COST OF OWNERSHIP			**$ 16,902,752**

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

Audited by: Francois Raab
Infosizing (www.sizing.com)

Numerical Quantity Summary

Measurement Results:

Database Scale Factor	=	3000
Total Data Storage / Database Size	=	16.6
Start of Database Load Time	=	12-17-02 13:29:40
End of Database Load Time	=	12-17-02 20:16:44
Database Load Time	=	6 hrs. 48 min.
Query Streams for Throughput Test	=	8
TPC-H Power	=	92,894.0
TPC-H Throughput	=	68,085.0
Composite QphH@3000GB	=	79,528.0
Total System Price Over 3 Years	=	$16,902,752
TPC-H Price/Performance Metric	=	$213

Measurement Intervals:

Measurement Interval in Throughput Test (Ts) = 27,918 seconds

Duration of stream execution:

StreamID	Seed	Start Date	Start Time	End Date	End Time	Duration
Stream00	1217201644	12/18/2002	14:13:54	12/18/2002	15:18:25	1:04:31
Stream01	1217201645	12/18/2002	15:18:25	12/18/2002	22:11:38	6:53:13
Stream02	1217201646	12/18/2002	15:18:25	12/18/2002	22:09:47	6:51:21
Stream03	1217201647	12/18/2002	15:18:25	12/18/2002	22:11:44	6:53:18
Stream04	1217201648	12/18/2002	15:18:25	12/18/2002	22:11:26	6:53:00
Stream05	1217201649	12/18/2002	15:18:25	12/18/2002	22:12:18	6:53:52
Stream06	1217201650	12/18/2002	15:18:25	12/18/2002	22:09:07	6:50:41
Stream07	1217201651	12/18/2002	15:18:25	12/18/2002	22:11:02	6:52:37
Stream08	1217201652	12/18/2002	15:18:25	12/18/2002	22:13:17	6:54:51
Refresh		12/18/2002	15:18:25	12/18/2002	23:03:43	7:45:17

TPC-H Timing Intervals

Query	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8
Stream0	244.2	23.1	139.0	106.4	153.8	14.1	154.9	90.8
Stream01	622.0	564.2	1384.9	930.8	1556.3	242.4	678.2	1056.3
Stream02	651.0	482.2	1454.4	1214.1	1816.4	636.3	711.9	1280.7
Stream03	612.3	406.2	1029.0	1297.8	1522.6	175.2	892.5	1657.4
Stream04	469.8	384.9	1307.1	1131.8	1931.0	70.8	1452.1	1889.4
Stream05	547.1	544.1	1158.4	1070.3	1934.0	81.0	533.7	1407.8
Stream06	632.3	440.3	963.8	1156.4	1890.4	198.8	823.7	1077.2
Stream07	582.0	666.0	1131.4	1326.1	2078.1	55.4	1087.8	1017.1
Stream08	473.5	357.5	1648.9	1271.5	1225.3	127.8	535.7	1192.9
Min Qi	469.8	357.5	963.8	930.8	1225.3	55.4	533.7	1017.1
Max Qi	651.0	666.0	1648.9	1326.1	2078.1	636.3	1452.1	1889.4
Avg Qi	573.8	480.7	1259.7	1174.8	1744.3	198.5	839.5	1322.4
Query	**Q9**	**Q10**	**Q11**	**Q12**	**Q13**	**Q14**	**Q15**	**Q16**
Stream0	452.6	188.9	121.7	59.2	286.8	46.4	73.5	100.7
Stream01	4033.3	1183.3	924.7	875.2	1282.0	561.4	368.6	497.5
Stream02	2425.1	753.7	1256.2	718.7	1438.3	237.1	380.7	584.4
Stream03	3123.6	1699.4	908.0	754.9	1498.1	223.8	570.1	773.0
Stream04	3368.1	1599.6	860.7	778.4	1421.8	135.4	464.9	762.1
Stream05	3377.3	1572.6	842.4	924.7	1312.7	319.7	423.0	682.2
Stream06	3104.8	1609.6	837.0	689.3	1200.3	222.7	229.5	690.6
Stream07	3695.1	1381.7	1033.9	491.6	1489.2	378.4	216.5	743.5
Stream08	3366.2	1688.7	169.3	653.8	1278.1	365.2	386.6	504.9
Min Qi	2425.1	753.7	169.3	491.6	1200.3	135.4	216.5	497.5
Max Qi	4033.3	1699.4	1256.2	924.7	1498.1	561.4	570.1	773.0
Avg Qi	3311.7	1436.1	854.0	735.8	1365.0	305.4	380.0	654.8
Query	**Q17**	**Q18**	**Q19**	**Q20**	**Q21**	**Q22**	**RF1**	**RF2**
Stream0	90.6	197.0	132.2	348.5	460.4	19.6	217.9	149.0
Stream01	1285.4	884.4	1292.2	1207.1	3092.6	270.4	212.0	164.5
Stream02	1488.7	944.7	1124.5	1791.6	2857.8	433.4	215.0	163.8
Stream03	1070.5	858.3	970.2	1323.7	3299.6	132.5	216.5	163.9
Stream04	1462.0	984.1	704.9	445.5	2885.8	270.3	213.2	161.5
Stream05	1519.8	932.2	823.9	1260.1	3334.1	231.5	215.5	164.5
Stream06	1922.0	1024.8	1224.5	1479.7	3057.3	166.3	214.2	162.3
Stream07	1168.7	1167.3	1138.7	1237.0	2317.2	354.5	214.6	163.7
Stream08	1921.3	925.6	1283.4	1466.1	3729.8	319.6	218.0	162.2
Min Qi	1070.5	858.3	704.9	445.5	2317.2	132.5	212.0	161.5
Max Qi	1922.0	1167.3	1292.2	1791.6	3729.8	433.4	218.0	164.5
Avg Qi	1479.8	965.2	1070.3	1276.3	3071.8	272.3	214.9	163.3

INFO SIZING

TPC TRANSACTION PROCESSING PERFORMANCE COUNCIL CERTIFIED AUDITOR

Benchmark Sponsor:

Alain Crolotte
NCR
100 N. Sepulveda Blvd.
El Segundo, CA 90245

January 02, 2003

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

Platform:	**NCR 5350**
Database Manager:	**Teradata V2R5.0**
Operating System:	**UNIX MP-RAS 03.02.00**

The results were:

CPU (Speed)	Memory	Disks	**QphH@3000GB**
NCR 5350 (64 nodes, each with)			
2 x Intel Pentium IV (2.8 GHz)	512 KB Cache/cpu 4 GB Main	42 x 18 GB ext. 4 x 18 GB int.	**79,528.0**

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:

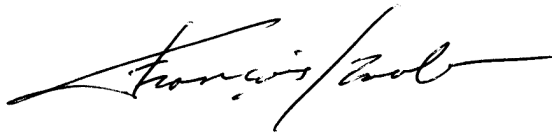
- The database records were defined with the proper layout and size
- The database population was generated using DBGEN
- The database was properly scaled to 3,000GB and populated accordingly
- The compliance of the database auxiliary data structures was verified
- The database load time was correctly 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
- 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 8 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,



François Raab
President

Preface

TPC Benchmark H Overview

The TPC Benchmark™ H (TPC-H) is a Decision Support benchmark. It is a suite of business oriented queries and concurrent updates. The queries and the data populating the database have been chosen to have broad industry-wide 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 sets 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 clikc 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 to specific population and scaling requirements.*
- *Are implemented with constraints derived from staying closely synchronized with an on-line production database.*

Table of Contents

1. General Items

1.1 Benchmark Sponsor(s)

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

NCR is the sponsor of this TPC-H benchmark.

1.2 Parameter Settings

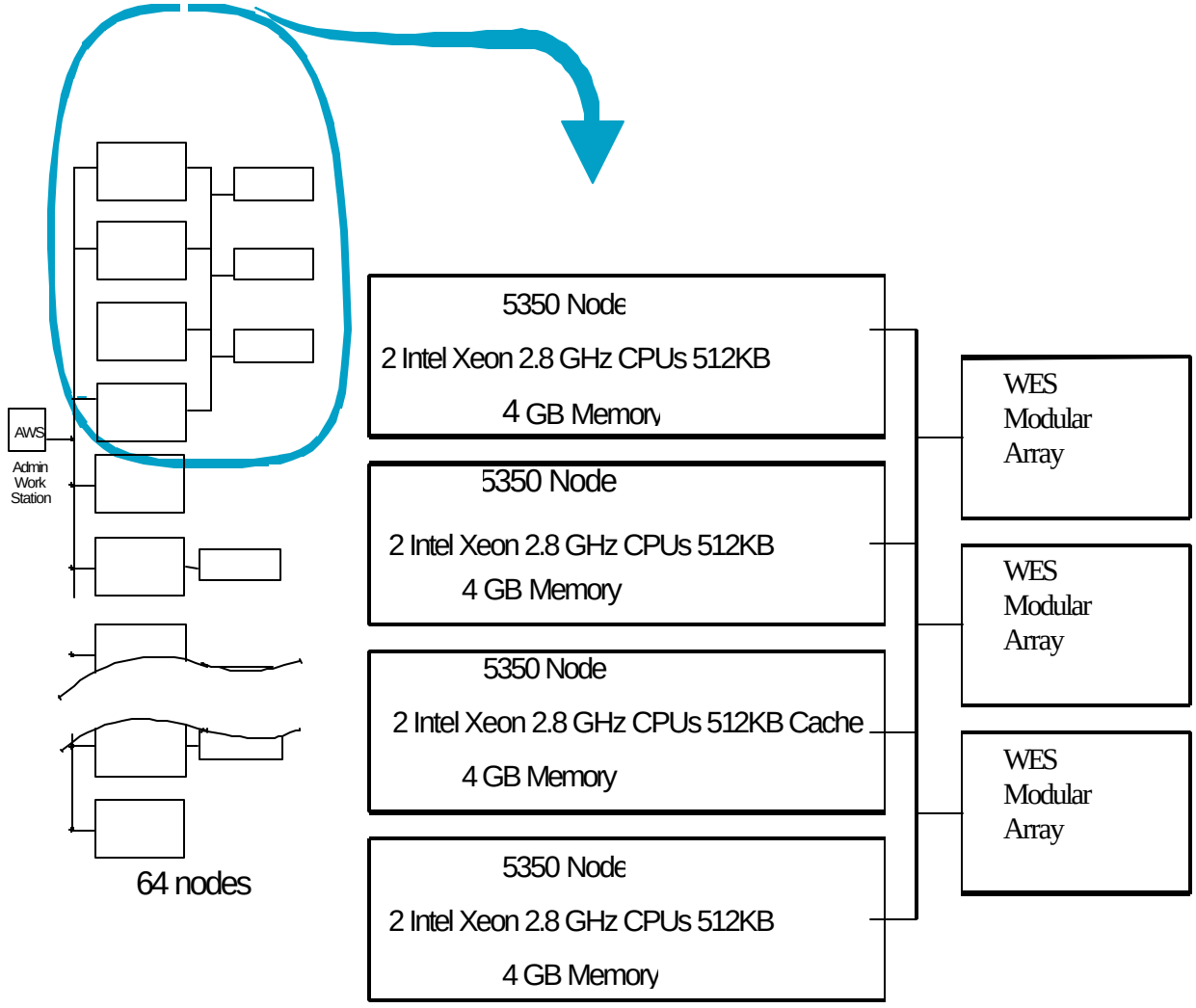
Settings must be provided for all customer-tunable parameters and options which have been changed from the defaults found in actual products, including but not limited to:

- *Database tuning options*
- *Optimizer/Query execution options*
- *Query processing tool/language configuration parameters*
- *Recovery/commit options*
- *Consistency/locking options*
- *Operating system and configuration parameters*

This requirement can be satisfied by providing a full list of all parameters and options.

See Appendix A for all Teradata Version 2 parameters.

1.3 Configuration Diagram



1.3.1 Measured and Priced Configuration Diagram

Server: 64 5350 Nodes each **four** nodes with:
- 8 Intel Xeon 2.8Ghz CPUs w/512KB Cache
- 16 GB Memory
- 3 Dual Controller arrays each w/ 56 x 18GB 15K drives
- 4 BYNET Interface Cards
- 4 CD-ROM Unit, Floppy Drive & Tape Drive
- 4 Network cards
- 16 18GB internal drives

BYNET interconnect support with:
- 2 64-port BYNET switches

2. Clause 1 Logical Database Design

2.1 Database Definition Statements

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

See Appendix B for the Create Table statements. The actual programs and scripts that create tables, build indexes, and define collect statistics, which create and populate the Teradata database for the 5350 TPC-H benchmark are found in Appendix E.3.

2.2 Physical Organization

The physical organization of tables and indices, within the test and qualification databases, must be disclosed.

Teradata systems automatically handle data and index entry placement, without any manual organization or setup activity required. During this benchmark, no intervention or special options to Teradata's natural data placement were utilized.

2.3 Horizontal Partitioning

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

Horizontal partitioning was used for the lineitem and order tables.

2.4 Replication

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

No replication beyond the creation of indices was used

3. Clause 2 Queries and Refresh Functions

3.1 Teradata SQL Used

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

Teradata SQL was the query language used to implement all queries.

3.2 Verifying Method for Random Number Generation

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

The supplied DBGEN and QGEN methods were used to verify random numbers for the 5350 TPC-H benchmark.

3.3 Generating Values for Substitution Parameters

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.

Values for the substitution parameter were generated from a customized internal driver program that embeds the functionality of the QGEN utility. The source code for this program is disclosed in Appendix G.

QGEN Version 1.5.0 was used in this benchmark execution.

3.4 Query Text and Output Data from Qualification 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. The output data for the power and throughput tests must be made available electronically upon request.

Appendix C contains the query text and query output.

3.5 Query Substitution Parameters and Seeds Used

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

Appendix D contains the seed and query substitution parameters.

3.6 Isolation Level

The isolation level used to run the queries must be disclosed.

The isolation level used to run the queries is repeatable read.

3.7 Source Code of Refresh Functions

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

A specially-written driver program was implemented to execute both the power and the throughput tests, including RF1 and RF2, the update functions. This program uses DBGEN functionality to produce data and primary keys for use in both single and multi-stream tests.

Appendix F contains the source code of this program.

4. Clause 3 Database System Properties

4.1 Atomicity

4.1.1 Completed Transaction

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

The ORDER table total price and the LINEITEM table extended price were accessed, as well as a row count for the HISTORY table. The ACID Transaction was performed against ORDER and LINEITEM rows, changes were made and verified to the LINEITEM and ORDER tables, and it was proven that the correct data was inserted into the HISTORY table. Verification was done using these formulas:

- L_Extendedprice = L_Extendedprice + ((delta)*(L_Extendedprice/L_Quantity))
- O_Totalprice = O_Totalprice+(O_Cost*(1-L_Discount)*(1+L_Tax))

4.1.2 Aborted Transaction

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

A count of the number of HISTORY table rows was obtained. The ACID Transaction was performed against randomly-selected rows, substituting a ROLLBACK for the COMMIT of the transaction.

The ORDER total price and the LINEITEM extended price were verified to be the same as they were prior to executing the ACID Transaction. Further, it was verified that no HISTORY record was inserted.

4.2. Consistency

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 Test

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

The initial consistency of the ORDER and LINEITEM tables was established, by proving this condition: O_Totalprice = Sum(L_Extendedprice*(1-L_Discount)*(1+L_Tax)). The prescribed number of ACID Transactions were executed and the consistency of the involved ORDER and LINEITEM rows was re-verified.

4.3 Isolation

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

4.3.1 Read-Write Conflict with Commit

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

Following the guidelines in the TPC-H Specification document, clause 3.4.2.1, it was verified that the second transaction does not see the first transaction's updates, and does not complete, until the first transaction has committed.

4.3.2 Read-Write Conflict with Rollback

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

Following the guidelines in the TPC-H Specification document, clause 3.4.2.2, it was verified that the second transaction does not see the first transaction's updates, and that the second transaction does not complete until the first transaction has rolled back.

4.3.3 Write-Write Conflict with Commit

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

Following the guidelines in the TPC-H Specification document, clause 3.4.2.3, it was verified that the second transaction, which attempts to update the same data as the first transaction, waits until the first transaction completes, and receives data that reflects the changes made by the first transaction.

4.3.4 Write-Write Conflict with Rollback

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

Following the guidelines in the TPC-H Specification document, clause 3.4.2.4, it was verified that the second transaction, which attempts to update the same data as the first transaction, waits until the first transaction rollbacks, and receives data that reflects the original state of the data, not the changes made by the first transaction.

4.3.5 Read and Write Against Different Tables Concurrently

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

Based on the TPC-H Specification document, clause 3.4.2.5, it was proven that a second transaction that updates tables in the database not referenced by an earlier-started read-only transaction will complete prior to the read-only transaction. Verification was made that the appropriate rows were updated and that the update transaction started after and completed before the read only transaction.

4.3.6 Updates Not Indefinitely Delayed by Reads on Same Table

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

Following TPC-H Specification document, clause 3.4.2.6, process 1 submitted Query 1 (a long-running query) for execution, followed by a second process that executed a short update transaction against the same table. A third process submitted a second long-running query against the same table while the original process 1 was still executing. Process 1's query completed first, followed by process 2's update transaction, and lastly process 3's query completed. It was verified that the correct rows were updated and that updates are executed in a timely manner.

4.4 Durability

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

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 data.

A disk failure was caused in the midst of the required durability test, the system was restarted, and the durability success file and the HISTORY table were compared successfully. The process recorded in the TPC-H Specification Document, Clause 3.5.2 was adhered to during this test.

4.4.2 System Crash

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

A system interruption was caused in the midst of the required durability test, the system was restarted, and the durability success file and the HISTORY table were compared successfully. The process recorded in the TPC-H Specification Document, Clause 3.5.3 as adhered to during this test.

4.4.3 Memory Failure

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

A memory failure was caused in the midst of the required durability test, the system was restarted, and the durability success file and the HISTORY table were compared successfully. The process recorded in the TPC-H Specification Document, Clause 3.5.3 was adhered to during this test.

5. Clause 4 Scaling and Database Population

5.1 Ending 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.

Order	4,500,000,000
Lineitem	18,000,048,306
Customer	450,000,000
Part	600,000,000
Supplier	30,000,000
Partsupp	2,400,000,000
Nation	25
Region	5

5.2 Distribution of tables and logs across media

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

In this configuration of 64 nodes, every four-node set has:

- 3 Fiber Channel WES modular array
- 168 x 18GB disk drives

Each 5350 node has been configured with 21 virtual AMPs, totalling 1344 virtual AMPs in the SUT.

The Teradata database system enforces the following data placement rules:

- The rows of each table are randomly assigned to one of the 1344 virtual AMPs.
- Each virtual AMP controls approximately an equal portion of each tables' rows.
- Partitioning for lineitem and orders is performed within each AMP, i.e. row location vs. AMP is unaffected by partitioning. No partitioning is used for other tables.
- There is no knowledge of which physical disk specific rows reside on.
- The transient journal, responsible for logging before images of data changes, is local to each virtual AMP, and is therefore dispersed across disks similar to user data.

Lineitem and orders tables are using the new V2R5.0 feature Partitioned Primary Index. With this technique, there is no change in the way the AMP for a row is selected based on the hash of the primary index. Within an AMP, however, the rows are partitioned by the user specified partitioning expression (7 partitions were used in this benchmark). All rows within a partition are ordered by hash. This is the same as tables without Partitioned Primary Index. Whether partitioning is used or not, data is evenly dispersed across all ranks within all disk arrays. Consequently, the following distribution summary is offered.

The following description of data distribution is for one single node, and can be assumed to be identical for all 64 nodes in the system unless otherwise specified.

Disk Drive	Description of Content of One Node
Internal 1	Operating system, root
Internal 2	Utilities, driver output (node 1)
Internal 3	DBGEN generated datasets for inserts on the first 20 nodes only.
Disk Array Module	1.5625 % of LINEITEM, ORDER, CUSTOMER, PART, SUPPLIER, PARTSUPP, NATION, REGION, TRANSIENT JOURNAL

NOTE: As the Region and Nation table have only 5 and 25 rows respectively, some virtual AMPs will not be assigned rows from those smaller tables.

5.3 Mapping of Database Partitions

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

The database was not replicated.

5.4 RAID Implementation

Impleementations may use some form of RAID. The RAID level used must be disclosed for each device. If RAID is used in an implementation, the logical intent of its use must be disclosed.

RAID 1 (mirroring) was used for everything.

5.5 Modifications to the DBGEN

Any modifications to the DBGEN (see Clause 4.2.1) source code (provided in Appendix B) 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.

Appendix E contains the source of the inmo ds for the PFast utility program. Section 5.7 of this FDR provides detail about this utility program.

5.6 Database Load Time

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

The database load time was 6 hours 48 minutes.

5.7 Database Load Mechanism Details and Illustration

The details of the database load mechanism must be described and illustrated with a block diagram.

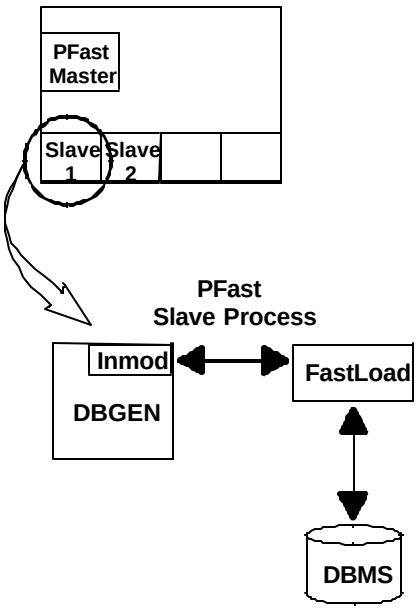
Two different methods were used to load the TPC-H database. Both incorporated the standard Teradata FastLoad utility, and both are described and illustrated below.

5.7.1 Parallel FastLoad

Parallel FastLoad (PFast) is a product that extends the functionality of the standard Teradata FastLoad utility. PFast, which extends parallelism to the client portion of FastLoad, has two components: A master process that executes on a single node along with four slave processes. The master process begins and coordinates the entire database load activity, while each of the slave processes do the actual generation (or reading) or rows and FastLoad execution. PFast loads data to a table through multiple parallel streams.

For this benchmark, PFast is used to load all tables: Lineitem, Order, Customer, Part, Supplier, Partsupp, Region, Nation. Two slave processes are activated on the SUT, each generating 1/2 of the rows feeding the database on the 64-node system.

The FastLoad utility is the driver within each slave process, calling DBGEN as additional rows are required. The generated rows then pass through an inmod (specific to the TPC-H database), and control is passed back to the FastLoad instance which loads the data. Each slave has a copy of the DBGEN code and the inmod.



GD01B008

Appendix E contains the inmods used by Pfast.

5.7.2 Pipeline-to-FastLoad

With the Pipeline-to-FastLoad approach, data was generated using the standard TPC-H data generator executing from the UNIX test platform. A customized procedure was designed, in which rows generated moved through a UNIX named pipe to a continuously active single instance of the Teradata FastLoad utility. This Teradata FastLoad utility loaded the table data in parallel across all virtual AMPs, and did not require any presorting or staging of the data.

The Nation and Region tables were loaded concurrently using this pipeline technique, so for some of this loading interval, two concurrent Fastload jobs were active at the same time.

Appendix E contains the source code for the Pipeline-to-FastLoad technique.

5.8 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 4.1.3.1.

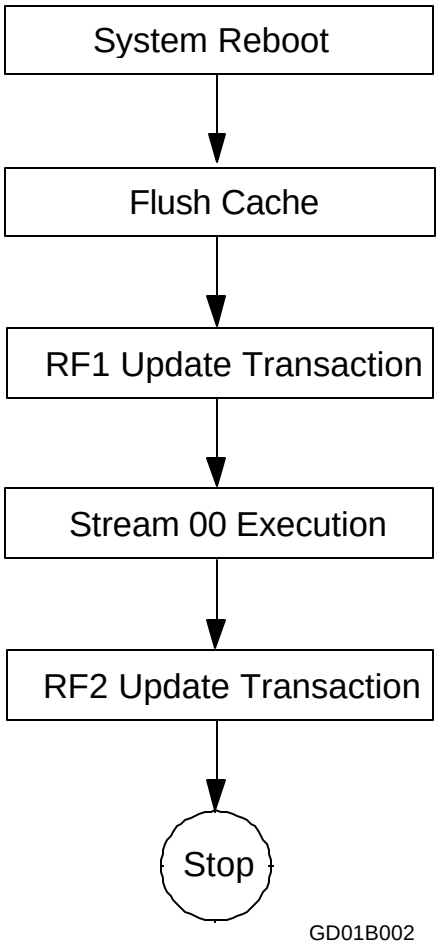
The data storage ratio is computed based on the following information:

Disk Type	# of Disks	Space per Disk	Sub-Total Disk Space	Total Size	Data Storage Ratio
External	2688	16.92 GB	45481GB		
Internal	256	16.92 GB	4332 GB	49813 GB	16.6

6. Clause 5 Performance Metrics and Execution Rules

6.1 Steps in the Power Test

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



6.2 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.

The Power Test timing intervals can be found in the Executive Summary which is placed at the beginning of this document, under the Numerical Quantity Summary.

6.3 Number of Streams for the Throughput Test

The number of execution streams used for the Throughput Test must be disclosed.

The Throughput Test used 8 execution streams.

6.4 Start and End Date/Times for Each Query Stream

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

The Throughput Test start time and finish time for each stream is reported in the Executive Summary of this document within the Numerical Quantity Summary.

6.5 Total Elapsed Time of the Measurement Interval

The total elapsed time of the measurement interval:

The total elapsed time of the throughput test was 105,754 seconds.

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

StreamID	RF1 Start Date/Time RF1 End Date/Time		RF2 Start Date/Time RF2 End Date/Time	
Stream00	12/18/2002	14:13:54	12/18/2002	15:15:56
	12/18/2002	14:17:32	12/18/2002	15:18:25
Stream01	12/18/2002	22:13:17	12/18/2002	22:16:49
	12/18/2002	22:16:49	12/18/2002	22:19:34
Stream02	12/18/2002	22:19:34	12/18/2002	22:23:09
	12/18/2002	22:23:09	12/18/2002	22:25:53
Stream03	12/18/2002	22:25:53	12/18/2002	22:29:29
	12/18/2002	22:29:29	12/18/2002	22:32:13
Stream04	12/18/2002	22:32:13	12/18/2002	22:35:46
	12/18/2002	22:35:46	12/18/2002	22:38:28
Stream05	12/18/2002	22:38:28	12/18/2002	22:42:03
	12/18/2002	22:42:03	12/18/2002	22:44:48
Stream06	12/18/2002	22:44:48	12/18/2002	22:48:22
	12/18/2002	22:48:22	12/18/2002	22:51:04
Stream07	12/18/2002	22:51:04	12/18/2002	22:54:39
	12/18/2002	22:54:39	12/18/2002	22:57:23
Stream08	12/18/2002	22:57:23	12/18/2002	23:01:01
	12/18/2002	23:01:01	12/18/2002	23:03:43

6.7 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.

The timing intevals for each query and update function for the Throughput Test is reported in the Executive Summary at the beginning of this document, within the Numerical Quantities Summary.

6.8 Performance Metrics

Verify that the metrics are computed as required.

The performance metrics, and the numbers on which they are based, are contained within the Executive Summary at the beginning of this document, within the Numerical Quantities Summary.

6.9 The Performance Metric and Numerical Quantities from Both Runs

The performance metric (QphH@Size) and the numberical quantities (TPC-H Power@Size and TPC-H Throughput@Size) from both of the runs must be disclosed (see Clause 5.4.1)..

Two consecutive runs were executed. The following table contains the performance metric and numerical quantites from both runs.

System	QppH@3000GB	QthH@3000GB	QphH@3000GB
Run 1	92,892.0	68,143.7	79,561.3
Run 2	92,894.0	68,085.1	79,528.0

6.10 Activity Between Runs

Any activity on the SUT that takes place between the conclusion of Run 1 and the beginning of Run 2 must be fully disclosed including listings of scripts or command logs along with any system reboots or database restarts.

A failure occured during the second run. As per the TPC-H benchmark specification, the third run was used for repeatability.

7. Clause 6 SUT and Driver Implementation

7.1 Description of Driver Performance Functions

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

No driver external to the SUT was used.

7.2 Detailed Description of the Internal Driver Program and Implementation Layer Used

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 internal driver program used in this benchmark utilizes the standard Teradata call-level interface (CLIv2). An implementation specific layer was added between the driver program and CLIv2 to hide some of the complexities of CLIv2 from the main body of the program. This program provides the following functionality:

- The program reads the same input files as QGEN and generates the query text with the appropriate input variables.
- The program directly submits the queries, with a time-date stamp between each query submission.
- The program produces two output files: 1) A summary output that includes the query times, and 2) Detail output which includes all of the query text and output.

Source code of the Driver Program and Implementation Specific Layer is included in Appendix F.

7.3 Profile-Directed Optimization

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

Profile-directed optimization was not used.

8. Clause 7 Pricing

8.1 Detailed List of Hardware and Software Used

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

A detailed list of hardware and software used in this benchmark, as well as the total three-year price calculations, is listed in the Executive Summary at the beginning of this document. This pricing information was verified with the NCR Customer Support Services in Dayton, Ohio.

8.2 Total Three Year Price

The total 3-year price of the entire configuration must be reported, including: hardware, software, hardware maintenance, and software support charges. Separate component pricing is required (see Clause 7.3.1. Pricing Spreadsheet.) Hardware maintenance and software support must be reported separately. The software support level must be disclosed separately from that of hardware, with separate pricing and discounts.

NCR's Standard Pricing methodology has been used in the pricing of this configuration . The hardware service scope includes one hour remote problem acknowledgement and the presence on site within 4 hours of either a customer replaceable part or a qualified maintenance engineer. The software service scope includes four hour acknowledgement of software problems via the Web. See the Pricing Summary at the beginning of this document

For assistance with any of these prices or their applicability to any customer's requirements, please contact the following individual:

Mr. Jeffrey Shoemacher, Director of Pricing

email: Jeffrey.Shoemacher@ncr.com phone: (937)445-7865

8.3 Committed Delivery Date of General Availability

The committed delivery date for general availability of products used in the price calculations must be reported. When the priced system includes products with different availability dates, the reported availability date for the priced system must be the date at which all components are committed to be available.

Teradata V2R5.0 software is available now.

5350 hardware is available now.

9. Clause 9 Audit

9.1 Auditor’s Information and Attestation Letter

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.

An attestation letter is attached to the summary report, as well as the auditor’s name and address. This letter was submitted at the time of benchmark publication.

Appendix A: Operating Systems and Database Parameters and Options

A.1 Operating System Parameters

```
**************************************

   Unix mtune file

**************************************

* Lines ending in "%%INS%%" are from mtune.d/*  %%INS%%
* and constructed automatically.          %%INS%%
* DO NOT edit manually.                          %%INS%%
YNET   1      1      1      %%INS%%
NFS_WSYNC     0      0      1      %%INS%%
NFS3_WSYNC    0      0      1      %%INS%%
* The following lines, if any, are entries       %%INS%%
* preserved from the previous mtune file.        %%INS%%
* Copyright 1994. 1996 AT&T Global Information Solutions -
Dayton, Ohio, USA
*
* Copyright (c) 1990 UNIX System Laboratories, Inc.
* Copyright (c) 1984, 1986, 1987, 1988, 1989, 1990 AT&T
* All Rights Reserved
*
* THIS IS UNPUBLISHED PROPRIETARY SOURCE CODE OF
* UNIX System Laboratories, Inc.
* The copyright notice above does not evidence any
* actual or intended publication of such source code.
*
* Copyright (c) 1987, 1988 Microsoft Corporation
* All Rights Reserved
*
* This Module contains Proprietary Information of Microsoft
* Corporation and should be treated as Confidential.
*
*ident        "@(#):mtune   23.1.2.3"
*
* Modifications & additions have been made to the mtune file for
performance
* tuning. Consult tuning documents for explanations.
* Modified: BUFHWM SYSSEGSZ SEGMAPSZ GPGSLO GPGSHI
* Added: LOTSFREE DESFREE MINFREE
* Deleted: SYSSEGSZ
*
* "OBSOLETE" in second field means parameter is no longer used by
the OS.
* The parameter may be removed in a later version of the OS.
Idconfig
* will a print warning if the parameter is used in stune.
*
* General Kernel Parameters ------------------
TRACESZ              8192   4096   8192
NCPU          32     1      32
NCALL         60     30     700
NFILE         OBSOLETE
NMOUNT        OBSOLETE
NPROC         250    50     10240
NREGION              OBSOLETE
NCLIST        120    1      400
MAXUP         30     15     2048
NOFILES              OBSOLETE
NHBUF         64     32     1024
NPBUF         20     20     8192
NAUTOUP              60     0      120
FDFLUSHR      1      1      1
BDFLUSHR      OBSOLETE
MAXPMEM              0      0      16384
SHLBMAX              3      2      6
FLCKREC              300    100    2000
PUTBUFSZ      5120   2000   20000
MAXSLICE      100    25     100
ULIMIT        OBSOLETE
SPTMAP        400    50     600
PIOMAP        50     50     50
PIOMAXSZ      64     4      64
MAXMINOR      0x3fffff       255    0x3fffff
NGROUPS_MAX   16     1      16
NBUF          100    100    3000
```

```
BUFHWM        0      0      65536
ARG_MAX               5120   1024   51200
RSTCHOWN      0      0      1
MAXLINK               2048   1000   32767
* File System Parameters ---------------
NINODE        500    100    5000
NS5INODE      OBSOLETE
UFSNINODE     500    100    5000
VX_NINODE     0      0      10000
NDQUOT        200    100    400
NRNODE        300    100    1300
S52KNBUF      OBSOLETE
S52KNHBUF     OBSOLETE
* ------ CDFS Parameters -----
NCDINODE      256    64     2048
NCDEXTENT     OBSOLETE
NCDFILSYS     OBSOLETE
* Paging Parameters -----------------
VHNDFRAC      OBSOLETE
AGEINTERVAL   OBSOLETE
MINPAGEFREE   64     64     64
GPGSLO        25     0      25
GPGSHI        OBSOLETE
GPGSMSK               OBSOLETE
MAXSC         OBSOLETE
MAXFC         OBSOLETE
MAXUMEM               OBSOLETE
MINARMEM      100    100    160
MINASMEM      25     25     40
MINAKMEM      16     4      64
MINHIDUSTK    4      4      32
MINUSTKGAP    2      2      32
PAGES_UNLOCK  200    200    200
* Pageout Daemon Parameters
LOTSFREE      0      0      512
DESFREE               0      0      256
MINFREE               0      0      128
* STREAMS Parameters ----------------
NQUEUE        OBSOLETE
NSTREAM               OBSOLETE
NSTRPUSH      9      9      10
NSTREVENT     OBSOLETE
MAXSEPGCNT    OBSOLETE
NMUXLINK      OBSOLETE
STRMSGSZ      0      0      32767
STRCTLSZ      1024   1024   1024
STRTHRESH     0x400000       0      0x2800000
NBLK4096      OBSOLETE
NBLK2048      OBSOLETE
NBLK1024      OBSOLETE
NBLK512               OBSOLETE
NBLK256               OBSOLETE
NBLK128               OBSOLETE
NBLK64        OBSOLETE
NBLK16        OBSOLETE
NBLK4         OBSOLETE
STRLOFRAC     OBSOLETE
STRMEDFRAC    OBSOLETE
* --------- muoe952386: Made FASTBUF tunable --------------------
------------
* If the value is set to 0, then the system will determine the
default value
* for this variable based on system size.
*
* NOTE: If FASTBUF value was changed from 0 the new value should
be 128 atleast
* and multiple of four bytes.
* ----------------------------------------------------------------
------------
FASTBUF               0      0      512
* ------ log (strlog) related tunable parameters
NLOG          10     3      16
MAXWERRMSG    80     0      100
MAXWTRCMSG    80     0      100
MAXWCONSMSG   80     0      100
NUMSP         64     5      128
NUMTIM        128    1      8192
NUMTRW        16     1      8192
TIM_HIWATER   OBSOLETE
TIM_LOWATER   OBSOLETE
TRW_HIWATER   65535  512    1048576
TRW_LOWATER   40960  512    1048576
SOCK_HIWATER  8192   512    1048576
SOCK_LOWATER  4096   128    1048576
NUMSAD        8      1      16
NSTRPHASH     64     16     512
NAUTOPUSH     32     32     32
* Message Parameters ---------------
MSGMAP        100    10     1600
MSGMAX        2048   512    32767
MSGMNB        4096   4096   65535
MSGMNI        50     50     1000
MSGSSZ        8      8      8
MSGTQL        40     40     512
```

```
MSGSEG        1024   1024   65535
* Semaphore Parameters -------------
SEMMAP        25     10     1000
SEMMNI        25     10     4096
SEMMNS        60     60     4096
SEMMNU        30     30     10240
SEMMSL        25     25     1000
SEMOPM        10     10     32
SEMUME        10     10     32
SEMVMX        32767  32767  32767
SEMAEM        16384  16384  16384
* Shared Memory Parameters ----------
SHMMAX        524288 131072 0x7FFFFFFF
SHMMIN        1      1      1
SHMMNI        100    100    500
SHMSEG        6      6      64
SHMALL        OBSOLETE
* Shared Memory Nailing GIDs ---------
SHM_NAILED_GID1      0      0      2147483647
SHM_NAILED_GID2      0      0      2147483647
SHM_NAILED_GID3      0      0      2147483647
SHM_NAILED_GID4      0      0      2147483647
SHM_NAILED_GID5      0      0      2147483647
SHM_NAILED_GID6      0      0      2147483647
SHM_NAILED_GID7      0      0      2147483647
SHM_NAILED_GID8      0      0      2147483647
SHM_NAILED_GID9      0      0      2147483647
* RFS Parameters ---------------------
NRCVD         150    40     500
NSNDD         150    100    350
NSRMOUNT      20     1      50
NADVERTISE    OBSOLETE
MAXGDP        24     10     32
MINSERVE      3      3      3
MAXSERVE      6      3      6
NRDUSER              250    1      700
RFHEAP        OBSOLETE
NLOCAL        OBSOLETE
NREMOTE              OBSOLETE
RCACHETIME    10     -1     10
RFS_VHIGH     OBSOLETE
RFS_VLOW      OBSOLETE
RF_MAXKMEM    0      0      50
* XENIX Parameters ------------------
DSTFLAG              1      0      1
NSCRN         0      0      10
NEMAP         10     10     10
TIMEZONE      480    0      1440
XSEMMAX              60     0      60
XSDSEGS              25     0      100
XSDSLOTS      3      0      5
* Miscellaneous Parameters ----------------------
DO386B1              2      0      2
DO387CR3      2      0      2
SANITYCLK     0      0      1
DMAEXCL              1      0      1
MAXDMAPAGE    0      0      524288
DMAABLEBUF    70     10     100
KDBSYMSIZE    200000 10000  400000
PIOSEGSZ      1024   1024   1024
SEGMAPSZ      0      0      51200
FORCESMALLMEMORY     0      0      1
* Device Driver Parameters ---------
NUMXT         3      1      3
NUMSXT        6      1      6
NCPYRIGHT     10     10     10
NKDVTTY              OBSOLETE
PRFMAX        4096   2048   10240
CMF           1      0      1
RCMF          0      0      1
COM2CONS      0      0      1
RIDEOUT              OBSOLETE
MNR_ON        OBSOLETE
SANECNT              OBSOLETE
USANEON              OBSOLETE
* ASYNCIO Parameters ----------------
NAIOSYS              300    0      4096
MINAIOS              OBSOLETE
MAXAIOS              5      1      64
AIOTIMEOUT    OBSOLETE
NAIOPROC      OBSOLETE
* EVENTS Parameters----------------------------
MEVQUEUES     50     50     50
MEVKEVS              50     50     50
MEVEXREFS     50     50     50
MEVEXPRS      50     50     50
MEVTERMS      250    250    250
MEVSEXPRS     50     50     50
MEVSTERMS     100    100    100
MEVTIDS              100    100    100
MEVRETRYS     50     50     50
MEVEXITS      50     50     50
MEVSIGS              50     50     50
MEVSTRDS      50     50     50
```

```
MEVDIRENTS    50     50     50
EVDATA        20480  20480  20480
EVTIDHTS      128    128    128
EVFNHTS              256    256    256
EVMAXEV              20     20     20
EVMAXDPE      1024   1024   1024
EVMAXMEM      10240  10240  10240
EVMAXTRAPS    25     25     25
EVMAXETERMS   20     20     20
* Timer and Scheduler Parameters ------------------
HRTIME        50     50     50
HRVTIME              50     50     50
RTMAXPRI      OBSOLETE
RTNPROCS      OBSOLETE
TSMAXUPRI     20     10     30
TSNPROCS      OBSOLETE
MAXCLSYSPRI   160    160    160
* Affinity Scheduling Tunables --------------------
AFFIN_ON      1      0      1
AFFINDECAY    16     0      512
* Resource Limit Parameters ------------------
*
* Default per process resource limits (set to 0x7FFFFFFF for
infinite limit)
* S prefix is for soft limits, H prefix is for hard limits
*
* CPULIM - maximum combined user and system time in seconds
* FSZLIM - maximum file size in bytes
* DATLIM - maximum writeable mapped memory (swap space) in bytes
* STKLIM - maximum size of current stack in bytes
* CORLIM - maximum size of core file in bytes
* FNOLIM - maximum number of file descriptors
* VMMLIM - maximum amount of simultaneously mapped virtual memory
in bytes
SCPULIM              0x7FFFFFFF    60     0x7FFFFFFF
HCPULIM              0x7FFFFFFF    60     0x7FFFFFFF
SFSZLIM              0x7FFFFFFF    0x100000      0x7FFFFFFF
HFSZLIM              0x7FFFFFFF    0x100000      0x7FFFFFFF
SDATLIM              0x1000000     0x1000000     0x7FFFFFFF
HDATLIM              0x1000000     0x1000000     0x7FFFFFFF
SSTKLIM              0x1000000     0x2000 0x7FFFFFFF
HSTKLIM              0x1000000     0x2000 0x7FFFFFFF
SCORLIM              0x2000000     0x100000      0x7FFFFFFF
HCORLIM              0x2000000     0x100000      0x7FFFFFFF
SFNOLIM              0x40   0x20   0x400
HFNOLIM              0x400  0x20   0x400
SVMMLIM              0x1000000     0x1000000     0x7FFFFFFF
HVMMLIM              0x1000000     0x1000000     0x7FFFFFFF
* Number of overflow buffers in pageio_setup
PGOVERFLOW    16     8      128
NOTPGOVERFLOW 16     8      128
* bdevcnt, cdevcnt tunable
BMAX          25     20     256
CMAX          40     30     256
NCR_3500      0      0      0
MULTI_PROC    0      0      0
* ------ Level 5 Tunable Parameters ------
L5SysInt_Type 5      4      5
L5NMIenables  0xff   0      0xff
L5SysIntenables      0      0      0xff
L5CPUenables  0xef   0      0xff
L5McAddrenables      0xfd   0      0xff
L5McDataenables      0x87   0      0xff
L5DMAenables  0xc0   0      0xff
SBIthreshold  50     0      0x7fffffff
SBIdisablePeriod     1440   0      0x7fffffff
L5WatchDogPeriod     15     0      0x7fffffff
L5WatchDogPFRPeriod  1800   0      0x7fffffff
L5FrontSwitchTime    0      -2     60
* ------ End of Level 5 Tunable Parameters ------
* ------ performance Group Tunables ------
JQF_CLIENTS   2500   100    3000
JQF_SIZE      40     40     300
JQF_SESS      10     10     50
PW_MAX_ORA_PID       OBSOLETE
PW_MAX_EVENT  OBSOLETE
* muoe961889 : hbc - 27 Jun 1996
* Increased LISTIO_MAX_CNT to 1024
LISTIO_MAX_CNT       1024   1      2048
TUBESIZE      1024   1024   4096
TUBETYPE      OBSOLETE
* ------ End of Performance group Tunables ------
* SUM Privilege Module tunable -----------------------
PRIVID        0      0      0
* ------ Override Autocad lockout mechanism ------
ACADOVERRIDE  0      0      1
* tunables for loadable kernel modules
BDEV_RESERVE  10     0      255
CDEV_RESERVE  25     0      255
FMOD_RESERVE  15     0      255
VFS_RESERVE   10     0      255
DEF_UNLOAD_DELAY     600    0      3600
* End of tunables for loadable kernel modules
* Added thru MR muoe951326, 04/09/95
```

```
* OS_COMPAT --- kernel compatibility options ---
* 0 Use default behavior
* 1 Use traditional behavior
* 2 Use new SVR4.2 behaviors
OS_COMPAT     1      0      2
* ------ RPC tunables muoe952511, 7/12/95 */ ---------
RPC_HIWATER   0      0      500000
RPC_LOWATER   0      0      500000
* Raw Device Async I/O parameters ---------
MAXFREE_RAIO  128    32     512
MINFREE_RAIO  32     0      128
MAXRAIO              256    32     4096
* More Raw Device Async I/O parameters ---------
RAIO_TOGGLE   1      0      1
* UnixWare-compatible async I/O parameters
NUMAIO        128    32     4096
NUMPROCAIO    32     4      1024
AIO_LISTIO_MAX       100    32     1024
AIO_MAX              1      1      1
AIO_LOCK_ON_DEMAND   0      0      1
VDMAXRETRY    1      0      2
NMBYTE        256    256    65536
KMEM_MINIPAGES       100    8      512
KMEM_DESIPAGES       100    8      512
DMEM_DESIPAGES       100    8      512
BK_SPTALLOC_SZ       0      100    500
* --- DA0EXTN additions for Tunable Parameters (Fri Mar 22
15:20:46 EST 2002) ---
VDASYNCMAX    50     0      100
VDASYNCPARITY 1      0      1
VDASYNCWRITES 1      0      1
VDDELAY              0      0      10
VDDISTJOBS    500    100    10000
VDDISTOOS     0      0      1
VDHASHMAX     2048   512    8192
VDILOGFLUSH   600    30     65535
VDJOBS        1000   200    10000
VDKEEPALIVE   15     5      30
VDMPPGCPUCNT  1      1      32
VDPREEMPTCNT  10     1      20
VDRPT         3600   0      86400
VDTIMEOUT     10     3      30
VDUNITJOBS    100    50     1000
VDUNITMAX     100    50     10000
VDWRITEBACK   0      0      1
* --- End of DAEXTN additions for Tunable Parameters ---
ILDMAXOPENS   OBSOLETE
ILDMAXPPA     32     16     256
* Byn Tuneable Parameters ----------
BYN_MAXNETS   2      1      8
BYN_BOOTNETWAIT      30000  100    60000
BYN_MAXNETWAIT       300    100    60000
BYN_SELCOORDWAIT     1500   100    60000
BYN_FASTTIME  1      0      1
GTW_MSS_HI_WATER     0x40000       0x10000       0x80000
GTW_MSS_LO_WATER     0x2000 0x2000 0x4000
GTW_RECON_TIMEOUT    20     20     60

**************************************

   Unix stune file

**************************************

*ident "@(#)master:master.d/stune  1.4.1.4"
* Initial tuning performed on     Wed Feb  6 11:19:29 EST 2002
ARG_MAX       20480
BUFHWM 12300
DESFREE       256
HDATLIM       0x4000000
HSTKLIM       0x4000000
LOTSFREE      512
MAXUP  400
MINFREE       128
NCALL  500
NHBUF  256
NPBUF  1024
NPROC  8000
NUMTIM 3000
NUMTRW 3000
SDATLIM       0x4000000
SEMMNI 50
SEMMNS 250
SEMMNU 2500
SEMMSL 40
SSTKLIM       0x4000000
STRTHRESH 0x2800000
TRW_LOWATER   65535
UFSNINODE     4500
SHMMAX 2621440
MSGTQL 512
MSGMNB 65535
MSGMNI 512
MSGSEG 30000
```

```
VX_NINODE     10000
VDMPPGCPUCNT  2
AFFIN_ON      1
RAIO_TOGGLE   1
SEGMAPSZ      8192
SANITYCLK     0
MSGMAP 1600
MSGMAX 32767
PUTBUFSZ 20000
MSGSSZ 8
SVMMLIM       0x4000000
HVMMLIM       0x4000000
SFNOLIM       1024
SOCK_HIWATER  16384
SOCK_LOWATER  16380
BDEV_RESERVE  50
CDEV_RESERVE  50
FMOD_RESERVE  55
VFS_RESERVE   50
BYN_MAXNETS   2
BYN_BOOTNETWAIT      30000
BYN_MAXNETWAIT       300
BYN_SELCOORDWAIT     1500
BYN_FASTTIME  1
KDBSYMSIZE    200000
```

A.2 Database Parameters

```
**************************************

   Teradata DBMS Tuneables

**************************************
DBS Control Record - General Fields:

    1.  Version               = 5
    2.  SysInit               = TRUE
    3.  DeadLockTimeout       = 240
    4.  (Reserved for future use)
    5.  HashFuncDBC           = 5 (Universal)
    6.  (Reserved for future use)
    7.  (Reserved for future use)
    8.  SessionMode           = 0 (Teradata)
    9.  LockLogger            = FALSE
    10. RollbackPriority      = FALSE
    11. MaxLoadTasks          = 5

    12. RollForwardLock       = FALSE
    13. MaxDecimal            = 18
    14. Century Break         = 0
    15. DateForm              = 0 (IntegerDate)
    16. System TimeZone Hour  = 0
    17. System TimeZone Minute = 0
    18. RollbackRSTransaction  = FALSE
    19. RSDeadLockInterval    = 0 (240)
    20. RoundHalfwayMagUp     = FALSE
    21. (Reserved for future use)

    22. Target Level Emulation = FALSE
    23. Export Width Table ID  = 0 (Expected Defaults)
    24. (Reserved for future use)

    25. (Reserved for future use)

    26. Single Sign On        = 0 (On)
    27. IdCol Batch Size      = 1000 (Expected Defaults)


DBS Control Record - File System Fields:

    1.  FreeSpacePercent        = 40%
    2.  MiniCylPackLowCylProd   = 10 (free cylinders)
    3.  PermDBSize              = 255 (sectors)
    4.  JournalDBSize           = 12 (sectors)
    5.  DefragLowCylProd        = 100 (free cylinders)
    6.  PermDBAllocUnit         = 1 (sectors)
    7.  WriteDBsToDisk          = FALSE
    8.  Cylinders Saved for PERM = 10 (cylinders)


DBS Control Record - Performance Fields:

    1.  DictionaryCacheSize   = 1024 (kilobytes)
    2.  DBSCacheCtrl          = TRUE
    3.  DBSCacheThr           = 10%
    4.  MaxParseTreeSegs      = 1000
    5.  ReadAhead             = TRUE
```

```
    6.  StepsSegmentSize       = 1024 (kilobytes)
    7.  RedistBufSize          = 4 (kilobytes)  *defaulted* (amp-
level buffering only)
    8.  DisableSyncScan        = FALSE
    9.  SyncScanCacheThr       = 10%
   10.  HTMemAlloc             = 0%
   11.  SkewAllowance          = 75%
   12.  Read Ahead Count       = 1
   13.  PPICacheThrP           = 10
```

Appendix B. Database Definition Statements

B.1 Create Table Statements

The following CREATE User (Database) and Table statements were used to define tables used in the TPC-H benchmark test.

```
      CREATE USER tpcd3000g AS PERM=12000E9, PASSWORD=tpcd3000g;

      CREATE MULTISET TABLE LINEITEM, DATABLOCKSIZE=112
KILOBYTES
  (
    L_ORDERKEY       DECIMAL (15,0) not null
   ,L_PARTKEY        INTEGER not null
   ,L_SUPPKEY        INTEGER not null
   ,L_LINENUMBER     INTEGER not null
   ,L_QUANTITY       DECIMAL(15,2) not null
   ,L_EXTENDEDPRICE  DECIMAL(15,2) not null
   ,L_DISCOUNT       DECIMAL(15,2) not null
   ,L_TAX            DECIMAL(15,2) not null
   ,L_RETURNFLAG     CHAR(1) CASESPECIFIC not null
   ,L_LINESTATUS     CHAR(1) CASESPECIFIC not null
   ,L_SHIPDATE       DATE FORMAT 'yyyy-mm-dd' not null
   ,L_COMMITDATE     DATE FORMAT 'yyyy-mm-dd' not null
   ,L_RECEIPTDATE    DATE FORMAT 'yyyy-mm-dd' not null
   ,L_SHIPINSTRUCT   CHAR(25) CASESPECIFIC not null
   ,L_SHIPMODE       CHAR(10) CASESPECIFIC not null
   ,L_COMMENT        VARCHAR(44) CASESPECIFIC not null)
    PRIMARY INDEX (l_orderkey)  PARTITION BY (RANGE_N
    ( L_ShipDate Between
                      * AND DATE '1992-12-31',
      DATE '1993-01-01' AND DATE '1993-12-31',
      DATE '1994-01-01' AND DATE '1994-12-31',
      DATE '1995-01-01' AND DATE '1995-12-31',
      DATE '1996-01-01' AND DATE '1996-12-31',
      DATE '1997-01-01' AND DATE '1997-12-31',
      DATE '1998-01-01' AND * ));
```

```
CREATE MULTISET TABLE ORDERTBL, DATABLOCKSIZE=112 KILOBYTES
  (
    O_ORDERKEY       DECIMAL (15,0) not null
   ,O_CUSTKEY        INTEGER not null
   ,O_ORDERSTATUS    CHAR(1) CASESPECIFIC not null
   ,O_TOTALPRICE     DECIMAL(15,2) not null
   ,O_ORDERDATE      DATE FORMAT 'yyyy-mm-dd' not null
   ,O_ORDERPRIORITY  CHAR(15) CASESPECIFIC not null
   ,O_CLERK          CHAR(15) CASESPECIFIC not null
   ,O_SHIPPRIORITY   INTEGER not null
   ,O_COMMENT        VARCHAR(79) CASESPECIFIC not null)
  PRIMARY INDEX( O_ORDERKEY )  PARTITION BY (RANGE_N
  ( O_OrderDate Between
                   * AND DATE '1992-12-31',
   DATE '1993-01-01' AND DATE '1993-12-31',
   DATE '1994-01-01' AND DATE '1994-12-31',
   DATE '1995-01-01' AND DATE '1995-12-31',
   DATE '1996-01-01' AND DATE '1996-12-31',
   DATE '1997-01-01' AND DATE '1997-12-31',
   DATE '1998-01-01' AND * ));
```

```
CREATE MULTISET TABLE PARTSUPP
  (
    PS_PARTKEY     INTEGER not null
   ,PS_SUPPKEY     INTEGER not null
   ,PS_AVAILQTY    INTEGER not null
   ,PS_SUPPLYCOST  DECIMAL(15,2) not null
   ,PS_COMMENT     VARCHAR(199) CASESPECIFIC not null
  )
;

CREATE MULTISET TABLE PARTTBL
  (
    P_PARTKEY      INTEGER not null
   ,P_NAME         VARCHAR(55) CASESPECIFIC not null
   ,P_MFGR         CHAR(25) CASESPECIFIC not null
   ,P_BRAND        CHAR(10) CASESPECIFIC not null
   ,P_TYPE         VARCHAR(25) CASESPECIFIC not null
   ,P_SIZE         INTEGER not null
   ,P_CONTAINER    CHAR(10) CASESPECIFIC not null
   ,P_RETAILPRICE  DECIMAL(15,2) not null
   ,P_COMMENT      VARCHAR(23) CASESPECIFIC not null
  )
UNIQUE PRIMARY INDEX( P_PARTKEY );


CREATE MULTISET TABLE SUPPLIER
  (
    S_SUPPKEY    INTEGER not null
   ,S_NAME       CHAR(25) CASESPECIFIC not null
   ,S_ADDRESS    VARCHAR(40) CASESPECIFIC not null
   ,S_NATIONKEY  INTEGER not null
   ,S_PHONE      CHAR(15) CASESPECIFIC not null
   ,S_ACCTBAL    DECIMAL(15,2) not null
   ,S_COMMENT    VARCHAR(101) CASESPECIFIC not null
  )
UNIQUE PRIMARY INDEX( S_SUPPKEY );

CREATE MULTISET TABLE CUSTOMER
  (
    C_CUSTKEY     INTEGER not null
   ,C_NAME        VARCHAR(25) CASESPECIFIC not null
   ,C_ADDRESS     VARCHAR(40) CASESPECIFIC not null
   ,C_NATIONKEY   INTEGER not null
   ,C_PHONE       CHAR(15) CASESPECIFIC not null
   ,C_ACCTBAL     DECIMAL(15,2) not null
   ,C_MKTSEGMENT  CHAR(10) CASESPECIFIC not null
   ,C_COMMENT     VARCHAR(117) CASESPECIFIC not null
  )
UNIQUE PRIMARY INDEX( C_CUSTKEY );


CREATE MULTISET TABLE NATION
  (
    N_NATIONKEY  INTEGER NOT NULL
   ,N_NAME       CHAR(25) CASESPECIFIC NOT NULL
   ,N_REGIONKEY  INTEGER NOT NULL
   ,N_COMMENT    VARCHAR(152) CASESPECIFIC NOT NULL
  )
UNIQUE PRIMARY INDEX( N_NATIONKEY )
;

CREATE MULTISET TABLE REGION
  (
    R_REGIONKEY  INTEGER NOT NULL
   ,R_NAME       CHAR(25) CASESPECIFIC NOT NULL
   ,R_COMMENT    VARCHAR(152) CASESPECIFIC NOT NULL
  )
UNIQUE PRIMARY INDEX( R_REGIONKEY );
```

B.2 Create Index and Collect Statistics Statements

```
/* This is the initial PREPARATION H index and stats */

sel date,time;

collect statistics lineitem column l_partkey;
collect statistics lineitem column l_suppkey;
collect statistics lineitem column l_orderkey;
collect statistics lineitem column l_shipdate;
collect statistics lineitem column l_linenumber;

sel date,time;

create unique index ox_ok (o_orderkey) on ordertbl;
collect statistics ordertbl column o_orderkey;
collect statistics ordertbl column o_custkey;
collect statistics ordertbl column o_orderdate;
collect statistics ordertbl column o_shippriority;
```

```
sel date,time;

create index psx_sk (ps_suppkey) on partsupp;
collect statistics partsupp column ps_partkey;
collect statistics partsupp column ps_suppkey;
collect statistics partsupp column ps_availqty;

sel date,time;

collect statistics parttbl column p_partkey;
collect statistics parttbl column p_type;
collect statistics parttbl column p_name;
collect statistics parttbl column p_size;
collect statistics parttbl column p_comment;

sel date,time;

create index sx_nk (s_nationkey) on supplier;
collect statistics supplier column s_suppkey;
collect statistics supplier column s_nationkey;
collect statistics supplier column s_name;

sel date,time;

create index cx_nk (c_nationkey) on customer;
collect statistics customer column c_custkey;
collect statistics customer column c_nationkey;
collect statistics customer column c_name;

sel date,time;

collect statistics region column r_regionkey;
collect statistics region column r_name;

sel date,time;

collect statistics nation column n_nationkey;
collect statistics nation column n_name;
collect statistics nation column n_regionkey;

sel date,time;

alter table lineitem, default datablocksize;
alter table ordertbl, default datablocksize;

sel date,time;

.quit


.set width 132
sel date,time;
.os /home2/tpcd/preps/modify_DBs

create hash index l_fpk2 (l_partkey,l_suppkey) on lineitem by
(l_partkey) order by hash (l_partkey);

.os /home2/tpcd/preps/modify_defaultDBs
sel date,time;

.quit


.set width 132
sel date,time;
.os /home2/tpcd/preps/modify_DBs

create hash index o_fpk2 (o_custkey) on ordertbl by (o_custkey)
order by hash (o_custkey);

.os /home2/tpcd/preps/modify_defaultDBs
sel date,time;

.quit
```

Appendix C. Query Text and Output Data from Qualification Database

```
 Submitting SQL Request #1:

/* Teradata
*/
/* @(#)TERADATA 1.sql 1.1.1.1@(#) */
/* Query 01 - Var_0 Rev_01 - TPC-H/TPC-R Pricing Summary Report
Query   */

SELECT
        L_RETURNFLAG,
        L_LINESTATUS,
        SUM(L_QUANTITY (FLOAT)) (DECIMAL(18,2)) AS SUM_QTY,
        SUM(L_EXTENDEDPRICE (FLOAT)) (DECIMAL(18,2)) AS
SUM_BASE_PRICE,
        SUM(L_EXTENDEDPRICE*(1-L_DISCOUNT) (FLOAT))
(DECIMAL(18,2)) AS SUM_DISC_
PRICE,
        SUM(L_EXTENDEDPRICE*(1-L_DISCOUNT)*(1+L_TAX) (FLOAT))
(DECIMAL(18,2)) AS
 SUM_CHARGE,
        AVG(L_QUANTITY (FLOAT)) (DECIMAL(18,2)) AS AVG_QTY,
        AVG(L_EXTENDEDPRICE (FLOAT)) (DECIMAL(18,2)) AS
AVG_PRICE,
        AVG(L_DISCOUNT (FLOAT)) (DECIMAL(18,2)) AS AVG_DISC,
        COUNT(*) (DEC(18,0)) AS COUNT_ORDER
FROM
        LINEITEM
WHERE
        L_SHIPDATE <= DATE '1998-12-01' - INTERVAL '90' DAY
GROUP BY
        L_RETURNFLAG,
        L_LINESTATUS
ORDER BY
        L_RETURNFLAG,
        L_LINESTATUS;

 Query 1 complete, 4 rows returned

|Col1|Col2|_________________Col3|_________________Col4|________
_________Col5|
_________________Col6|_________________Col7|_________________C
ol8|___________
_______Col9|_________________Col10|
|A   |F   |           37734107.00|        56586554400.73|
53758257134.87|
        55909065222.83|                 25.52|
38273.13|
       0.05|            1478493.00|
|N   |F   |             991417.00|         1487504710.38|
1413082168.05|
         1469649223.19|                 25.52|
38284.47|
       0.05|              38854.00|
|N   |O   |           74476040.00|       111701729697.74|
106118230307.61|
       110367043872.50|                 25.50|
38249.12|
       0.05|            2920374.00|
|R   |F   |           37719753.00|        56568041380.90|
53741292684.60|
        55889619119.83|                 25.51|
38250.85|
       0.05|            1478870.00|

Submitting SQL Request #2:

/* Teradata
*/
/* @(#)TERADATA 2.sql 1.1.1.1@(#) */
/* Query 02 - Var_0 Rev_01 - TPC-H/TPC-R Minimum Cost Supplier
Query  */

SELECT
        S_ACCTBAL,
        S_NAME,
        N_NAME,
        P_PARTKEY,
        P_MFGR,
        S_ADDRESS,
        S_PHONE,
        S_COMMENT
```

```
FROM
        PARTTBL,
        SUPPLIER,
        PARTSUPP,
        NATION,
        REGION
WHERE
        P_PARTKEY = PS_PARTKEY
        AND S_SUPPKEY = PS_SUPPKEY
        AND P_SIZE = 15
        AND P_TYPE LIKE '%BRASS'
        AND S_NATIONKEY = N_NATIONKEY
        AND N_REGIONKEY = R_REGIONKEY
        AND R_NAME = 'EUROPE'
        AND PS_SUPPLYCOST = (
                SELECT
                        MIN(PS_SUPPLYCOST)
                FROM
                        PARTSUPP,
                        SUPPLIER,
                        NATION,
                        REGION
                WHERE
                        P_PARTKEY = PS_PARTKEY
                        AND S_SUPPKEY = PS_SUPPKEY
                        AND S_NATIONKEY = N_NATIONKEY
                        AND N_REGIONKEY = R_REGIONKEY
                        AND R_NAME = 'EUROPE'
        )
ORDER BY
        S_ACCTBAL DESC,
        N_NAME,
        S_NAME,
        P_PARTKEY;

 Query 2 complete, 460 rows returned


 only displaying 100 rows per TPC-H spec

|_________________Col1|Col2_____________________|Col3_____________
_______|_______
Col4|Col5_____________________|Col6_____________________________
______|Col7____
_______|Col8_____________________________________________________
_____________
________|
|            9938.53|Supplier#000005359       |UNITED KINGDOM
|     18
5358|Manufacturer#4           |QKuHYh,vZGiwu2FWEJoLDx04
|33-429-7
90-6131|blithely silent pinto beans are furiously. slyly final
deposits acros
        |
|            9937.84|Supplier#000005969       |ROMANIA
|     10
8438|Manufacturer#1           |ANDENSOSmk,miq23Xfb5RWt6dvUcvt6Qa
|29-520-6
92-3537|carefully slow deposits use furiously. slyly ironic
platelets above the
ironic  |
|            9936.22|Supplier#000005250       |UNITED KINGDOM
|
 249|Manufacturer#4           |B3rqp0xbSEim4Mpy2RH J
|33-320-2
28-2957|blithely special packages are. stealthily express
deposits across the cl
osely final instructi|
|            9923.77|Supplier#000002324       |GERMANY
|      2
9821|Manufacturer#4           |y3OD9UywSTOk
|17-779-2
99-1839|quickly express packages breach quiet pinto beans. requ
        |
|            9871.22|Supplier#000006373       |GERMANY
|      4
3868|Manufacturer#5           |J8fcXWsTqM
|17-813-4
85-8637|never silent deposits integrate furiously blit
        |
|            9870.78|Supplier#000001286       |GERMANY
|      8
1285|Manufacturer#2
|YKA,E2fjiVd7eUrzp2Ef8j1QxGo2DFnosaTEH   |17-516-9
24-4574|final theodolites cajole slyly special,
        |
|            9870.78|Supplier#000001286       |GERMANY
|     18
1285|Manufacturer#4
|YKA,E2fjiVd7eUrzp2Ef8j1QxGo2DFnosaTEH   |17-516-9
24-4574|final theodolites cajole slyly special,
        |
|            9852.52|Supplier#000008973       |RUSSIA
|      1
```

```
8972|Manufacturer#2           |t5L67YdBYYH6o,Vz24jpDyQ9
|32-188-5
94-7038|quickly regular instructions wake-- carefully unusual
braids into the ex
pres    |
|            9847.83|Supplier#000008097       |RUSSIA
|     13
0557|Manufacturer#2           |xMe97bpE69NzdwLoX
|32-375-6
40-3593|slyly regular dependencies sleep slyly furiously express
dep
        |
|            9847.57|Supplier#000006345       |FRANCE
|      8
6344|Manufacturer#1
|VSt3rzk3qG698u6ld8HhOByvrTcSTSvQlDQDag  |16-886-7
66-7945|silent pinto beans should have to snooze carefully along
the final reque
s       |
|            9847.57|Supplier#000006345       |FRANCE
|     17
3827|Manufacturer#2
|VSt3rzk3qG698u6ld8HhOByvrTcSTSvQlDQDag  |16-886-7
66-7945|silent pinto beans should have to snooze carefully along
the final reque
s       |
|            9836.93|Supplier#000007342       |RUSSIA
|
4841|Manufacturer#4           |JOlK7C1,7xrEZSSOw
|32-399-4
14-5385|final accounts haggle. bold accounts are furiously
dugouts. furiously si
lent asymptotes are slyly|
|            9817.10|Supplier#000002352       |RUSSIA
|     12
4815|Manufacturer#2           |4LfoHUZjgjEbAKw TgdKcgOc4D4uCYw
|32-551-8
31-1437|blithely pending packages across the ironic accounts grow
slyly after th
e furiously|
|            9817.10|Supplier#000002352       |RUSSIA
|     15
2351|Manufacturer#3           |4LfoHUZjgjEbAKw TgdKcgOc4D4uCYw
|32-551-8
31-1437|blithely pending packages across the ironic accounts grow
slyly after th
e furiously|
|            9739.86|Supplier#000003384       |FRANCE
|     13
8357|Manufacturer#2           |o,Z3v4POifevE k9U1b 6J1ucX,I
|16-494-9
13-5925|slyly ironic theodolites hag
        |
|            9721.95|Supplier#000008757       |UNITED KINGDOM
|     15
6241|Manufacturer#3           |Atg6GnM4dT2
|33-821-4
07-2995|ironic, even dolphins above the furiously ironic foxes
sleep slyly aroun
d the caref|
|            9681.33|Supplier#000008406       |RUSSIA
|      7
8405|Manufacturer#1           |,qUuXcftUl
|32-139-8
73-8571|furiously even deposits affix thinly special theodolites.
furiou
        |
|            9643.55|Supplier#000005148       |ROMANIA
|     10
7617|Manufacturer#1           |kT4ciVFslx9z4s79p Js825
|29-252-6
17-4850|doggedly even ideas boost furiously against the furiously
express
        |
|            9624.82|Supplier#000001816       |FRANCE
|      3
4306|Manufacturer#3           |e7vab91vLJPWxxZnewmnDBpDmxYHrb
|16-392-2
37-6726|blithely regular accounts cajole furiously. regular
        |
|            9624.78|Supplier#000009658       |ROMANIA
|     18
9657|Manufacturer#1           |oE9uBgEfSS4opIcepXyAYM,x
|29-748-8
76-2014|regular deposits haggle. furiously express asympto
        |
|            9612.94|Supplier#000003228       |ROMANIA
|     12
0715|Manufacturer#2           |KDdpNKN3cWu7ZSrbdqp7AfSLxx,qWB
|29-325-7
84-8187|carefully pending accounts serve. furiously close
deposits boost slyly.
q       |
```

```
|            9612.94|Supplier#000003228       |ROMANIA
|     19
8189|Manufacturer#4           |KDdpNKN3cWu7ZSrbdqp7AfSLxx,qWB
|29-325-7
84-8187|carefully pending accounts serve. furiously close
deposits boost slyly.
q       |
|            9571.83|Supplier#000004305       |ROMANIA
|     17
9270|Manufacturer#2           |qNHZ7WmCzygwMPRDO9Ps
|29-973-4
81-1831|furiously final deposits
        |
|            9558.10|Supplier#000003532       |UNITED KINGDOM
|      8
8515|Manufacturer#4
|EOeuiiOn21OVpTlGguufFDFsbN1p0lhpxHp     |33-152-3
01-2164|daring, sly accounts breach about th
        |
|            9492.79|Supplier#000005975       |GERMANY
|      2
5974|Manufacturer#5           |S6mIiCTx82z7lV
|17-992-5
79-4839|always pending packages boost slyly.
        |
|            9461.05|Supplier#000002536       |UNITED KINGDOM
|      2
0033|Manufacturer#1           |8mmGbyzaU
7ZS2wJumTibypncu9pNkDc4FYA    |33-556-9
73-5522|even foxes are quickly furiously express requests.
packages
        |
|            9453.01|Supplier#000000802       |ROMANIA
|     17
5767|Manufacturer#1           |,6HYXb4uaHITmtMBj4Ak57Pd
|29-342-8
82-6463|final, regular packages across the slowly regular packag
        |
|            9408.65|Supplier#000007772       |UNITED KINGDOM
|     11
7771|Manufacturer#4           |AiC5YAH,gdu0i7
|33-152-4
91-1126|blithely final ideas sleep carefully. requests are
        |
|            9359.61|Supplier#000004856       |ROMANIA
|      6
2349|Manufacturer#5           |HYogcF3Jb yh1
|29-334-8
70-9731|carefully unusual packages sleep carefully even ideas.
dogged accoun
        |
|            9357.45|Supplier#000006188       |UNITED KINGDOM
|     13
8648|Manufacturer#1           |g801,ssP8wpTk4Hm
|33-583-6
07-1633|carefully regular deposits wake carefully furiously even
i
        |
|            9352.04|Supplier#000003439       |GERMANY
|     17
0921|Manufacturer#4           |qYPDgoiBGhCYxjgC
|17-128-9
96-4650|fluffily regular pinto beans wake. unusual, final ideas c
        |
|            9312.97|Supplier#000007807       |RUSSIA
|      9
0279|Manufacturer#5           |oGYMPCk9XHGB2PBfKRnHA
|32-673-8
72-5854|unusual asymptotes above the
        |
|            9312.97|Supplier#000007807       |RUSSIA
|     10
0276|Manufacturer#5           |oGYMPCk9XHGB2PBfKRnHA
|32-673-8
72-5854|unusual asymptotes above the
        |
|            9280.27|Supplier#000007194       |ROMANIA
|      4
7193|Manufacturer#3           |zhRUQkBSrFYxIAXTfInj vyGRQjeK
|29-318-4
54-2133|slyly ironic requests despite the unusual ins
        |
|            9274.80|Supplier#000008854       |RUSSIA
|      7
6346|Manufacturer#3           |1xhLoOUM7I3mZ1mKnerw OSqdbb4QbGa
|32-524-1
48-5221|ruthlessly ironic instructions along the regular, furious
requests integ
rate car|
|            9249.35|Supplier#000003973       |FRANCE
|      2
6466|Manufacturer#1
|d18GiDsL6Wm2IsGXM,RZf1jCsgZAOjNYVThTRP4 |16-722-8
```

```
66-1658|quickly ironic sauternes use b
        |
|            9249.35|Supplier#000003973       |FRANCE
|      3
3972|Manufacturer#1
|d18GiDsL6Wm2IsGXM,RZf1jCsgZAOjNYVThTRP4 |16-722-8
66-1658|quickly ironic sauternes use b
        |
|            9208.70|Supplier#000007769       |ROMANIA
|      4
0256|Manufacturer#5           |rsimdze 5o9P Ht7xS
|29-964-4
24-9649|furiously ruthless epitaphs among the furiously regular
accounts use slo
wly fluffily ev|
|            9201.47|Supplier#000009690       |UNITED KINGDOM
|      6
7183|Manufacturer#5           |CB BnUTlmi5zdeEl7R7
|33-121-2
67-9529|blithely unusual accounts integrate slyly. platelets
        |
|            9192.10|Supplier#000000115       |UNITED KINGDOM
|      8
5098|Manufacturer#3           |nJ 2t0f7Ve,wL1,6WzGBJLNBUCKlsV
|33-597-2
48-1220|slyly bold pinto beans boost across the furiously regular
packages. care
fully regu|
|            9189.98|Supplier#000001226       |GERMANY
|      2
1225|Manufacturer#4           |qsLCqSvLyZfuXIpjz
|17-725-9
03-1381|final, express instruction
        |
|            9128.97|Supplier#000004311       |RUSSIA
|     14
6768|Manufacturer#5           |I8IjnXd7NSJRs594RxsRR0
|32-155-4
40-7120|regular pinto beans sleep ca
        |
|            9104.83|Supplier#000008520       |GERMANY
|     15
0974|Manufacturer#4           |RqRVDgD0ER J9 b41vR2,3
|17-728-8
04-1793|deposits sleep carefully e
        |
|            9101.00|Supplier#000005791       |ROMANIA
|     12
8254|Manufacturer#5           |zub2zCV,jhHPPQqi,P2INAjE1zI
n66cOEoXFG  |29-549-2
51-5384|carefully ironic packages after the
        |
|            9094.57|Supplier#000004582       |RUSSIA
|      3
9575|Manufacturer#1           |WB0XkCSG3r,mnQ
n,h9VIxjjr9ARHFvKgMDf    |32-587-5
77-1351|asymptotes above the slyly even requests haggle furiously
about the regu
lar accounts|
|            8996.87|Supplier#000004702       |FRANCE
|     10
2191|Manufacturer#5           |8XVcQK23akp
|16-811-2
69-8946|stealthy requests haggle c
        |
|            8996.14|Supplier#000009814       |ROMANIA
|     13
9813|Manufacturer#2
|af0O5pg83lPU4IDVmEylXZVqYZQzSDlYLAmR    |29-995-5
71-8781|ironic theodolites are evenly unusual requests-- pending
pinto beans acr
oss the in|
|            8968.42|Supplier#000010000       |ROMANIA
|     11
9999|Manufacturer#5           |aTGLEusCiL4F PDBdv665XBJhPyCOB0i
|29-578-4
32-2146|furiously final ideas believe furiously. furiously final
ideas
        |
|            8936.82|Supplier#000007043       |UNITED KINGDOM
|     10
9512|Manufacturer#1
|FVajceZInZdbJE6Z9XsRUxrUEpiwHDrOXi,1Rz  |33-784-1
77-8208|furiously regular excuses wake after the blithely special
pinto beans? e
ven instructions sl|
|            8929.42|Supplier#000008770       |FRANCE
|     17
3735|Manufacturer#4           |R7cG26TtXrHAP9 HckhfRi
|16-242-7
46-9248|final accounts sleep furiously. blithely ironic foxes
wake boldly across
 the furiously s|
```

```
|            8920.59|Supplier#000003967       |ROMANIA
|      2
6460|Manufacturer#1           |eHoAXe62SY9
|29-194-7
31-3944|quickly even requests should have to affix blithely-- fur
        |
|            8920.59|Supplier#000003967       |ROMANIA
|     17
3966|Manufacturer#2           |eHoAXe62SY9
|29-194-7
31-3944|quickly even requests should have to affix blithely-- fur
        |
|            8913.96|Supplier#000004603       |UNITED KINGDOM
|     13
7063|Manufacturer#2           |OUzlvMUr7n,utLxmPNeYKSf3T24OXskxB5
|33-789-2
55-7342|slyly ironic packages detect furious accounts. ironic de
        |
|            8877.82|Supplier#000007967       |FRANCE
|     16
7966|Manufacturer#5           |A3pi1BARM4nx6R,qrwFoRPU
|16-442-1
47-9345|final deposits after the silent deposits ha
        |
|            8862.24|Supplier#000003323       |ROMANIA
|      7
3322|Manufacturer#3           |W9 lYcsC9FwBqk3ItL
|29-736-9
51-3710|unusual, pending theodolites integrate furiously slyly
even pinto beans.
 unusual sheaves sleep befor|
|            8841.59|Supplier#000005750       |ROMANIA
|     10
0729|Manufacturer#5           |Erx3lAgu0g62iaHF9x50uMH4EgeN9hEG
|29-344-5
02-5481|excuses after the blithely regular packages mold
carefully deposits. reg
ular a  |
|            8781.71|Supplier#000003121       |ROMANIA
|      1
3120|Manufacturer#5           |wNqTogx238ZYCamFb,50v,bj
4IbNFW9Bvw1xP  |29-707-2
91-5144|packages are quickly after the final, even packages.
furiously regular
        |
|            8754.24|Supplier#000009407       |UNITED KINGDOM
|     17
9406|Manufacturer#4           |CHRCbkaWcf5B
|33-903-9
70-9604|regular dependencies haggle across the carefully bold
        |
|            8691.06|Supplier#000004429       |UNITED KINGDOM
|     12
6892|Manufacturer#2           |k,BQms5UhoAF1B2Asi,fLib
|33-964-3
37-5038|quickly special foxes against the furiously silent
platelets wake quickl
y after t|
|            8655.99|Supplier#000006330       |RUSSIA
|     19
3810|Manufacturer#2           |UozlaENr0ytKe2w6CeIEWFWn
iO3S8Rae7Ou    |32-561-1
98-3705|blithely even packages alongside
        |
|            8638.36|Supplier#000002920       |RUSSIA
|      7
5398|Manufacturer#1           |Je2a8bszf3L
|32-122-6
21-7549|express deposits wake. furiously silent requests wake
carefully silent i
nstru   |
|            8638.36|Supplier#000002920       |RUSSIA
|     17
0402|Manufacturer#3           |Je2a8bszf3L
|32-122-6
21-7549|express deposits wake. furiously silent requests wake
carefully silent i
nstru   |
|            8607.69|Supplier#000006003       |UNITED KINGDOM
|      7
6002|Manufacturer#2
|EH9wADcEiuenM0NR08zDwMidw,52Y2RyILEiA   |33-416-8
07-5206|always special foxes wake slyly bold, ironic accounts.
ironic instructio
ns affix carefull|
|            8569.52|Supplier#000005936       |RUSSIA
|
5935|Manufacturer#5           |jXaNZ6vwnEWJ2ksLZJpjtgt0bY2a3AU
|32-644-2
51-7916|packages sleep furiously. special requests about the
fluffily even accou
nts detect|
|            8564.12|Supplier#000000033       |GERMANY
|     11
```

```
0032|Manufacturer#1
|gfeKpYw3400L0SDywXA6Ya1Qmq1w6YB9f3R     |17-138-8
97-9374|ironic instructions are. special pearls above
        |
|            8553.82|Supplier#000003979       |ROMANIA
|     14
3978|Manufacturer#4           |BfmVhCAnCMY3jzpjUMy4CNWs9
HzpdQR7INJU   |29-124-6
46-4897|express, ironic pinto beans cajole around the express,
even packages. qu
        |
|            8517.23|Supplier#000009529       |RUSSIA
|      3
7025|Manufacturer#5           |e44R8o7JAIS9iMcr
|32-565-2
97-8775|furiously silent requests cajole furiously furiously
ironic foxes. slyly
 express p|
|            8517.23|Supplier#000009529       |RUSSIA
|      5
9528|Manufacturer#2           |e44R8o7JAIS9iMcr
|32-565-2
97-8775|furiously silent requests cajole furiously furiously
ironic foxes. slyly
 express p|
|            8503.70|Supplier#000006830       |RUSSIA
|      4
4325|Manufacturer#4           |BC4WFCYRUZyaIgchU 4S
|32-147-8
78-5069|quickly regular excuses detect evenly around
        |
|            8457.09|Supplier#000009456       |UNITED KINGDOM
|      1
9455|Manufacturer#1           |7SBhZs8gP1cJjT0Qf433YBk
|33-858-4
40-4349|carefully final accounts sleep blithely special foxes.
slyly regular pin
to beans alon|
|            8441.40|Supplier#000003817       |FRANCE
|     14
1302|Manufacturer#2           |hU3fz3xL78
|16-339-3
56-5115|blithely blithe ideas are
        |
|            8432.89|Supplier#000003990       |RUSSIA
|     19
1470|Manufacturer#1
|wehBBp1RQbfxAYDASS75MsywmsKHRVdkrvNe6m  |32-839-5
09-9301|final requests along the blithely ironic packages kindle
against the car
efully fina|
|            8431.40|Supplier#000002675       |ROMANIA
|
5174|Manufacturer#1           |HJFStOu9R5NGPOegKhgbzBdyvrG2yh8w
|29-474-6
43-1443|express, final deposits cajole carefully. stealthily
unusual requests
        |
|            8407.04|Supplier#000005406       |RUSSIA
|     16
2889|Manufacturer#4           |j7 gYF5RW8DC5UrjKC
|32-626-1
52-4621|quickly final sheaves boost. car
        |
|            8386.08|Supplier#000008518       |FRANCE
|      3
6014|Manufacturer#3
|2jqzqqAVe9crMVGP,n9nTsQXulNLTUYoJjEDcqWV|16-618-7
80-7481|slyly ironic theodolites are slyly. dogged, pendin
        |
|            8376.52|Supplier#000005306       |UNITED KINGDOM
|     19
0267|Manufacturer#5           |9t8Y8
QqSIsoADPt6NLdk,TP5zyRx41oBUlgoGc9|33-632-5
14-7931|furiously even instructions integrate during the
furiously regular re
        |
|            8348.74|Supplier#000008851       |FRANCE
|      6
6344|Manufacturer#4           |nWxi7GwEbjhw1
|16-796-2
40-2472|ironic instructions nag slyly against the slyly even
theodolites. reques
ts alongside of |
|            8338.58|Supplier#000007269       |FRANCE
|      1
7268|Manufacturer#4           |ZwhJSwABUoiB04,3
|16-267-2
77-4365|ruthlessly regular asymptotes a
        |
|            8328.46|Supplier#000001744       |ROMANIA
|      6
```

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9237|Manufacturer#5           |oLo3fV64q2,FKHa3p,qHnS7Yzv,ps8
|29-330-7
28-5873|blithely silent excuses are slyly above the furiously
even courts
        |
|            8307.93|Supplier#000003142       |GERMANY
|      1
8139|Manufacturer#1           |dqblvV8dCNAorGlJ
|17-595-4
47-6026|theodolites sleep blithely carefully regular warhorses.
slyly regular in
s       |
|            8231.61|Supplier#000009558       |RUSSIA
|     19
2000|Manufacturer#2           |mcdgen,yT1iJDHDS5fV
|32-762-1
37-5858|slyly regular theodolites sleep fluffily express depos
        |
|            8152.61|Supplier#000002731       |ROMANIA
|      1
5227|Manufacturer#4           | nluXJCuY1tu
|29-805-4
63-2030|gifts use. slyly silent ideas are carefully beneath the
silent instructi
ons. slyly sil|
|            8109.09|Supplier#000009186       |FRANCE
|      9
9185|Manufacturer#1           |wgfosrVPexl9pEXWywaqlBMDYYf
|16-668-5
70-1402|quickly pending requests are blithely along the ironic,
final requests;
instr   |
|            8102.62|Supplier#000003347       |UNITED KINGDOM
|      1
8344|Manufacturer#5           |m CtXS2S16i
|33-454-2
74-8532|packages grow special orbits. regular theodolites about
the carefully pe
        |
|            8046.07|Supplier#000008780       |FRANCE
|     19
1222|Manufacturer#3           |AczzuE0UK9osj ,Lx0Jmh
|16-473-2
15-6395|regular epitaphs integrate slyly.
        |
|            8042.09|Supplier#000003245       |RUSSIA
|     13
5705|Manufacturer#4           |Dh8Ikg39onrbOL4DyTfGw8a9oKUX3d9Y
|32-836-1
32-8872|carefully regular instructions integrate blithely silent
foxes. furiousl
y express instructions haggl|
|            8042.09|Supplier#000003245       |RUSSIA
|     15
0729|Manufacturer#1           |Dh8Ikg39onrbOL4DyTfGw8a9oKUX3d9Y
|32-836-1
32-8872|carefully regular instructions integrate blithely silent
foxes. furiousl
y express instructions haggl|
|            7992.40|Supplier#000006108       |FRANCE
|     11
8574|Manufacturer#1           |8tBydnTDwUqfBfFV4l3
|16-974-9
98-8937|regular pinto beans are after
        |
|            7980.65|Supplier#000001288       |FRANCE
|      1
3784|Manufacturer#4           |zE,7HgVPrCn
|16-646-4
64-8247|unusual pinto beans cajole furiously according t
        |
|            7950.37|Supplier#000008101       |GERMANY
|      3
3094|Manufacturer#5           |kkYvL6IuvojJgTNG IKkaXQDYgx8ILohj
|17-627-6
63-8014|quickly regular requests are furiously. pending deposits
wake
        |
|            7937.93|Supplier#000009012       |ROMANIA
|      8
3995|Manufacturer#2           |iUiTziH,Ek3i4lwSgunXMgrcTzwdb
|29-250-9
25-9690|blithely bold ideas haggle quickly final, regular request
        |
|            7914.45|Supplier#000001013       |RUSSIA
|     12
5988|Manufacturer#2           |riRcntps4KEDtYScjpMIWeYF6mNnR
|32-194-6
98-3365|final, ironic theodolites alongside of the ironic
        |
|            7912.91|Supplier#000004211       |GERMANY
|     15
9180|Manufacturer#5           |2wQRVovHrm3,v03IKzfTd,1PYsFXQFFOG
|17-266-9
```

```
47-7315|final requests integrate slyly above the silent, even
        |
|            7912.91|Supplier#000004211       |GERMANY
|     18
4210|Manufacturer#4           |2wQRVovHrm3,v03IKzfTd,1PYsFXQFFOG
|17-266-9
47-7315|final requests integrate slyly above the silent, even
        |
|            7894.56|Supplier#000007981       |GERMANY
|      8
5472|Manufacturer#4           |NSJ96vMROAbeXP
|17-963-4
04-3760|regular, even theodolites integrate carefully. bold,
special theodolites
 are slyly fluffily iron|
|            7887.08|Supplier#000009792       |GERMANY
|     16
4759|Manufacturer#3           |Y28ITVeYriT3kIGdV2K8fSZ
V2UqT5H1Otz     |17-988-9
38-4296|pending, ironic packages sleep among the carefully ironic
accounts. quic
kly final accounts |
|            7871.50|Supplier#000007206       |RUSSIA
|     10
4695|Manufacturer#1           |3w fNCnrVmvJjE95sgWZzvW
|32-432-4
52-7731|furiously dogged pinto beans cajole. bold, express
notornis until the sl
yly pending |
|            7852.45|Supplier#000005864       |RUSSIA
|
8363|Manufacturer#4           |WCNfBPZeSXh3h,c
|32-454-8
83-3821|blithely regular deposits
        |
|            7850.66|Supplier#000001518       |UNITED KINGDOM
|      8
6501|Manufacturer#1           |ONda3YJiHKJOC
|33-730-3
83-3892|furiously final accounts wake carefully idle requests.
even dolphins wak
e acc   |
|            7843.52|Supplier#000006683       |FRANCE
|      1
1680|Manufacturer#4           |2Z0JGkiv01Y00oCFwUGfviIbhzCdy
|16-464-5
17-8943|carefully bold accounts doub
```

```
        |

Submitting SQL Request #3:

/* Teradata
*/
/* @(#)TERADATA 3.sql 1.1.1.1@(#) */
/* Query 03 - Var_0 Rev_01 - TPC-H/TPC-R Shipping Priority Query
*/

SELECT
        L_ORDERKEY,
        SUM(L_EXTENDEDPRICE*(1-L_DISCOUNT) (FLOAT))
(DECIMAL(18,2)) AS REVENUE,
        O_ORDERDATE,
        O_SHIPPRIORITY
FROM
        CUSTOMER,
        ORDERTBL,
        LINEITEM
WHERE
        C_MKTSEGMENT  = 'BUILDING'
        AND C_CUSTKEY    = O_CUSTKEY
        AND L_ORDERKEY   = O_ORDERKEY
        AND O_ORDERDATE  < '1995-03-15'
        AND L_SHIPDATE   > '1995-03-15'
GROUP BY
        L_ORDERKEY,
        O_ORDERDATE,
        O_SHIPPRIORITY
ORDER BY
        REVENUE DESC,
        O_ORDERDATE;

 Query 3 complete, 11620 rows returned


 only displaying 10 rows per TPC-H spec

|_____________Col1|_____________________Col2|______Col3|_______Col
4|
|         2456423.00|             406181.01|1995-03-05|
0|
|         3459808.00|             405838.70|1995-03-04|
0|
|          492164.00|             390324.06|1995-02-19|
0|
```

```
|         1188320.00|             384537.94|1995-03-09|
0|
|         2435712.00|             378673.06|1995-02-26|
0|
|         4878020.00|             378376.80|1995-03-12|
0|
|         5521732.00|             375153.92|1995-03-13|
0|
|         2628192.00|             373133.31|1995-02-22|
0|
|          993600.00|             371407.46|1995-03-05|
0|
|         2300070.00|             367371.15|1995-03-13|
0|

Submitting SQL Request #4:

/*  Teradata
*/
/* @(#)TERADATA 4.sql 1.1.1.1@(#) */
/*  Query 04 - Var_0 Rev_01 - TPC-H/TPC-R Order Priority Checking
Query */

SELECT
        O_ORDERPRIORITY,
        COUNT(*) AS ORDER_COUNT
FROM
        ORDERTBL
WHERE
        O_ORDERDATE >=  '1993-07-01'
        AND O_ORDERDATE < DATE '1993-07-01' + INTERVAL '3' MONTH
        AND EXISTS (
                SELECT
                        *
                FROM
                        LINEITEM
                WHERE
                        L_ORDERKEY = O_ORDERKEY
                        AND L_COMMITDATE < L_RECEIPTDATE
        )
GROUP BY
        O_ORDERPRIORITY
ORDER BY
        O_ORDERPRIORITY;

 Query 4 complete, 5 rows returned

|Col1___________|_______Col2|
|1-URGENT       |      10594|
|2-HIGH         |      10476|
|3-MEDIUM       |      10410|
|4-NOT SPECIFIED|      10556|
|5-LOW          |      10487|

Submitting SQL Request #5:

/*  Teradata
*/
/* @(#)TERADATA 5.sql 1.1.1.2@(#) */
/*  Query 05 - Var_0 Rev_01 - TPC-H/TPC-R Local Supplier Volume
Query */

SELECT
        N_NAME,
        SUM(L_EXTENDEDPRICE*(1-L_DISCOUNT) (FLOAT))
(DECIMAL(18,2)) AS REVENUE
FROM
        CUSTOMER,
        ORDERTBL,
        LINEITEM,
        SUPPLIER,
        NATION,
        REGION
WHERE
        C_CUSTKEY = O_CUSTKEY
        AND L_ORDERKEY = O_ORDERKEY
        AND L_SUPPKEY = S_SUPPKEY
        AND C_NATIONKEY = S_NATIONKEY
        AND S_NATIONKEY = N_NATIONKEY
        AND N_REGIONKEY = R_REGIONKEY
        AND R_NAME = 'ASIA'
        AND O_ORDERDATE >= '1994-01-01'
        AND O_ORDERDATE < DATE '1994-01-01' + INTERVAL '1' YEAR
GROUP BY
        N_NAME
ORDER BY
        REVENUE DESC;

 Query 5 complete, 5 rows returned

|Col1_____________________|___________________Col2|
|INDONESIA                |          55502041.17|
|VIETNAM                  |          55295087.00|
|CHINA                    |          53724494.26|
```

```
|INDIA                     |           52035512.00|
|JAPAN                     |           45410175.70|

Submitting SQL Request #6:

/* Teradata
*/
/* @(#)TERADATA 6.sql 1.1.1.1@(#) */
/* Query 06 - Var_0 Rev_01 - TPC-H/TPC-R Forecasting Revenue
Change Query */

SELECT
        SUM(L_EXTENDEDPRICE*L_DISCOUNT (FLOAT)) (DECIMAL(18,2))
AS REVENUE
FROM
        LINEITEM
WHERE
        L_SHIPDATE >= '1994-01-01'
        AND L_SHIPDATE < DATE '1994-01-01' + INTERVAL '1' YEAR
        AND L_DISCOUNT BETWEEN .06 - 0.01 AND .06 + 0.01
        AND L_QUANTITY < 24;

 Query 6 complete, 1 rows returned

|____________________Col1|
|          123141078.23|

Submitting SQL Request #7:

/* Teradata
*/
/* @(#)TERADATA 7.sql 1.1.1.1@(#) */
/* Query 07 - Var_0 Rev_01 - TPC-H/TPC-R Volume Shipping Query
*/

SELECT
        N1.N_NAME  AS SUPP_NATION,
        N2.N_NAME  AS CUST_NATION,
        EXTRACT(YEAR FROM L_SHIPDATE) AS "YEAR",
        SUM(L_EXTENDEDPRICE * (1-L_DISCOUNT) (FLOAT))
(DECIMAL(18,2)) AS REVENUE

FROM
        SUPPLIER,
        LINEITEM,
        ORDERTBL,
        CUSTOMER,
        NATION N1,
        NATION N2
WHERE
        S_SUPPKEY  = L_SUPPKEY
        AND O_ORDERKEY = L_ORDERKEY
        AND C_CUSTKEY = O_CUSTKEY
        AND S_NATIONKEY = N1.N_NATIONKEY
        AND C_NATIONKEY = N2.N_NATIONKEY
        AND (
                (N1.N_NAME = 'FRANCE' AND N2.N_NAME = 'GERMANY')
                OR (N1.N_NAME = 'GERMANY' AND N2.N_NAME =
'FRANCE')
        )
        AND  L_SHIPDATE BETWEEN '1995-01-01' AND '1996-12-31'
GROUP BY
        SUPP_NATION,
        CUST_NATION,
        "YEAR"
ORDER BY
        SUPP_NATION,
        CUST_NATION,
        "YEAR";

 Query 7 complete, 4 rows returned

|Col1______________________|Col2______________________|_______Col3|
_______________
___Col4|
|FRANCE                    |GERMANY                   |       1995|
5463
9732.73|
|FRANCE                    |GERMANY                   |       1996|
5463
3083.31|
|GERMANY                   |FRANCE                    |       1995|
5253
1746.67|
|GERMANY                   |FRANCE                    |       1996|
5252
0549.02|

Submitting SQL Request #8:

/* Teradata
*/
/* @(#)TERADATA 8.sql 1.1.1.1@(#) */
```

```
/* Query 08 - Var_0 Rev_01 - TPC-H/TPC-R National Market Share
Query */

SELECT
        EXTRACT(YEAR FROM O_ORDERDATE) AS "YEAR",
        SUM(CASE
                WHEN N2.N_NAME = 'BRAZIL'
                THEN (L_EXTENDEDPRICE*(1-L_DISCOUNT) (FLOAT))
                ELSE 0
        END) / SUM(L_EXTENDEDPRICE*(1-L_DISCOUNT) (FLOAT))
(DECIMAL(18,2)) AS MK
T_SHARE
FROM
        PARTTBL,
        SUPPLIER,
        LINEITEM,
        ORDERTBL,
        CUSTOMER,
        NATION N1,
        NATION N2,
        REGION
WHERE
        P_PARTKEY = L_PARTKEY
        AND S_SUPPKEY = L_SUPPKEY
        AND L_ORDERKEY = O_ORDERKEY
        AND O_CUSTKEY = C_CUSTKEY
        AND C_NATIONKEY = N1.N_NATIONKEY
        AND N1.N_REGIONKEY = R_REGIONKEY
        AND R_NAME = 'AMERICA'
        AND S_NATIONKEY = N2.N_NATIONKEY
        AND O_ORDERDATE BETWEEN '1995-01-01' AND '1996-12-31'
        AND P_TYPE = 'ECONOMY ANODIZED STEEL'
GROUP BY
        "YEAR"
ORDER BY
        "YEAR";

 Query 8 complete, 2 rows returned

|_______Col1|__________________Col2|
|       1995|                  0.03|
|       1996|                  0.04|


Submitting SQL Request #9:
```

```
/* Teradata
*/
/* @(#)TERADATA 9.sql 1.1.1.1@(#) */
/* Query 09 - Var_0 Rev_01 - TPC-H/TPC-R Product Type Profit
Measure Query */

SELECT
        N_NAME  AS NATION,
        EXTRACT(YEAR FROM O_ORDERDATE) AS "YEAR",
        SUM(L_EXTENDEDPRICE*(1-L_DISCOUNT)-
PS_SUPPLYCOST*L_QUANTITY (FLOAT)) (DE
CIMAL(18,2)) AS SUM_PROFIT
FROM
        PARTTBL,
        SUPPLIER,
        LINEITEM,
        PARTSUPP,
        ORDERTBL,
        NATION
WHERE
        S_SUPPKEY = L_SUPPKEY
        AND PS_SUPPKEY = L_SUPPKEY
        AND PS_PARTKEY = L_PARTKEY
        AND P_PARTKEY = L_PARTKEY
        AND O_ORDERKEY = L_ORDERKEY
        AND S_NATIONKEY = N_NATIONKEY
        AND P_NAME LIKE '%green%'
GROUP BY
        NATION,
        "YEAR"
ORDER BY
        NATION,
        "YEAR" DESC;

 Query 9 complete, 175 rows returned

|Col1____________________|_______Col2|__________________Col3|
|ALGERIA                 |       1998|           31342867.23|
|ALGERIA                 |       1997|           57138193.02|
|ALGERIA                 |       1996|           56140140.13|
|ALGERIA                 |       1995|           53051469.65|
|ALGERIA                 |       1994|           53867582.13|
|ALGERIA                 |       1993|           54942718.13|
|ALGERIA                 |       1992|           54628034.71|
|ARGENTINA               |       1998|           30211185.71|
|ARGENTINA               |       1997|           50805741.75|
|ARGENTINA               |       1996|           51923746.58|
```

ARGENTINA	1995	49298625.77		GERMANY	1997	49309074.88
ARGENTINA	1994	50835610.11		GERMANY	1996	49918683.17
ARGENTINA	1993	51646079.18		GERMANY	1995	52650718.72
ARGENTINA	1992	50410314.99		GERMANY	1994	50346900.42
BRAZIL	1998	27217924.38		GERMANY	1993	50991895.81
BRAZIL	1997	48378669.20		GERMANY	1992	48274126.10
BRAZIL	1996	50482870.36		INDIA	1998	29943144.35
BRAZIL	1995	47623383.63		INDIA	1997	50665453.23
BRAZIL	1994	47840165.73		INDIA	1996	50283092.29
BRAZIL	1993	49054694.04		INDIA	1995	50006774.64
BRAZIL	1992	48667639.08		INDIA	1994	48995190.76
CANADA	1998	30379833.77		INDIA	1993	50286902.85
CANADA	1997	50465052.31		INDIA	1992	50850329.40
CANADA	1996	52560501.39		INDONESIA	1998	27672340.00
CANADA	1995	52375332.81		INDONESIA	1997	50512145.73
CANADA	1994	52600364.66		INDONESIA	1996	51653060.12
CANADA	1993	52644504.07		INDONESIA	1995	51508779.59
CANADA	1992	53932871.70		INDONESIA	1994	52817950.32
CHINA	1998	31075466.16		INDONESIA	1993	47959994.96
CHINA	1997	50551874.45		INDONESIA	1992	51776605.03
CHINA	1996	51039293.88		IRAN	1998	29065736.24
CHINA	1995	49287534.62		IRAN	1997	50042063.05
CHINA	1994	50851090.07		IRAN	1996	50926653.19
CHINA	1993	54229629.83		IRAN	1995	51249667.65
CHINA	1992	52400529.37		IRAN	1994	50337085.87
EGYPT	1998	29054433.39		IRAN	1993	51730763.49
EGYPT	1997	50627611.45		IRAN	1992	49955856.56
EGYPT	1996	49542212.84		IRAQ	1998	31624551.00
EGYPT	1995	48311550.32		IRAQ	1997	55121749.02
EGYPT	1994	49790644.74		IRAQ	1996	55897663.79
EGYPT	1993	48904292.97		IRAQ	1995	54815472.52
EGYPT	1992	49434932.62		IRAQ	1994	54408516.13
ETHIOPIA	1998	28040717.27		IRAQ	1993	53633167.98
ETHIOPIA	1997	47455009.87		IRAQ	1992	55891939.34
ETHIOPIA	1996	46491097.57		JAPAN	1998	27934179.67
ETHIOPIA	1995	46804449.30		JAPAN	1997	44517162.55
ETHIOPIA	1994	48516143.92		JAPAN	1996	42545606.12
ETHIOPIA	1993	46551891.56		JAPAN	1995	43749356.40
ETHIOPIA	1992	44934648.64		JAPAN	1994	44840243.07
FRANCE	1998	32226407.84		JAPAN	1993	44660015.53
FRANCE	1997	47121485.86		JAPAN	1992	45410249.12
FRANCE	1996	47263135.50		JORDAN	1998	26901488.58
FRANCE	1995	47275997.57		JORDAN	1997	45471878.41
FRANCE	1994	47067209.33		JORDAN	1996	46794325.79
FRANCE	1993	51163370.11		JORDAN	1995	45178828.58
FRANCE	1992	47846235.33		JORDAN	1994	45333636.51
GERMANY	1998	28624942.66		JORDAN	1993	47971496.10

```
|JORDAN                    |       1992|           44717239.18|
|KENYA                     |       1998|           28597614.34|
|KENYA                     |       1997|           47949733.73|
|KENYA                     |       1996|           46886924.62|
|KENYA                     |       1995|           46072338.76|
|KENYA                     |       1994|           45772061.17|
|KENYA                     |       1993|           46308728.23|
|KENYA                     |       1992|           47257780.84|
|MOROCCO                   |       1998|           26732115.58|
|MOROCCO                   |       1997|           45637304.25|
|MOROCCO                   |       1996|           45558221.75|
|MOROCCO                   |       1995|           47851318.89|
|MOROCCO                   |       1994|           46272172.94|
|MOROCCO                   |       1993|           46764326.18|
|MOROCCO                   |       1992|           48122783.58|
|MOZAMBIQUE                |       1998|           30712392.01|
|MOZAMBIQUE                |       1997|           50316528.76|
|MOZAMBIQUE                |       1996|           51640320.25|
|MOZAMBIQUE                |       1995|           50693774.51|
|MOZAMBIQUE                |       1994|           49253277.63|
|MOZAMBIQUE                |       1993|           49153016.54|
|MOZAMBIQUE                |       1992|           48247551.85|
|PERU                      |       1998|           29326102.32|
|PERU                      |       1997|           49753780.40|
|PERU                      |       1996|           50935170.29|
|PERU                      |       1995|           53309883.41|
|PERU                      |       1994|           50643531.80|
|PERU                      |       1993|           51584622.00|
|PERU                      |       1992|           47523899.05|
|ROMANIA                   |       1998|           30368667.40|
|ROMANIA                   |       1997|           50365683.85|
|ROMANIA                   |       1996|           49598999.01|
|ROMANIA                   |       1995|           47537642.87|
|ROMANIA                   |       1994|           51455283.01|
|ROMANIA                   |       1993|           50407136.89|
|ROMANIA                   |       1992|           48185385.13|
|RUSSIA                    |       1998|           28322384.03|
|RUSSIA                    |       1997|           50106685.18|
|RUSSIA                    |       1996|           51753342.43|
|RUSSIA                    |       1995|           49215820.36|
|RUSSIA                    |       1994|           52205666.44|
|RUSSIA                    |       1993|           51860230.03|
|RUSSIA                    |       1992|           53251677.15|
|SAUDI ARABIA              |       1998|           31541259.81|
|SAUDI ARABIA              |       1997|           52438750.81|
|SAUDI ARABIA              |       1996|           52543737.82|
|SAUDI ARABIA              |       1995|           52938696.53|
|SAUDI ARABIA              |       1994|           51389601.97|
|SAUDI ARABIA              |       1993|           52937508.88|
|SAUDI ARABIA              |       1992|           54843459.64|
|UNITED KINGDOM            |       1998|           28494874.00|
|UNITED KINGDOM            |       1997|           49381810.90|
|UNITED KINGDOM            |       1996|           51386853.96|
|UNITED KINGDOM            |       1995|           51509586.79|
|UNITED KINGDOM            |       1994|           48086499.71|
|UNITED KINGDOM            |       1993|           49166827.22|
|UNITED KINGDOM            |       1992|           49349122.08|
|UNITED STATES             |       1998|           25126238.95|
|UNITED STATES             |       1997|           50077306.42|
|UNITED STATES             |       1996|           48048649.47|
|UNITED STATES             |       1995|           48809032.42|
|UNITED STATES             |       1994|           49296747.18|
|UNITED STATES             |       1993|           48029946.80|
|UNITED STATES             |       1992|           48671944.50|
|VIETNAM                   |       1998|           30442736.06|
|VIETNAM                   |       1997|           50309179.79|
|VIETNAM                   |       1996|           50488161.41|
|VIETNAM                   |       1995|           49658284.61|
|VIETNAM                   |       1994|           50596057.26|
|VIETNAM                   |       1993|           50953919.15|
|VIETNAM                   |       1992|           49613838.32|

Submitting SQL Request #10:

/* Teradata
*/
/* @(#)TERADATA 10.sql 1.1.1.1@(#) */
/* Query 10 - Var_0 Rev_01 - TPC-H/TPC-R Returned Item Reporting
Query */

SELECT
        C_CUSTKEY,
        C_NAME,
        SUM(L_EXTENDEDPRICE*(1-L_DISCOUNT) (FLOAT))
(DECIMAL(18,2)) AS REVENUE,
        C_ACCTBAL,
        N_NAME,
        C_ADDRESS,
        C_PHONE,
        C_COMMENT
FROM
        CUSTOMER,
        ORDERTBL,
        LINEITEM,
```

```
        NATION
WHERE
        C_CUSTKEY = O_CUSTKEY
        AND L_ORDERKEY = O_ORDERKEY
        AND O_ORDERDATE >= '1993-10-01'
        AND O_ORDERDATE < DATE '1993-10-01' + INTERVAL '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;

 Query 10 complete, 37967 rows returned


 only displaying 20 rows per TPC-H spec

|_______Col1|Col2_____________________|___________________Col3|___
___________Col
4|Col5_____________________|Col6_____________________________
___|Col7_______
____|Col8_____________________________________________________
_____________
_____|
|      57040|Customer#000057040       |            734235.25|
632.8
7|JAPAN                    |Eioyzjf4pp
|22-895-641-
3466|requests sleep blithely about the furiously i
     |
|     143347|Customer#000143347       |            721002.69|
2557.4
7|EGYPT                    |1aReFYv,Kw4
|14-742-935-
3718|fluffily bold excuses haggle finally after the u
     |
|      60838|Customer#000060838       |            679127.31|
2454.7
7|BRAZIL                   |64EaJ5vMAHWJlBOxJklpNc2RJiWE
|12-913-494-
9813|furiously even pinto beans integrate under the ruthless
foxes; ironic, even
 dolphins across the slyl|
|     101998|Customer#000101998       |            637029.57|
3790.8
9|UNITED KINGDOM           |01c9CILnNtfOQYmZj
|33-593-865-
6378|accounts doze blithely! enticing, final deposits sleep
blithely special acc
ounts. slyly express accounts pla|
|     125341|Customer#000125341       |            633508.09|
4983.5
1|GERMANY                  |S29ODD6bceU8QSuuEJznkNaK
|17-582-695-
5962|quickly express requests wake quickly blithely
     |
|      25501|Customer#000025501       |            620269.78|
7725.0
4|ETHIOPIA                 |  W556MXuoiaYCCZamJI,Rn0B4ACUGdkQ8DZ
|15-874-808-
6793|quickly special requests sleep evenly among the special
deposits. special d
eposi|
|     115831|Customer#000115831       |            596423.87|
5098.1
0|FRANCE                   |rFeBbEEyk dl
ne7zV5fDrmiq1oK09wV7pxqCgIc|16-715-386-
3788|carefully bold excuses sleep alongside of the thinly idle
     |
|      84223|Customer#000084223       |            594998.02|
528.6
5|UNITED KINGDOM           |nAVZCs6BaWap rrM27N 2qBnzc5WBauxbA
|33-442-824-
8191|pending, final ideas haggle final requests. unusual, regular
asymptotes aff
ix according to the even foxes. |
|      54289|Customer#000054289       |            585603.39|
5583.0
2|IRAN                     |vXCxoCsU0Bad5JQI ,oobkZ
|20-834-292-
4707|express requests sublate blithely regular requests. regular,
even ideas sol
ve.  |
|      39922|Customer#000039922       |            584878.11|
7321.1
1|GERMANY                  |Zgy4s50l2GKN4pLDPBU8m342gIw6R
|17-147-757-
```

```
8036|even pinto beans haggle. slyly bold accounts inte
     |
|       6226|Customer#000006226       |             576783.76|
2230.0
9|UNITED KINGDOM           |8gPu8,NPGkfyQQ0hcIYUGPIBWc,ybP5g,
|33-657-701-
3391|quickly final requests against the regular instructions wake
blithely final
 instructions. pa|
|        922|Customer#000000922       |             576767.53|
3869.2
5|GERMANY                  |Az9RFaut7NkPnc5zSD2PwHgVwr4jRzq
|17-945-916-
9648|boldly final requests cajole blith
     |
|     147946|Customer#000147946       |             576455.13|
2030.1
3|ALGERIA                  |iANyZHjqhyy7Ajah0pTrYyhJ
|10-886-956-
3143|furiously even accounts are blithely above the furiousl
     |
|     115640|Customer#000115640       |             569341.19|
6436.1
0|ARGENTINA                |Vtgfia9qI 7EpHgecU1X
|11-411-543-
4901|final instructions are slyly according to the
     |
|      73606|Customer#000073606       |             568656.86|
1785.6
7|JAPAN                    |xuR0Tro5yChDfOCrjkd2ol
|22-437-653-
6966|furiously bold orbits about the furiously busy requests wake
across the fur
iously quiet theodolites. d|
|     110246|Customer#000110246       |             566842.98|
7763.3
5|VIETNAM                  |7KzflgX MDOq7sOkI
|31-943-426-
9837|dolphins sleep blithely among the slyly final
     |
|     142549|Customer#000142549       |             563537.24|
5085.9
9|INDONESIA                |ChqEoK43OysjdHbtKCp6dKqjNyvvi9
|19-955-562-
2398|regular, unusual dependencies boost slyly; ironic
attainments nag fluffily
into the unusual packages?|
|     146149|Customer#000146149       |             557254.99|
1791.5
5|ROMANIA                  |s87fvzFQpU
|29-744-164-
6487|silent, unusual requests detect quickly slyly regul
     |
|      52528|Customer#000052528       |             556397.35|
551.7
9|ARGENTINA                |NFztyTOR10UOJ
|11-208-192-
3205|unusual requests detect. slyly dogged theodolites use slyly.
deposit
     |
|      23431|Customer#000023431       |             554269.54|
3381.8
6|ROMANIA                  |HgiV0phqhaIa9aydNoIlb
|29-915-458-
2654|instructions nag quickly. furiously bold accounts cajol
     |

Submitting SQL Request #11:

/* Teradata
*/
/* @(#)TERADATA 11.sql 1.1.1.1@(#) */
/* Query 11 - Var_0 Rev_01 - TPC-H/TPC-R Important Stock
Identification Query */


SELECT
        PS_PARTKEY,
        SUM(PS_SUPPLYCOST * PS_AVAILQTY (FLOAT)) (DEC(18,2)) AS
"VALUE"
FROM
        PARTSUPP,
        SUPPLIER,
        NATION
WHERE
        PS_SUPPKEY = S_SUPPKEY
        AND S_NATIONKEY = N_NATIONKEY
        AND N_NAME = 'GERMANY'
GROUP BY
        PS_PARTKEY HAVING
                SUM(PS_SUPPLYCOST * PS_AVAILQTY) > (
                        SELECT
                                SUM(PS_SUPPLYCOST * PS_AVAILQTY
(FLOAT)) * 0.000
```

```
1000000                                                                 |      92406|          13287414.50|
                        FROM                                            |     182636|          13223726.74|
                                PARTSUPP,                               |     199969|          13135288.21|
                                SUPPLIER,                               |      62865|          13001926.94|
                                NATION                                  |       7284|          12945298.19|
                        WHERE                                           |     197867|          12944510.52|
                                PS_SUPPKEY = S_SUPPKEY                  |      11562|          12931575.51|
                                AND S_NATIONKEY = N_NATIONKEY           |      75165|          12916918.12|
                                AND N_NAME = 'GERMANY'                  |      97175|          12911283.50|
                )                                                       |     140840|          12896562.23|
ORDER BY                                                                |      65241|          12890600.46|
        "VALUE" DESC;                                                   |     166120|          12876927.22|
                                                                        |       9035|          12863828.70|
 Query 11 complete, 1048 rows returned                                  |     144616|          12853549.30|
                                                                        |     176723|          12832309.74|
|_______Col1|__________________Col2|                                   |     170884|          12792136.58|
|     129760|          17538456.86|                                   |      29790|          12723300.33|
|     166726|          16503353.92|                                   |      95213|          12555483.73|
|     191287|          16474801.97|                                   |     183873|          12550533.05|
|     161758|          16101755.54|                                   |     171235|          12476538.30|
|      34452|          15983844.72|                                   |      21533|          12437821.32|
|     139035|          15907078.34|                                   |      17290|          12432159.50|
|       9403|          15451755.62|                                   |     156397|          12260623.50|
|     154358|          15212937.88|                                   |     122611|          12222812.98|
|      38823|          15064802.86|                                   |     139155|          12220319.25|
|      85606|          15053957.15|                                   |     146316|          12215800.61|
|      33354|          14408297.40|                                   |     171381|          12199734.52|
|     154747|          14407580.68|                                   |     198633|          12078226.95|
|      82865|          14235489.78|                                   |     167417|          12046637.62|
|      76094|          14094247.04|                                   |      59512|          12043468.76|
|        222|          13937777.74|                                   |      31688|          12034893.64|
|     121271|          13908336.00|                                   |     159586|          12001505.84|
|      55221|          13716120.47|                                   |       8993|          11963814.30|
|      22819|          13666434.28|                                   |     120302|          11857707.55|
|      76281|          13646853.68|                                   |      43536|          11779340.52|
|      85298|          13581154.93|                                   |       9552|          11776909.16|
|      85158|          13554904.00|                                   |      86223|          11772205.08|
|     139684|          13535538.72|                                   |      53776|          11758669.65|
|      31034|          13498025.25|                                   |     131285|          11616953.74|
|      87305|          13482847.04|                                   |      91628|          11611114.83|
|      10181|          13445148.75|                                   |     169644|          11567959.72|
|      62323|          13411824.30|                                   |     182299|          11567462.05|
|      26489|          13377256.38|                                   |      33107|          11453818.76|
|      96493|          13339057.83|                                   |     104184|          11436657.44|
|      56548|          13329014.97|                                   |      67027|          11419127.14|
|      55576|          13306843.35|                                   |     176869|          11371451.71|
|     159751|          13306614.48|                                   |      30885|          11369674.79|
```

```
|      54420|          11345076.88|      58708|          10466280.44|
|      72240|          11313951.05|      89768|          10465477.22|
|     178708|          11294635.17|     146493|          10444291.58|
|      81298|          11273686.13|      55424|          10444006.48|
|     158324|          11243442.72|      16560|          10425574.74|
|     117095|          11242535.24|     133114|          10415097.90|
|     176793|          11237733.38|     195810|          10413625.20|
|      86091|          11177793.79|      76673|          10391977.18|
|     116033|          11145434.36|      97305|          10390890.57|
|     129058|          11119112.20|     134210|          10387210.02|
|     193714|          11104706.39|     188536|          10386529.92|
|     117195|          11077217.96|     122255|          10335760.32|
|      49851|          11043701.78|       2682|          10312966.10|
|      19791|          11030662.62|      43814|          10303086.61|
|      75800|          11012401.62|      34767|          10290405.18|
|     161562|          10996371.69|     165584|          10273705.89|
|      10119|          10980015.75|       2231|          10270415.55|
|      39185|          10970042.56|     111259|          10263256.56|
|      47223|          10950022.13|     195578|          10239795.82|
|     175594|          10942923.05|      21093|          10217531.30|
|     111295|          10893675.61|      29856|          10216932.54|
|     155446|          10852764.57|     133686|          10213345.76|
|     156391|          10839810.38|      87745|          10185509.40|
|      40884|          10837234.19|     135153|          10179379.70|
|     141288|          10837130.21|      11773|          10167410.84|
|     152388|          10830977.82|      76316|          10165151.70|
|      33449|          10830858.72|     123076|          10161225.78|
|     149035|          10826130.02|      91894|          10130462.19|
|     162620|          10814275.68|      39741|          10128387.52|
|     118324|          10791788.10|     111753|          10119780.98|
|      38932|          10777541.75|     142729|          10104748.89|
|     121294|          10764225.22|     116775|          10097750.42|
|      48721|          10762582.49|     102589|          10034784.36|
|      63342|          10740132.60|     186268|          10012181.57|
|       5614|          10724668.80|      44545|          10000286.48|
|      62266|          10711143.10|      23307|           9966577.50|
|     100202|          10696675.55|     124281|           9930018.90|
|     197741|          10688560.72|      69604|           9925730.64|
|     169178|          10648522.80|      21971|           9908982.03|
|       5271|          10639392.65|      58148|           9895894.40|
|      34499|          10584177.10|      16532|           9886529.90|
|      71108|          10569117.56|     159180|           9883744.43|
|     137132|          10539880.47|      74733|           9877582.88|
|      78451|          10524873.24|      35173|           9858275.92|
|     150827|          10503810.48|       7116|           9856881.02|
|     107237|          10488030.84|     124620|           9838589.14|
|     101727|          10473558.10|     122108|           9829949.35|
```

```
|      67200|            9828690.69|
|     164775|            9821424.44|
|       9039|            9816447.72|
|      14912|            9803102.20|
|     190906|            9791315.70|
|     130398|            9781674.27|
|     119310|            9776927.21|
|      10132|            9770930.78|
|     107211|            9757586.25|
|     113958|            9757065.50|
|      37009|            9748362.69|
|      66746|            9743528.76|
|     134486|            9731922.00|
|      15945|            9731096.45|
|      55307|            9717745.80|
|      56362|            9714922.83|
|      57726|            9711792.10|
|      57256|            9708621.00|
|     112292|            9701653.08|
|      87514|            9699492.53|
|     174206|            9680562.02|
|      72865|            9679043.34|
|     114357|            9671017.44|
|     112807|            9665019.21|
|     115203|            9661018.73|
|     177454|            9658906.35|
|     161275|            9634313.71|
|      61893|            9617095.44|

  [ROWS CUT]

Submitting SQL Request #12:

/* Teradata
*/
/* @(#)TERADATA 12.sql 1.1.1.1@(#) */
/* Query 12 - Var_0 Rev_01 - TPC-H/TPC-R Shipping Modes and Order
Priority Query
 */

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
        ORDERTBL,
        LINEITEM
WHERE
        O_ORDERKEY = L_ORDERKEY
        AND L_SHIPMODE IN ('MAIL','SHIP')
        AND L_COMMITDATE < L_RECEIPTDATE
        AND L_SHIPDATE < L_COMMITDATE
        AND L_RECEIPTDATE >= '1994-01-01'
        AND L_RECEIPTDATE < DATE '1994-01-01' + INTERVAL '1' YEAR
GROUP BY
        L_SHIPMODE
ORDER BY
        L_SHIPMODE;

 Query 12 complete, 2 rows returned

|Col1______|_______Col2|_______Col3|
|MAIL      |       6202|       9324|
|SHIP      |       6200|       9262|

Submitting SQL Request #1:

/* Teradata
*/
/* @(#)TERADATA 13.sql 1.1.1.1@(#) */
/* Query 13 - Var_0 Rev_01 - TPC-H/TPC-R Customer Distribution
Query */

SELECT
        C_COUNT, COUNT(*) AS CUSTDIST
FROM   (
        SELECT
                C_CUSTKEY,
                COUNT(O_ORDERKEY)
        FROM
                CUSTOMER LEFT OUTER JOIN ORDERTBL ON
                        C_CUSTKEY = O_CUSTKEY
                        AND O_COMMENT NOT LIKE
'%special%requests%'
```

```
        GROUP BY
                C_CUSTKEY
        ) AS C_ORDERS (C_CUSTKEY, C_COUNT)
GROUP BY
        C_COUNT
ORDER BY
        CUSTDIST DESC,
        C_COUNT DESC;

 Query 13 complete, 42 rows returned

|_______Col1|_______Col2|
|          0|      50004|
|          9|       6641|
|         10|       6566|
|         11|       6058|
|          8|       5949|
|         12|       5553|
|         13|       4989|
|         19|       4748|
|          7|       4707|
|         18|       4625|
|         15|       4552|
|         17|       4530|
|         14|       4484|
|         20|       4461|
|         16|       4323|
|         21|       4217|
|         22|       3730|
|          6|       3334|
|         23|       3129|
|         24|       2622|
|         25|       2079|
|          5|       1972|
|         26|       1593|
|         27|       1185|
|          4|       1033|
|         28|        869|
|         29|        559|
|          3|        398|
|         30|        373|
|         31|        235|
|          2|        144|
|         32|        128|
|         33|         71|
|         34|         48|
|         35|         33|
|          1|         23|
|         36|         17|
|         37|          7|
|         40|          4|
|         38|          4|
|         39|          2|
|         41|          1|

Submitting SQL Request #14:

/* Teradata
*/
/* @(#)TERADATA 14.sql 1.1.1.1@(#) */
/* Query 14 - Var_0 Rev_01 - TPC-H/TPC-R Promotion Effect Query
*/

SELECT
        100.00*SUM(CASE
                WHEN P_TYPE LIKE 'PROMO%'
                THEN L_EXTENDEDPRICE*(1-L_DISCOUNT)
                ELSE 0
        END (FLOAT)) / SUM(L_EXTENDEDPRICE*(1-L_DISCOUNT)
(FLOAT)) (DECIMAL (18,
2)) AS PROMO_REVENUE
FROM
        LINEITEM,
        PARTTBL
WHERE
        L_PARTKEY = P_PARTKEY
        AND L_SHIPDATE >= '1995-09-01'
        AND L_SHIPDATE < DATE '1995-09-01' + INTERVAL '1' MONTH;

 Query 14 complete, 1 rows returned

|__________________Col1|
|                 16.38|

Submitting SQL Request #15:

/* Teradata                                                    */
/* @(#)TERADATA 15.sql 1.1.1.1@(#) */
/* Query 15 - Var_0 Rev_01 - TPC-H/TPC-R  Top Supplier Query */

CREATE VIEW REVENUE0 (SUPPLIER_NO,TOTAL_REVENUE) AS
        SELECT
                L_SUPPKEY,
```

```
                SUM(L_EXTENDEDPRICE*(1-L_DISCOUNT) (FLOAT))
(DECIMAL(18,2))
        FROM
                LINEITEM
        WHERE
                L_SHIPDATE >= '1996-01-01'
                AND L_SHIPDATE < DATE '1996-01-01' + INTERVAL '3'
MONTH
        GROUP BY
                L_SUPPKEY;

 SQL statement complete.

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

 Query 15 complete, 1 rows returned

|_______Col1|Col2____________________|Col3____________________
_____________|
Col4___________|___________________Col5|
|       8449|Supplier#000008449       |Wp34zim9qYFbVctdW
|
20-469-856-8873|           1772627.21|

DROP VIEW REVENUE0;

 SQL statement complete.

Submitting SQL Request #16:
```

```
/* Teradata
*/
/* @(#)TERADATA 16.sql 1.1.1.1@(#) */
/* Query 16 - Var_0 Rev_01 - TPC-H/TPC-R Parts/Supplier
Relationship Query */

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

 Query 16 complete, 18314 rows returned

|Col1______|Col2____________________|_______Col3|_______Col4|
|Brand#41  |MEDIUM BRUSHED TIN      |          3|         28|
|Brand#54  |STANDARD BRUSHED COPPER |         14|         27|
|Brand#11  |STANDARD BRUSHED TIN    |         23|         24|
|Brand#11  |STANDARD BURNISHED BRASS|         36|         24|
|Brand#15  |MEDIUM ANODIZED NICKEL  |          3|         24|
|Brand#15  |SMALL ANODIZED BRASS    |         45|         24|
```

```
|Brand#15  |SMALL BURNISHED NICKEL   |         19|         24|          |Brand#21  |LARGE ANODIZED COPPER    |         36|         20|
|Brand#21  |MEDIUM ANODIZED COPPER   |          3|         24|          |Brand#21  |LARGE BRUSHED TIN        |          3|         20|
|Brand#22  |SMALL BRUSHED NICKEL     |          3|         24|          |Brand#21  |MEDIUM ANODIZED COPPER   |         14|         20|
|Brand#22  |SMALL BURNISHED BRASS    |         19|         24|          |Brand#21  |PROMO BRUSHED TIN        |         36|         20|
|Brand#25  |MEDIUM BURNISHED COPPER  |         36|         24|          |Brand#21  |PROMO POLISHED NICKEL    |         45|         20|
|Brand#31  |PROMO POLISHED COPPER    |         36|         24|          |Brand#21  |SMALL ANODIZED COPPER    |          9|         20|
|Brand#33  |LARGE POLISHED TIN       |         23|         24|          |Brand#21  |SMALL POLISHED NICKEL    |         23|         20|
|Brand#33  |PROMO POLISHED STEEL     |         14|         24|          |Brand#22  |LARGE ANODIZED COPPER    |         36|         20|
|Brand#35  |PROMO BRUSHED NICKEL     |         14|         24|          |Brand#22  |LARGE BRUSHED COPPER     |         49|         20|
|Brand#41  |ECONOMY BRUSHED STEEL    |          9|         24|          |Brand#22  |PROMO ANODIZED TIN       |         49|         20|
|Brand#41  |ECONOMY POLISHED TIN     |         19|         24|          |Brand#22  |PROMO POLISHED BRASS     |         45|         20|
|Brand#41  |LARGE PLATED COPPER      |         36|         24|          |Brand#22  |SMALL BURNISHED STEEL    |         45|         20|
|Brand#42  |ECONOMY PLATED BRASS     |          3|         24|          |Brand#23  |MEDIUM ANODIZED STEEL    |         45|         20|
|Brand#42  |STANDARD POLISHED TIN    |         49|         24|          |Brand#23  |PROMO POLISHED STEEL     |         23|         20|
|Brand#43  |PROMO BRUSHED TIN        |          3|         24|          |Brand#23  |STANDARD BRUSHED TIN     |         14|         20|
|Brand#43  |SMALL ANODIZED COPPER    |         36|         24|          |Brand#23  |STANDARD PLATED NICKEL   |         36|         20|
|Brand#44  |STANDARD POLISHED NICKEL |          3|         24|          |Brand#24  |PROMO PLATED COPPER      |         49|         20|
|Brand#52  |ECONOMY PLATED TIN       |         14|         24|          |Brand#24  |PROMO PLATED STEEL       |         49|         20|
|Brand#52  |STANDARD BURNISHED NICKEL|          3|         24|          |Brand#24  |PROMO POLISHED STEEL     |          9|         20|
|Brand#53  |MEDIUM ANODIZED STEEL    |         14|         24|          |Brand#24  |STANDARD BRUSHED TIN     |         36|         20|
|Brand#14  |PROMO ANODIZED NICKEL    |         45|         23|          |Brand#25  |LARGE ANODIZED BRASS     |          3|         20|
|Brand#32  |ECONOMY PLATED BRASS     |          9|         23|          |Brand#25  |PROMO BURNISHED TIN      |          3|         20|
|Brand#52  |SMALL ANODIZED COPPER    |          3|         23|          |Brand#31  |ECONOMY POLISHED NICKEL  |          3|         20|
|Brand#11  |ECONOMY BRUSHED COPPER   |         45|         20|          |Brand#31  |MEDIUM PLATED TIN        |         45|         20|
|Brand#11  |ECONOMY PLATED BRASS     |         23|         20|          |Brand#31  |SMALL ANODIZED STEEL     |         14|         20|
|Brand#11  |LARGE BRUSHED COPPER     |         49|         20|          |Brand#32  |ECONOMY ANODIZED COPPER  |         36|         20|
|Brand#11  |LARGE POLISHED COPPER    |         49|         20|          |Brand#32  |ECONOMY BRUSHED NICKEL   |         49|         20|
|Brand#12  |STANDARD ANODIZED TIN    |         49|         20|          |Brand#32  |LARGE ANODIZED TIN       |         19|         20|
|Brand#12  |STANDARD PLATED BRASS    |         19|         20|          |Brand#32  |MEDIUM BURNISHED COPPER  |         19|         20|
|Brand#13  |ECONOMY BRUSHED BRASS    |          9|         20|          |Brand#32  |SMALL ANODIZED STEEL     |         45|         20|
|Brand#13  |ECONOMY BURNISHED STEEL  |         14|         20|          |Brand#33  |ECONOMY POLISHED COPPER  |         19|         20|
|Brand#13  |LARGE BURNISHED NICKEL   |         19|         20|          |Brand#33  |PROMO PLATED NICKEL      |         14|         20|
|Brand#13  |MEDIUM BURNISHED COPPER  |         36|         20|          |Brand#33  |SMALL POLISHED TIN       |          9|         20|
|Brand#13  |SMALL BRUSHED TIN        |         45|         20|          |Brand#33  |STANDARD ANODIZED BRASS  |         49|         20|
|Brand#13  |STANDARD ANODIZED COPPER |          3|         20|          |Brand#33  |STANDARD BURNISHED BRASS |         45|         20|
|Brand#13  |STANDARD PLATED NICKEL   |         23|         20|          |Brand#34  |ECONOMY BRUSHED NICKEL   |         49|         20|
|Brand#14  |ECONOMY ANODIZED COPPER  |         14|         20|          |Brand#34  |LARGE BRUSHED BRASS      |         19|         20|
|Brand#14  |ECONOMY PLATED TIN       |         36|         20|          |Brand#34  |SMALL BRUSHED TIN        |          3|         20|
|Brand#14  |ECONOMY POLISHED NICKEL  |          3|         20|          |Brand#34  |STANDARD PLATED COPPER   |          9|         20|
|Brand#14  |MEDIUM ANODIZED NICKEL   |          3|         20|          |Brand#35  |LARGE ANODIZED NICKEL    |          3|         20|
|Brand#14  |SMALL POLISHED TIN       |         14|         20|          |Brand#35  |MEDIUM ANODIZED BRASS    |         45|         20|
|Brand#15  |MEDIUM ANODIZED COPPER   |          9|         20|          |Brand#35  |MEDIUM ANODIZED STEEL    |         23|         20|
|Brand#15  |MEDIUM PLATED TIN        |         23|         20|          |Brand#35  |PROMO ANODIZED COPPER    |         49|         20|
|Brand#15  |PROMO PLATED BRASS       |         14|         20|          |Brand#35  |SMALL POLISHED COPPER    |         14|         20|
|Brand#15  |SMALL ANODIZED COPPER    |         45|         20|          |Brand#41  |LARGE ANODIZED STEEL     |          3|         20|
|Brand#15  |SMALL PLATED COPPER      |         49|         20|          |Brand#41  |LARGE BRUSHED NICKEL     |         23|         20|
|Brand#15  |STANDARD PLATED TIN      |          3|         20|          |Brand#41  |LARGE BURNISHED COPPER   |          3|         20|
```

Brand#41	MEDIUM PLATED STEEL	19	20		Brand#11	LARGE ANODIZED COPPER	14	16
Brand#41	SMALL BURNISHED COPPER	23	20		Brand#11	LARGE BRUSHED TIN	45	16
Brand#42	MEDIUM BURNISHED BRASS	14	20		Brand#11	LARGE BURNISHED COPPER	23	16
Brand#42	SMALL BURNISHED COPPER	3	20		Brand#11	LARGE BURNISHED NICKEL	36	16
Brand#43	ECONOMY POLISHED COPPER	9	20		Brand#11	LARGE PLATED STEEL	14	16
Brand#43	SMALL PLATED STEEL	3	20		Brand#11	MEDIUM BRUSHED NICKEL	14	16
Brand#43	STANDARD BURNISHED TIN	23	20		Brand#11	MEDIUM BRUSHED STEEL	49	16
Brand#44	LARGE ANODIZED STEEL	23	20		Brand#11	MEDIUM BURNISHED NICKEL	49	16
Brand#44	PROMO ANODIZED TIN	23	20		Brand#11	MEDIUM BURNISHED TIN	3	16
Brand#51	ECONOMY BRUSHED BRASS	49	20		Brand#11	MEDIUM PLATED COPPER	9	16
Brand#51	ECONOMY POLISHED NICKEL	9	20		Brand#11	PROMO ANODIZED BRASS	19	16
Brand#51	MEDIUM BRUSHED TIN	9	20		Brand#11	PROMO ANODIZED BRASS	49	16
Brand#51	MEDIUM PLATED BRASS	9	20		Brand#11	PROMO ANODIZED STEEL	45	16
Brand#51	PROMO BURNISHED BRASS	9	20		Brand#11	PROMO PLATED BRASS	45	16
Brand#51	SMALL PLATED NICKEL	49	20		Brand#11	SMALL ANODIZED TIN	45	16
Brand#51	STANDARD ANODIZED NICKEL	49	20		Brand#11	SMALL BRUSHED STEEL	49	16
Brand#51	STANDARD BRUSHED COPPER	3	20		Brand#11	SMALL BURNISHED COPPER	19	16
Brand#52	ECONOMY ANODIZED BRASS	3	20		Brand#11	SMALL BURNISHED COPPER	45	16
Brand#52	ECONOMY BRUSHED COPPER	49	20		Brand#11	SMALL BURNISHED NICKEL	14	16
Brand#52	LARGE ANODIZED NICKEL	45	20		Brand#11	SMALL POLISHED NICKEL	36	16
Brand#52	MEDIUM ANODIZED TIN	23	20		Brand#11	STANDARD ANODIZED BRASS	19	16
Brand#52	MEDIUM BURNISHED TIN	45	20		Brand#11	STANDARD ANODIZED COPPER	14	16
Brand#52	SMALL PLATED COPPER	36	20		Brand#11	STANDARD BRUSHED STEEL	45	16
Brand#52	STANDARD ANODIZED BRASS	45	20		Brand#11	STANDARD POLISHED NICKEL	23	16
Brand#53	ECONOMY PLATED COPPER	45	20		Brand#12	ECONOMY ANODIZED TIN	14	16
Brand#53	PROMO ANODIZED COPPER	49	20		Brand#12	ECONOMY BRUSHED COPPER	9	16
Brand#53	PROMO BRUSHED COPPER	23	20		Brand#12	ECONOMY BRUSHED COPPER	36	16
Brand#53	PROMO PLATED TIN	19	20		Brand#12	ECONOMY BURNISHED BRASS	9	16
Brand#53	PROMO POLISHED NICKEL	3	20		Brand#12	ECONOMY BURNISHED NICKEL	36	16
Brand#53	SMALL ANODIZED STEEL	9	20		Brand#12	LARGE ANODIZED BRASS	14	16
Brand#53	SMALL BRUSHED COPPER	3	20		Brand#12	LARGE ANODIZED COPPER	9	16
Brand#53	SMALL BRUSHED NICKEL	3	20		Brand#12	LARGE ANODIZED STEEL	23	16
Brand#54	ECONOMY PLATED STEEL	9	20		Brand#12	LARGE BURNISHED TIN	36	16
Brand#54	ECONOMY POLISHED TIN	3	20		Brand#12	LARGE PLATED COPPER	49	16
Brand#54	SMALL BRUSHED BRASS	19	20		Brand#12	LARGE POLISHED COPPER	49	16
Brand#55	MEDIUM ANODIZED COPPER	3	20		Brand#12	MEDIUM PLATED COPPER	19	16
Brand#55	PROMO BURNISHED STEEL	14	20		Brand#12	MEDIUM PLATED NICKEL	23	16
Brand#55	PROMO POLISHED NICKEL	49	20		Brand#12	PROMO ANODIZED BRASS	45	16
Brand#55	STANDARD ANODIZED BRASS	19	20		Brand#12	PROMO ANODIZED STEEL	49	16
Brand#55	STANDARD BURNISHED COPPER	45	20		Brand#12	PROMO BURNISHED STEEL	9	16
Brand#43	ECONOMY ANODIZED TIN	3	19		Brand#12	SMALL BRUSHED NICKEL	36	16
Brand#11	ECONOMY ANODIZED BRASS	14	16		Brand#12	SMALL BRUSHED TIN	45	16
Brand#11	ECONOMY ANODIZED BRASS	23	16		Brand#12	STANDARD ANODIZED BRASS	3	16
Brand#11	ECONOMY ANODIZED COPPER	14	16		Brand#12	STANDARD ANODIZED NICKEL	14	16
Brand#11	ECONOMY BRUSHED BRASS	49	16		Brand#12	STANDARD BRUSHED BRASS	3	16
Brand#11	ECONOMY BRUSHED STEEL	19	16		Brand#12	STANDARD BRUSHED TIN	9	16
Brand#11	ECONOMY BURNISHED NICKEL	23	16		Brand#12	STANDARD BRUSHED TIN	36	16

```
|Brand#12  |STANDARD POLISHED COPPER |          9|         16|
|Brand#13  |ECONOMY ANODIZED STEEL   |         45|         16|
|Brand#13  |ECONOMY POLISHED BRASS   |          3|         16|
|Brand#13  |LARGE BRUSHED NICKEL     |         23|         16|
|Brand#13  |LARGE BURNISHED NICKEL   |          9|         16|
|Brand#13  |MEDIUM BRUSHED STEEL     |         49|         16|

  [ROWS CUT]

Submitting SQL Request #17:

/* Teradata
*/
/* @(#)TERADATA 17.sql 1.1.1.1@(#) */
/* Query 17 - Var_0 Rev_01 - TPC-H/TPC-R Small-Quantity-Order
Revenue Query */

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

 Query 17 complete, 1 rows returned

|____________________Col1|
|             348406.05|

Submitting SQL Request #18:

/* Teradata
*/
/* @(#)TERADATA 18.sql 1.1.1.1@(#) */
/* Query 18 - Var_0 Rev_01 - TPC-H/TPC-R Large Volume Customer
Query */
/* Return the first 100 selected rows
*/

SELECT
        C_NAME,
        C_CUSTKEY,
        O_ORDERKEY,
        O_ORDERDATE,
        O_TOTALPRICE,
        SUM(L_QUANTITY (FLOAT)) (DECIMAL(18,2)) AS SUM_QTY
FROM
        CUSTOMER,
        ORDERTBL,
        LINEITEM
WHERE
        O_ORDERKEY IN (
                SELECT
                        L_ORDERKEY
                FROM
                        LINEITEM
                GROUP BY
                        L_ORDERKEY HAVING
                                SUM(L_QUANTITY) > 300
        )
        AND C_CUSTKEY = O_CUSTKEY
        AND O_ORDERKEY = L_ORDERKEY
GROUP BY
        C_NAME,
        C_CUSTKEY,
        O_ORDERKEY,
        O_ORDERDATE,
        O_TOTALPRICE
ORDER BY
        O_TOTALPRICE DESC,
        O_ORDERDATE;

 Query 18 complete, 57 rows returned

|Col1____________________|_______Col2|_________________Col3|______
Col4|__________
_____Col5|___________________Col6|
|Customer#000128120       |     128120|         4722021.00|1994-
04-07|
544089.09|               323.00|
```

```
|Customer#000144617       |     144617|        3043270.00|1997-        469692.58|               307.00|
02-12|                                                                  |Customer#000148885       |     148885|        2942469.00|1992-
530604.44|               317.00|                                        05-31|
|Customer#000013940       |      13940|        2232932.00|1997-        469630.44|               313.00|
04-13|                                                                  |Customer#000114586       |     114586|         551136.00|1993-
522720.61|               304.00|                                        05-19|
|Customer#000066790       |      66790|        2199712.00|1996-        469605.59|               308.00|
09-30|                                                                  |Customer#000105260       |     105260|        5296167.00|1996-
515531.82|               327.00|                                        09-06|
|Customer#000046435       |      46435|        4745607.00|1997-        469360.57|               303.00|
07-03|                                                                  |Customer#000147197       |     147197|        1263015.00|1997-
508047.99|               309.00|                                        02-02|
|Customer#000015272       |      15272|        3883783.00|1993-        467149.67|               320.00|
07-28|                                                                  |Customer#000064483       |      64483|        2745894.00|1996-
500241.33|               302.00|                                        07-04|
|Customer#000146608       |     146608|        3342468.00|1994-        466991.35|               304.00|
06-12|                                                                  |Customer#000136573       |     136573|        2761378.00|1996-
499794.58|               303.00|                                        05-31|
|Customer#000096103       |      96103|        5984582.00|1992-        461282.73|               301.00|
03-16|                                                                  |Customer#000016384       |      16384|         502886.00|1994-
494398.79|               312.00|                                        04-12|
|Customer#000024341       |      24341|        1474818.00|1992-        458378.92|               312.00|
11-15|                                                                  |Customer#000117919       |     117919|        2869152.00|1996-
491348.26|               302.00|                                        06-20|
|Customer#000137446       |     137446|        5489475.00|1997-        456815.92|               317.00|
05-23|                                                                  |Customer#000012251       |      12251|         735366.00|1993-
487763.25|               311.00|                                        11-24|
|Customer#000107590       |     107590|        4267751.00|1994-        455107.26|               309.00|
11-04|                                                                  |Customer#000120098       |     120098|        1971680.00|1995-
485141.38|               301.00|                                        06-14|
|Customer#000050008       |      50008|        2366755.00|1996-        453451.23|               308.00|
12-09|                                                                  |Customer#000066098       |      66098|        5007490.00|1992-
483891.26|               302.00|                                        08-07|
|Customer#000015619       |      15619|        3767271.00|1996-        453436.16|               304.00|
08-07|                                                                  |Customer#000117076       |     117076|        4290656.00|1997-
480083.96|               318.00|                                        02-05|
|Customer#000077260       |      77260|        1436544.00|1992-        449545.85|               301.00|
09-12|                                                                  |Customer#000129379       |     129379|        4720454.00|1997-
479499.43|               307.00|                                        06-07|
|Customer#000109379       |     109379|        5746311.00|1996-        448665.79|               303.00|
10-10|                                                                  |Customer#000126865       |     126865|        4702759.00|1994-
478064.11|               302.00|                                        11-07|
|Customer#000054602       |      54602|        5832321.00|1997-        447606.65|               320.00|
02-09|                                                                  |Customer#000088876       |      88876|         983201.00|1993-
471220.08|               307.00|                                        12-30|
|Customer#000105995       |     105995|        2096705.00|1994-        446717.46|               304.00|
07-03|
```

```
|Customer#000036619       |      36619|         4806726.00|1995-
01-17|                                                                 418161.49|                305.00|
446704.09|                328.00|                                       |Customer#000012599       |      12599|         4259524.00|1998-
12-29|                                                                 02-12|
446269.12|                310.00|                                      415200.61|                304.00|
|Customer#000053029       |      53029|         2662214.00|1993-      |Customer#000105410       |     105410|         4478371.00|1996-
08-13|                                                                 03-05|
446144.49|                302.00|                                      412754.51|                302.00|
|Customer#000018188       |      18188|         3037414.00|1995-      |Customer#000149842       |     149842|         5156581.00|1994-
01-25|                                                                 05-30|
443807.22|                308.00|                                      411329.35|                302.00|
|Customer#000066533       |      66533|           29158.00|1995-      |Customer#000010129       |      10129|         5849444.00|1994-
10-21|                                                                 03-21|
443576.50|                305.00|                                      409129.85|                309.00|
|Customer#000037729       |      37729|         4134341.00|1995-      |Customer#000069904       |      69904|         1742403.00|1996-
06-29|                                                                 10-19|
441082.97|                309.00|                                      408513.00|                305.00|
|Customer#000003566       |       3566|         2329187.00|1998-      |Customer#000017746       |      17746|            6882.00|1997-
01-04|                                                                 04-09|
439803.36|                304.00|                                      408446.93|                303.00|
|Customer#000045538       |      45538|         4527553.00|1994-      |Customer#000013072       |      13072|         1481925.00|1998-
05-22|                                                                 03-15|
436275.31|                305.00|                                      399195.47|                301.00|
|Customer#000081581       |      81581|         4739650.00|1995-      |Customer#000082441       |      82441|          857959.00|1994-
11-04|                                                                 02-07|
435405.90|                305.00|                                      382579.74|                305.00|
|Customer#000119989       |     119989|         1544643.00|1997-      |Customer#000088703       |      88703|         2995076.00|1994-
09-20|                                                                 01-30|
434568.25|                320.00|                                      363812.12|                302.00|

|Customer#000003680       |       3680|         3861123.00|1998-      Submitting SQL Request #19:
07-03|
433525.97|                301.00|                                      /* Teradata
                                                                       */
|Customer#000113131       |     113131|          967334.00|1995-      /* @(#)TERADATA 19.sql 1.1.1.1@(#) */
12-15|                                                                 /* Query 19 - Var_0 Rev_1 - TPC-H/TPC-R Discounted Revenue Query
432957.75|                301.00|                                      */
|Customer#000141098       |     141098|          565574.00|1995-
09-24|                                                                 SELECT
430986.69|                301.00|                                              SUM(L_EXTENDEDPRICE* (1 - L_DISCOUNT) (FLOAT))
|Customer#000093392       |      93392|         5200102.00|1997-      (DECIMAL(18,2)) AS REVENU
01-22|                                                                 E
425487.51|                304.00|                                       FROM
|Customer#000015631       |      15631|         1845057.00|1994-              LINEITEM,
05-12|                                                                         PARTTBL
419879.59|                302.00|                                      WHERE
|Customer#000112987       |     112987|         4439686.00|1996-              (
09-17|                                                                           P_PARTKEY = L_PARTKEY
```

```
                AND P_BRAND = 'Brand#12'
                AND P_CONTAINER IN  ( 'SM CASE', 'SM BOX', 'SM
PACK', 'SM PKG')
                AND L_QUANTITY >= 1 AND L_QUANTITY <= 1 + 10
                AND P_SIZE BETWEEN 1 AND 5
                AND L_SHIPMODE IN ('AIR', 'AIR REG')
                AND L_SHIPINSTRUCT = 'DELIVER IN PERSON'
        )
        OR
        (
                P_PARTKEY = L_PARTKEY
                AND P_BRAND = 'Brand#23'
                AND P_CONTAINER IN  ('MED BAG', 'MED BOX', 'MED
PKG', 'MED PACK'
)
                AND L_QUANTITY >= 10 AND L_QUANTITY <= 10 + 10
                AND P_SIZE BETWEEN 1  AND 10
                AND L_SHIPMODE IN ('AIR', 'AIR REG')
                AND L_SHIPINSTRUCT = 'DELIVER IN PERSON'
        )
        OR
        (
                P_PARTKEY = L_PARTKEY
                AND P_BRAND = 'Brand#34'
                AND P_CONTAINER IN  ( 'LG CASE', 'LG BOX', 'LG
PACK', 'LG PKG')
                AND L_QUANTITY >= 20 AND L_QUANTITY <= 20 + 10
                AND P_SIZE BETWEEN 1  AND 15
                AND L_SHIPMODE IN ('AIR', 'AIR REG')
                AND L_SHIPINSTRUCT = 'DELIVER IN PERSON'
        );

 Query 19 complete, 1 rows returned

|____________________Col1|
|            3083843.06|

Submitting SQL Request #20:

/* Teradata
*/
/* @(#)TERADATA 20.sql 1.1.1.1@(#) */
/* Query 20 - Var_0 Rev_01 - TPC-H/TPC-R The Potential Part
Promotion query */

SELECT
        S_NAME,
        S_ADDRESS
FROM
        SUPPLIER,
        NATION
WHERE
        S_SUPPKEY IN (
                SELECT
                        PS_SUPPKEY
                FROM
                        PARTSUPP
                WHERE
                        PS_PARTKEY IN (
                                SELECT
                                        P_PARTKEY
                                FROM
                                        PARTTBL
                                WHERE
                                        P_NAME LIKE 'forest%'
                        )
                AND  PS_AVAILQTY > (
                        SELECT
                                0.5 * SUM(L_QUANTITY)
                        FROM
                                LINEITEM
                        WHERE
                                L_PARTKEY = PS_PARTKEY
                                AND  L_SUPPKEY = PS_SUPPKEY
                                AND  L_SHIPDATE >= '1994-01-01'
                                AND  L_SHIPDATE <  DATE '1994-01-
01' + INTERVAL
'1' YEAR
                )
        )
        AND S_NATIONKEY = N_NATIONKEY
        AND N_NAME = 'CANADA'
ORDER BY
        S_NAME;

 Query 20 complete, 204 rows returned

|Col1____________________|Col2____________________________________
__|
|Supplier#000000020       |iybAE,RmTymrZVYaFZva2SH,j
|
|Supplier#000000091       |YV45D7TkfdQanOOZ7q9QxkyGUapU1oOWU6q3
|
```

```
|Supplier#000000197       |YC2Acon6kjY3zj3Fbxs2k4Vdf7X0cd2F
|
|Supplier#000000226       |83qOdU2EYRdPQAQhEtn GRZEd
|
|Supplier#000000285       |Br7e1nnt1yxrw6ImgpJ7YdhFDjuBf
|
|Supplier#000000378       |FfbhyCxWvcPrO8ltp9
|
|Supplier#000000402       |i9Sw4DoyMhzhKXCH9By,AYSgmD
|
|Supplier#000000530       |0qwCMwobKY OcmLyfRXlagA8ukENJv,
|
|Supplier#000000688       |D fw5ocppmZpYBBIPI718hCihLDZ5KhKX
|
|Supplier#000000710       |f19YPvOyb QoYwjKC,oPycpGfieBAcwKJo
|
|Supplier#000000736       |l6i2nMwVuovfKnuVgaSGK2rDy65DlAFLegiL7
|
|Supplier#000000761       |zlSLelQUj2XrvTTFnv7WAcYZGvvMTx882d4
|
|Supplier#000000884       |bmhEShejaS
|
|Supplier#000000887       |urEaTejH5POADP2ARrf
|
|Supplier#000000935       |ij98czM 2KzWe7dDTOxB8sq0UfCdvrX
|
|Supplier#000000975       |,AC e,tBpNwKb5xMUzeohxlRn,
hdZJo73gFQF8y|
|Supplier#000001263       |rQWr6nf8ZhB2TAiIDIvo5Io
|
|Supplier#000001399       |LmrocnIMSyYOWuANx7
|
|Supplier#000001446       |lch9HMNU1R7a0LIybsUodVknk6
|
|Supplier#000001454       |TOpimgu2TVXIjhiL93h,
|
|Supplier#000001500       |wDmF5xLxtQch9ctVu,
|
|Supplier#000001602       |uKNWIeafaM644
|
|Supplier#000001626       |UhxNRzUu1dtFmp0
|
|Supplier#000001682       |pXTkGxrTQVyH1Rr
|
|Supplier#000001699       |Q9C4rfJ26oijVPqqcqVXeRI
|
|Supplier#000001700       |7hMlCof1Y5zLFg
|
|Supplier#000001726       |TeRY7TtTH24sEword7yAaSkjx8
|
|Supplier#000001730       |Rc8e,1Pybn r6zo0VJIEiD0UD vhk
|
|Supplier#000001746       |qWsendlOekQG1aW4uq06uQaCm51se8lirv7
hBRd|
|Supplier#000001752       |Fra7outx41THYJaRThdOGiBk
|
|Supplier#000001856
|jXcRgzYF0ah05iR8p6w5SbJJLcUGyYiURPvFwUWM|
|Supplier#000001931       |FpJbMU2h6ZR2eBv8I9NIxF
|
|Supplier#000001939       |Nrk,JA4bfReUs
|
|Supplier#000001990       |DSDJkCgBJzuPg1yuM,CUdLnsRliOxkkHezTCA
|
|Supplier#000002020       |jB6r1d7MxP6co
|
|Supplier#000002022       | dwebGX7Id2pc25YvY33
|
|Supplier#000002036       |20ytTtVObjKUUI2WCB0A
|
|Supplier#000002204       |uYmlr46C06udCqanj0KiRsoTQakZsEyssL
|
|Supplier#000002243       |nSOEV3JeOU79
|
|Supplier#000002245       |hz2qWXWVjOyKhqPYMoEwz6zFkrTaDM
|
|Supplier#000002282       |ES21K9dxoW1I1TzWCj7ekdlNwSWnv1Z
6mQ,BKn|
|Supplier#000002303       |nCoWfpB6YOymbgOht7ltfklpkHl
|
|Supplier#000002373       |RzHSxOTQmElCjxIBiVA52Z JB58rJhPRylR
|
|Supplier#000002419       |qydBQd14I5l5mVXa4fYY
|
|Supplier#000002481       |nLKHUOn2Ml9TOA06Znq9GEMcIlMO2
|
|Supplier#000002571       |JZUugz04c iJFLrlGsz9O N,W 1rVHNIReyq
|
|Supplier#000002585       |CsPoKpw2QuTY4AV1NkWuttneIa4SN
|
|Supplier#000002630       |ZIQAvjNUY9KH5ive zm7k VlPiDl7CCo21
|
```

|Supplier#000002719 |4nnzQI2CbqREQUuIsXTBVUkaP4mNS3
|Supplier#000002721 |HVdFAN2JHMQSpKm
|Supplier#000002730 |lIFxR4fzm31C6,muzJwl84z
|Supplier#000002775 |yDclaDaBD4ihH
|Supplier#000002853 |rTNAOItXka
|Supplier#000002875 |6JgMi 9Qt6VmwL3Ltt1SRlKww0keLQ,RAZa
|Supplier#000002934 |m,trBENywSArwg3DhB
|Supplier#000002941 |Naddba 8YTEKekZyP0
|Supplier#000002960 |KCPCEsRGGo6vx8TygHh60nAYf9rStQT2T
|Supplier#000002980 |B9k9yVsyaXvWktOSHezqHiAEp9id0SKzkw
|Supplier#000003062 |LSQNgqY1xnOzz9zBCapy7HwOZQ
|Supplier#000003087 |ANwe8QsZ4rgj1HSqVz991eWQ
|Supplier#000003089 |s5b VCIZqMSZVa r g7LTdcg29GbTE7rI1x
|Supplier#000003095 |HxON3jJhUi3zjt,r mTD
|Supplier#000003201 |E87yws6I,t0qNs4QW7UzExKiJnJDZWue
|Supplier#000003213 |pxrRP4irQ1VoyfQ,dTf3
|Supplier#000003241 |j06SU,LS9O3mwjAMOViANeIhb
|Supplier#000003275 |9xO4nyJ2QJcX6vGf
|Supplier#000003288 |EDdfNt7E5Uc,xLTupoIgYL4yY7ujh,
|Supplier#000003313 |El2I7we,049SPrvomUm4hZwJoOhZkvLxLJXgVH
|Supplier#000003314 |jnisU8MzqO4iUB3zsPcrysMw3DDUojS4q7LD
|Supplier#000003380 |jPv0V,pszouuFT3YsAqlP,kxT3u,gTFiEbRt,x
|Supplier#000003403 |e3X2o ,KCG9tsHji8A XXCxiF2hZWBw
|Supplier#000003421 |Sh3dt9W5oeofFWovnFhrg,
|Supplier#000003441 |zvFJIzS,oUuShHjpcX
|Supplier#000003590 |sy79CMLxqb,Cbo
|Supplier#000003607 |lNqFHQYjwSAkf
|Supplier#000003625 |qY588W0Yk5iaUy1RXTgNrEKrMAjBYHcKs
|Supplier#000003656 |eEYmmO2gmD JdfG32XtDgJV,db56
|Supplier#000003782 |iVsPZg7bk06TqNMwi0LKbLUrC1zmrg
|Supplier#000003918 |meRvRCsJoAbfqd0Re4
|Supplier#000003941 |Pmb05mQfBMS618O7WKqZJ 9vyv
|Supplier#000003994 |W00LZp3NjK0
|Supplier#000004005 |V723F1wCy2eA4OgIu8TjBtOVUHp
|Supplier#000004033 |ncsAhv9Je,kFXTNjfb2
|Supplier#000004140 |0hL7DJyYjcHL
|Supplier#000004165 |wTJ2dZNQA8P2oi99N6DT47ndHy,XKD2
|Supplier#000004207 |tF64pwiOM4IkWjN3mS,e06WuAjLx
|Supplier#000004236 |dl,HPtJmGipxYsSqn9wmqkuWjst,mCeJ8O6T
|Supplier#000004246 |Xha aXQF7u4qU3LsHD
|Supplier#000004278 |bBddbpBxIVp Di9
|Supplier#000004343 |GK3sbopqrQEkWLMvVBFCG
|Supplier#000004346 |S3076LEOwo
|Supplier#000004388 |VfZ l1J,mwp4aS
|Supplier#000004406 |Ah0ZaLu6VwufPWUz,7kbXgYZhauEaHqGIg
|Supplier#000004430 |yvSsKNSTL5HLXBET4luOsPNLxKzAMk
|

|Supplier#000004522 |xXtCKwsZDArxIBGDfzX2PgobGZsBg
|
|Supplier#000004527 |p pVXCnxgcklWF6A1o3OHY3qW6
|
|Supplier#000004542 |NJSbLJDroYG2y1r3rDiKg
|
|Supplier#000004574 |1HvGwnVueZ5CIndc
|
|Supplier#000004655 |67NqBc4 t3PG3F8aO IsqWNq4kGaPowYL
|
|Supplier#000004701 |6jX4u47URzIMHf
|
|Supplier#000004711 |bEzjp1QdQu ls2ERMxv0km vn6bu2zXlL1
|
|Supplier#000004987 | UFx1upJ8MvOvgFjA8
|
|Supplier#000005000 |DeX804 w0H8FrCUvahgy ilbuzBX3NK
|
|Supplier#000005100 |OfvYPs3Io,wEvvLHNaLuCX
|
|Supplier#000005192 |JDp4rhXiDw0kf6RH
|
|Supplier#000005195 |Woi3b2ZaicPh ZSfu1EfXhE
|
|Supplier#000005283 |5fxYXxwXy,TQX,MqDC2hxzyQ
|
|Supplier#000005300 |gXG28YqpxU
|
|Supplier#000005386 |Ub6AAfHpWLWP
|
|Supplier#000005426 |9Dz2OVT1q sb4BK71ljQ1XjPBYRPvO
|
|Supplier#000005484 |saFdOR
qW7AFY,3asPqiiAa11Mo22pCoN0BtPrKo|
|Supplier#000005505 |d2sbjG43KwMPX
|
|Supplier#000005506 |On f5ypzoWgB
|
|Supplier#000005516 |XsN99Ks9wEvcohU6jRD2MeebQFf76mD8vovuY
|
|Supplier#000005536 |Nzo9tGkpgbHT,EZ4D,77MYKl4ah1C
|
|Supplier#000005605 |7Vj6Eil0mThqkM
|
|Supplier#000005631 |14TVrjlzo2SJEBYCDgpMwTlvwSqC
|
|Supplier#000005730 |5rkb0PSews HvxkL8JaD41UpnSF2cg8H1
|
|Supplier#000005736 |2dq XTYhtYWSfp
|
|Supplier#000005737 |dmEWcS32C3kx,d,B95 OmYn48
|
|Supplier#000005797 |,o,OebwRbSDmVl9gN9fpWPCiqB UogvlSR
|
|Supplier#000005836 |tx3SjPD2ZuWGFBRH,
|
|Supplier#000005875 |lK,sYiGzB94hSyHy9xvSZFbVQNCZe2LXZuGbS
|
|Supplier#000005974 |REhR5jE,lLusQXvf54SwYySgsSSVFhu
|
|Supplier#000005989 |rjFY,5kgLpBu7c
|
|Supplier#000006059 |4m0cv8MwJ9yX2vlwI Z
|
|Supplier#000006065 |UiI2Cy3W4Tu5sLk LuvXLRy6KihlGv
|
|Supplier#000006070 |TalC5m0pDrO6DZbngfmGmqe
|
|Supplier#000006109 |rY5gbfh3dKHnylcQUTPGCwnbe
|
|Supplier#000006121 |S92ycWwEzYYw4GspCBJN1WMuHhoZ
|
|Supplier#000006215 |j2iEbTsl,5PWdqWZ7k1yiISb7qtiiZljDIPEo
|
|Supplier#000006217 |RVN23SYT9jenUeaWGXUd
|
|Supplier#000006274 |S3yTZWqxTKUq g QQgcW9 AqhCkNZsW51hHuwU
|
|Supplier#000006435 |xIgE69XszYbnO4Eon7cHHO8y
|
|Supplier#000006463 |7 wkdj2EO49iotley2kmIM ADpLSszGV3RNWj
|
|Supplier#000006493 |ojV f,sNaB6Hm7r,fknDVTL63raJgAjZK
|
|Supplier#000006521 |b9 2zjHzxR
|
|Supplier#000006607 |3F 2e2gqD5u5B
|
|Supplier#000006706 |Ak4ga,ePu1QZ6C3qkrqjosaX0gxvqS9vkbe
|
|Supplier#000006761 |n4jhxGMqB5prD1HhpLvwrWStOLlla
|

```
|Supplier#000006808       |HGd2Xo 9nEcHJhZvXjXxWKIpApT
|
|Supplier#000006858       |fnlINT885vBBhsWwTGiZ0o22thwGY16h
GHJj21 |
|Supplier#000006872       |XIDPiA7PLXCWK6SeEcld
|
|Supplier#000006949       |mLxYUJhsGcLtKe ,GFirNu183AvT
|
|Supplier#000006985       |PrUUiboQpy,OtgJ01Z4BxJQUyrw9c3I
|
|Supplier#000007072       |2tRyX9M1a 4Rcm57s779F1ANG9jlpK
|
|Supplier#000007098
|G3j8g0KC4OcbAu2OVoPHrXQWMCUdjq8wgCHOExu |
|Supplier#000007135       |ls DoKV7V5ulfQy9V
|
|Supplier#000007160       |TqDGBULB3cTqIT6FKDvm9BS4e4v,zwYiQPb
|
|Supplier#000007169       |tEc95D2moN9S84nd55O,dlnW
|
|Supplier#000007322       |wr7dgte5q MAjiY0uwmi3MyDkSMX1
|
|Supplier#000007365       |51xhROLvQMJ05DndtZWt
|
|Supplier#000007398       |V8eE6oZ00OFNU,
|
|Supplier#000007402       |4UVv58ery1rjmqSR5
|
|Supplier#000007448       |yhhpWcatiJi7EJ6Q5VCaQ
|
|Supplier#000007477       |9m9j0wfhWzCvVHxkU,PpAxwSH0h
|
|Supplier#000007509       |q8,V6LJRoHJjHcOuSG7aLTMg
|
|Supplier#000007561       |rMcFg2530VC
|
|Supplier#000007789       |rQ7cUcPrtudOyO3svNSkimqH6qrfWT2Sz
|
|Supplier#000007801       |69fi,U1r6enUb
|
|Supplier#000007818       |yhhc2CQec Jrvc8zqBi83
|
|Supplier#000007885       |u3sicchh5ZpyTUpN1cJKNcAoabIWgY
|
|Supplier#000007918       |r,v9mBQ6LoEYyj1
|
|Supplier#000007926       |ErzCF80K9Uy
|
|Supplier#000007957       |ELwnio14ssoU1 dRyZIL OK3Vtzb
|
|Supplier#000007965       |F7Un5lJ7p5hhj
|
|Supplier#000007968       |DsF9UlZ2Fo6HXN9aErvyg1ikHoD582HSGZpP
|
|Supplier#000007998       |LnASFBfYRFOo9d6d,asBvVq9Lo2P
|
|Supplier#000008168       |aOa82a8ZbKCnfDLX
|
|Supplier#000008231       |IK7eGw Yj90sTdpsP,vcqWxLB
|
|Supplier#000008243       |2AyePMkDqmzVzjGTizXthFLo8h
EiudCMxOmIIG |
|Supplier#000008275       |BlbNDfWg,gpXKQlLN
|
|Supplier#000008323       |75I18sZmASwm
POeheRMdj9tmpyeQ,BfCXN5BIAb|
|Supplier#000008366
|h778cEj14BuW9OEKlvPTWq4iwASR6EBBXN7zeS8 |
|Supplier#000008423       |RQhKnkAhR0DAr3Ix4Q1weMMn00hNe Kq
|
|Supplier#000008480       |4sSDA4ACReklNjEm5T6b
|
|Supplier#000008532       |Uc29q4,5xVdDOF87UZrxhr4xWS0ihEUXuh
|
|Supplier#000008595       |MH0iB73GQ3z UW3O DbCbqmc
|
|Supplier#000008610       |SgVgP90vP452sUNTgzL9zKwXHXAzV6tV
|
|Supplier#000008705       |aE,trRNdPx,4yinTD9O3DebDIp
|
|Supplier#000008742       |HmPlQEzKCPEcTUL14,kKq
|
|Supplier#000008841       |I 85Lu1sekbg2xrSIzm0
|
|Supplier#000008895       |2cH4okfaLSZTTg8sKRbbJQxkmeFu2Esj
|
|Supplier#000008967       |2kwEHyMG 7FwozNImAUE6mH0hYtqYculJM
|
|Supplier#000008972       |w2vF6 D5YZO3visPXsqVfLADTK
|
|Supplier#000009032       |qK,trB6Sdy4Dz1BRUFNy
|
```

```
|Supplier#000009147       |rOAuryHxpZ9eOvx
|
|Supplier#000009252       |F7cZaPUHwh1 ZKyj3xmAVWC1XdP ue1p5m,i
|
|Supplier#000009278       |RqYTzgxj93CLX 0mcYfCENOefD
|
|Supplier#000009327       |uoqMdf7e7Gj9dbQ53
|
|Supplier#000009430       |igRqmneFt
|
|Supplier#000009567       |r4Wfx4c3xsEAjcGj71HHZByornl D9vrztXlv4
|
|Supplier#000009601       |51m637bO,Rw5DnHWFUvLacRx9
|
|Supplier#000009709       |rRnCbHYgDgl9PZYnyWKVYSUW0vKg
|
|Supplier#000009753       |wLhVEcRmd7PkJF4FBnGK7Z
|
|Supplier#000009796       |z,y4Idmr15DOvPUqYG
|
|Supplier#000009799       | 4wNjXGa4OKWl
|
|Supplier#000009811       |E3iuyq7UnZxU7oPZIe2Gu6
|
|Supplier#000009812       |APFRMy3lCbgFga53n5t9DxzFPQPgnjrGt32
|
|Supplier#000009862       |rJzweWeN58
|

  [ROWS CUT]

Submitting SQL Request #21:

/* Teradata
      */

/* Teradata
      */
/* @(#)TERADATA 21.sql 1.1.1.1@(#) */
/* Qurey 21 - Var_0 Rev_01 - TPC-H/TPC-R  The Suppliers Who Kept
Orders Waiting
Query */


/* Return the first 100 selected rows.
      */
SELECT
        S_NAME,
        COUNT(*) AS NUMWAIT
FROM
        SUPPLIER,
        LINEITEM L1,
        ORDERTBL,
        NATION
WHERE
        S_SUPPKEY = L1.L_SUPPKEY
        AND O_ORDERKEY = L1.L_ORDERKEY
        AND O_ORDERSTATUS='F'
        AND L1.L_RECEIPTDATE > L1.L_COMMITDATE
        AND EXISTS (
                SELECT
                        *
                FROM
                        LINEITEM L2
                WHERE
                        L2.L_ORDERKEY = L1.L_ORDERKEY
                        AND L2.L_SUPPKEY <> L1.L_SUPPKEY
        )
        AND NOT EXISTS (
                SELECT
                        *
                FROM
                        LINEITEM L3
                WHERE
                        L3.L_ORDERKEY = L1.L_ORDERKEY
                        AND L3.L_SUPPKEY <> L1.L_SUPPKEY
                        AND L3.L_RECEIPTDATE > L3.L_COMMITDATE
        )
        AND S_NATIONKEY = N_NATIONKEY
        AND N_NAME = 'SAUDI ARABIA'
GROUP BY
        S_NAME
ORDER BY
        NUMWAIT DESC,
        S_NAME;

 Query 21 complete, 411 rows returned


 only displaying 100 rows per TPC-H spec

|Col1____________________|_______Col2|
|Supplier#000002829      |         20|
```

Supplier#000005808	18| |Supplier#000008695	14
Supplier#000000262	17| |Supplier#000009224	14
Supplier#000000496	17| |Supplier#000000357	13
Supplier#000002160	17| |Supplier#000000436	13
Supplier#000002301	17| |Supplier#000000610	13
Supplier#000002540	17| |Supplier#000000788	13
Supplier#000003063	17| |Supplier#000000889	13
Supplier#000005178	17| |Supplier#000001062	13
Supplier#000008331	17| |Supplier#000001498	13
Supplier#000002005	16| |Supplier#000002056	13
Supplier#000002095	16| |Supplier#000002312	13
Supplier#000005799	16| |Supplier#000002344	13
Supplier#000005842	16| |Supplier#000002596	13
Supplier#000006450	16| |Supplier#000002615	13
Supplier#000006939	16| |Supplier#000002978	13
Supplier#000009200	16| |Supplier#000003048	13
Supplier#000009727	16| |Supplier#000003234	13
Supplier#000000486	15| |Supplier#000003727	13
Supplier#000000565	15| |Supplier#000003806	13
Supplier#000001046	15| |Supplier#000004472	13
Supplier#000001047	15| |Supplier#000005236	13
Supplier#000001161	15| |Supplier#000005906	13
Supplier#000001336	15| |Supplier#000006241	13
Supplier#000001435	15| |Supplier#000006326	13
Supplier#000003075	15| |Supplier#000006384	13
Supplier#000003335	15| |Supplier#000006394	13
Supplier#000005649	15| |Supplier#000006624	13
Supplier#000006027	15| |Supplier#000006629	13
Supplier#000006795	15| |Supplier#000006682	13
Supplier#000006800	15| |Supplier#000006737	13
Supplier#000006824	15| |Supplier#000006825	13
Supplier#000007131	15| |Supplier#000007021	13
Supplier#000007382	15| |Supplier#000007417	13
Supplier#000008913	15| |Supplier#000007497	13
Supplier#000009787	15| |Supplier#000007602	13
Supplier#000000633	14| |Supplier#000008134	13
Supplier#000001960	14| |Supplier#000008234	13
Supplier#000002323	14| |Supplier#000009435	13
Supplier#000002490	14| |Supplier#000009436	13
Supplier#000002993	14| |Supplier#000009564	13
Supplier#000003101	14| |Supplier#000009896	13
Supplier#000004489	14| |Supplier#000000379	12
Supplier#000005435	14| |Supplier#000000673	12
Supplier#000005583	14| |Supplier#000000762	12
Supplier#000005774	14| |Supplier#000000811	12
Supplier#000007579	14| |Supplier#000000821	12
Supplier#000008180	14| |Supplier#000001337	12

```
|Supplier#000001916       |         12|
|Supplier#000001925       |         12|
|Supplier#000002039       |         12|
|Supplier#000002357       |         12|
|Supplier#000002483       |         12|

Submitting SQL Request #22:

/* Teradata
*/
/* @(#)TERADATA 22.sql 1.1.1.1@(#) */
/* Query 22 - Var_0 Rev_01 - TPC-H/TPC-R Global Saleds
opportunity Query */

SELECT
        CNTRYCODE,
        COUNT(*) AS NUMCUST,
        SUM(C_ACCTBAL) AS TOTACCTBAL
FROM    (
        SELECT
                SUBSTRING (C_PHONE FROM 1 FOR 2) AS CNTRYCODE,
                C_ACCTBAL
        FROM
                CUSTOMER
        WHERE
                SUBSTRING (C_PHONE FROM 1 FOR 2) IN
                        ('13','31','23','29','30','18','17')
                AND C_ACCTBAL > (
                        SELECT
                                AVG(C_ACCTBAL)
                        FROM
                                CUSTOMER
                        WHERE
                                C_ACCTBAL > 0.00
                                AND SUBSTRING (C_PHONE FROM 1 FOR
2) IN

('13','31','23','29','30','18','17')
                )
                AND NOT EXISTS (
                        SELECT
                                *
                        FROM
                                ORDERTBL
                        WHERE
                                O_CUSTKEY=C_CUSTKEY
                )
        ) AS CUSTSALE
GROUP BY
        CNTRYCODE
ORDER BY
        CNTRYCODE;

 Query 22 complete, 7 rows returned

|Col1|_______Col2|__________________Col3|
|13  |        888|             6737713.99|
|17  |        861|             6460573.72|
|18  |        964|             7236687.40|
|23  |        892|             6701457.95|
|29  |        948|             7158866.63|
|30  |        909|             6808436.13|
|31  |        922|             6806670.18|
```

Appendix D. Query Substitution Parameters and Seeds Used

```
STREAM00      SEED=1212091008
1       73
2       32      STEEL   MIDDLE EAST
3       HOUSEHOLD       1995-03-26
4       1997-01-01
5       MIDDLE EAST     1994-01-01
6       1994-01-01      0.09    24
7       UNITED STATES   GERMANY
8       GERMANY EUROPE  MEDIUM PLATED NICKEL
9       indian
10      1994-06-01
11      UNITED STATES   0.0000000100
12      SHIP    RAIL    1993-01-01
13      pending packages
14      1993-08-01
15      1994-06-01
16      Brand#23        LARGE POLISHED  48      31      42
36      20
12      26      27
17      Brand#42        SM BAG
18      314
19      Brand#14        Brand#14        Brand#42        2
11      21
20      navajo  1993-01-01      CHINA
21      EGYPT
22      32      29      16      34      15      19      21

STREAM01      SEED=1212091009
1       81
2       20      BRASS   AMERICA
3       AUTOMOBILE      1995-03-12
4       1994-10-01
5       AFRICA  1994-01-01
6       1994-01-01      0.07    25
7       MOZAMBIQUE      UNITED STATES
8       UNITED STATES   AMERICA MEDIUM ANODIZED NICKEL
9       ghost
10      1993-03-01
11      JAPAN   0.0000000100
12      FOB     RAIL    1993-01-01
13      pending packages
14      1993-11-01
15      1996-12-01
16      Brand#21        PROMO BRUSHED   30      12      43
13      17
48      18      2
17      Brand#52        SM PACK
18      315
19      Brand#11        Brand#52        Brand#41        7
12      28
20      aquamarine      1997-01-01      GERMANY
21      VIETNAM
22      13      27      28      25      31      18      15

STREAM02      SEED=1212091010
1       89
2       8       TIN     MIDDLE EAST
3       HOUSEHOLD       1995-03-28
4       1997-05-01
5       AMERICA 1994-01-01
6       1994-01-01      0.04    25
7       INDIA   MOROCCO
8       MOROCCO AFRICA  SMALL POLISHED BRASS
```

```
9       drab
10      1993-12-01
11      ALGERIA 0.0000000100
12      MAIL    RAIL    1994-01-01
13      pending packages
14      1994-03-01
15      1994-09-01
16      Brand#25        MEDIUM BURNISHED        15      19      6
24
31      47      11      12
17      Brand#22        SM DRUM
18      313
19      Brand#13        Brand#35        Brand#45        3
13      25
20      lace    1995-01-01      RUSSIA
21      KENYA
22      32      17      33      15      20      21      22

STREAM03      SEED=1212091011
1       97
2       45      COPPER  ASIA
3       AUTOMOBILE      1995-03-14
4       1995-02-01
5       ASIA    1995-01-01
6       1995-01-01      0.02    24
7       ALGERIA GERMANY
8       GERMANY EUROPE  SMALL BURNISHED BRASS
9       cream
10      1994-09-01
11      JORDAN  0.0000000100
12      TRUCK   RAIL    1994-01-01
13      pending requests
14      1994-06-01
15      1997-04-01
16      Brand#23        ECONOMY PLATED  40      18      19
24      28
39      23      20
17      Brand#42        LG BAG
18      315
19      Brand#25        Brand#23        Brand#34        8
14      21
20      slate   1994-01-01      JAPAN
21      FRANCE
22      16      17      29      15      20      28      22

STREAM04      SEED=1212091012
1       105
2       33      STEEL   MIDDLE EAST
3       FURNITURE       1995-03-30
4       1997-09-01
5       EUROPE  1995-01-01
6       1995-01-01      0.07    25
7       PERU    UNITED STATES
8       UNITED STATES   AMERICA STANDARD BRUSHED BRASS
9       chartreuse
10      1993-07-01
11      ARGENTINA       0.0000000100
12      RAIL    TRUCK   1994-01-01
13      pending requests
14      1994-09-01
15      1994-12-01
16      Brand#21        STANDARD BRUSHED        2       45      8
9
27      31      14      25
17      Brand#12        LG PACK
18      312
19      Brand#22        Brand#51        Brand#34        3
15      28
20      drab    1997-01-01      BRAZIL
21      UNITED KINGDOM
22      12      22      25      13      11      17      19

STREAM05      SEED=1212091013
1       113
2       21      BRASS   ASIA
3       AUTOMOBILE      1995-03-16
4       1995-06-01
5       MIDDLE EAST     1995-01-01
6       1995-01-01      0.04    25
7       INDIA   MOZAMBIQUE
8       MOZAMBIQUE      AFRICA  STANDARD PLATED BRASS
9       blanched
10      1994-04-01
11      KENYA   0.0000000100
12      REG AIR TRUCK   1994-01-01
13      pending requests
14      1994-12-01
15      1997-07-01
16      Brand#25        LARGE ANODIZED  19      45      31
33      8
41      6       29
17      Brand#32        LG DRUM
18      314
```

```
19      Brand#24        Brand#44        Brand#33        9
16      24
20      peru    1996-01-01      MOZAMBIQUE
21      MOROCCO
22      19      20      28      21      16      13      32

STREAM06      SEED=1212091014
1       60
2       9       NICKEL  AFRICA
3       FURNITURE       1995-03-01
4       1993-03-01
5       AFRICA  1995-01-01
6       1995-01-01      0.02    24
7       ALGERIA INDIA
8       INDIA   ASIA    STANDARD ANODIZED BRASS
9       antique
10      1995-01-01
11      BRAZIL  0.0000000100
12      SHIP    TRUCK   1995-01-01
13      unusual requests
14      1995-03-01
15      1995-04-01
16      Brand#23        PROMO PLATED    25      5       15
12      8
37      1       44
17      Brand#52        MED BAG
18      315
19      Brand#31        Brand#22        Brand#22        4
17      20
20      brown   1994-01-01      FRANCE
21      GERMANY
22      16      18      15      12      27      20      24

STREAM07      SEED=1212091015
1       68
2       46      COPPER  ASIA
3       MACHINERY       1995-03-18
4       1995-10-01
5       AMERICA 1996-01-01
6       1996-01-01      0.07    24
7       PERU    ALGERIA
8       ALGERIA AFRICA  PROMO POLISHED STEEL
9       turquoise
10      1993-10-01
11      MOROCCO 0.0000000100
12      FOB     TRUCK   1995-01-01
13      unusual requests
14      1995-07-01
15      1997-11-01
16      Brand#21        SMALL POLISHED  25      26      49
42      13
8       3       39
17      Brand#22        MED PACK
18      313
19      Brand#33        Brand#55        Brand#21        9
18      28
20      maroon  1997-01-01      VIETNAM
21      UNITED STATES
22      31      17      14      10      29      16      27

STREAM08      SEED=1212091016
1       76
2       34      STEEL   AFRICA
3       BUILDING        1995-03-03
4       1993-07-01
5       EUROPE  1996-01-01
6       1996-01-01      0.05    25
7       INDONESIA       PERU
8       PERU    AMERICA PROMO BURNISHED STEEL
9       snow
10      1994-07-01
11      CANADA  0.0000000100
12      MAIL    TRUCK   1995-01-01
13      unusual accounts
14      1995-10-01
15      1995-07-01
16      Brand#25        ECONOMY ANODIZED        29      4
34      13
42      9       19      43
17      Brand#42        MED DRUM
18      314
19      Brand#35        Brand#43        Brand#21        4
19      24
20      turquoise       1996-01-01      IRAQ
21      PERU
22      17      15      16      19      31      34      21

STREAM09      SEED=1212091017
1       84
2       22      BRASS   EUROPE
3       MACHINERY       1995-03-20
4       1996-01-01
5       MIDDLE EAST     1996-01-01
6       1996-01-01      0.02    24
```

```
7       ARGENTINA       INDONESIA
8       INDONESIA       ASIA    ECONOMY BRUSHED STEEL
9       sandy
10      1993-05-01
11      MOZAMBIQUE      0.0000000100
12      TRUCK   MAIL    1995-01-01
13      unusual accounts
14      1996-01-01
15      1993-04-01
16      Brand#23        STANDARD BURNISHED      13      3       8
12
21      10      35      17
17      Brand#12        JUMBO BAG
18      312
19      Brand#42        Brand#21        Brand#15        10
20      20
20      green   1994-01-01      ALGERIA
21      INDONESIA
22      20      19      17      30      12      18      22
```

Appendix E. Data Load Components

Description of the loading method

For this TPC-D benchmark, two methods of loading data were employed. The first method uses a freely available parallel load utility called PFAST combined with a version of the DBGEN data generator redesigned to be a subroutine called by PFAST for each row to be loaded. Such subroutines are referred to as "Inmod" routines. The PFAST utility uses standard Teradata call-level interface (CLIv2) to communicate the data to the SUT.

The second method involves using the standard version of DBGEN in conjunction with it's in line load option (-d). We replaced the stub in line load routines that came with DBGEN with a routine that automatically invokes the standard Teradata load utility FASTLOAD, and uses a named pipe to transfer the data as generated by DBGEN to FASTLOAD. FASTLOAD then uses the standard Teradata call-level interface (CLIv2) to communcate the data to the SUT.

While either method can be used to load any or all of the TPC-D database, the second method is easy to use and easy to understand, while the first method is somewhat faster. Because of this, the first method was used for all tables, with the exception of Nation and Region, while the second method was used for the remaining tables.

E.1 Inmod for FastLoad used by Pfast

The Inmod subroutine is made up of a number of pieces. The file blkexit.c is the main body of the subroutine, and is a modification of the driver.c code from the standard DBGEN. Tdinload.c is a set of utility routines used by blkexit.c. The files build.c, bm_utils.c, rnd.c, print.c, bcd2.c, and speed_seed.c are used as-is from the standard DBGEN distribution with no modifications. All header files from DBGEN are used as-is from the standard DBGEN distribution with no modifications.

Makefile

```
#  Sccsid:     @(#)makefile 2.1.2.2
# makefile for Teradata DSS benchamrk data generator
#
#######
# Changes
# ------
# 990106  (jms) Integration of V2 changes
# 981210  (jms) Unification of inline and pfast makefiles
#               Still need to include dependencies/sources for
slave.o
#
#################
#BEFORE YOU START
#################
# to compile with varchar uncomment the following line
```

```
#VARCHAR= -DVC
# to compile for TPCR (N_NAME vs. N_NATIONKEY) uncomment the
following line
NATION= -DTPCR
# to compile with inserts order then lineitem uncomment the
following line
#INSORDERFIRST= -IOL
# to compile with deletes order then lineitem uncomment the
following line
#DELORDERFIRST= -DOL
#################
## CHANGE NAME OF ANSI COMPILER HERE
#################
CC      = cc
LDFLAGS = -g
LIBS    = -lm -lc
# Current values for DATABASE are: INFORMIX, DB2, TDAT (Teradata)
DATABASE= TDAT
PLATFORM= ATT
#
LOCALIZE= -D$(DATABASE) -D$(PLATFORM)
CFLAGS  = -g $(LOCALIZE) $(VARCHAR) $(NATION) $(INSORDERFIRST)
$(DELORDERFIRST) -o1 -586 -I/usr/include -I/usr/ucbinclude
#
# NO CHANGES SHOULD BE NECESSARY BELOW THIS LINE
###############
#
PROG1 = dbgen
PROG2 = qgen
PROG3 = tpcddriver
PROG4 = customer supplier part partsupp order lineitem nation
region
PROGS = $(PROG1) $(PROG2) $(PROG3) $(PROG4)
#
HDR1 = dss.h rnd.h config.h dsstypes.h shared.h bcd2.h
SRC1 = build.c driver.c bm_utils.c rnd.c print.c tdatload.c
bcd2.c \
       speed_seed.c permute.c text.c common.c
OBJ1 = build.o driver.o bm_utils.o rnd.o print.o bcd2.o \
       speed_seed.o tdatload.o permute.o text.o common.o
#
SRC2 = qgen.c varsub.c
HDR2 = tpcd.h permute.h
OBJ2 = build.o bm_utils.o qgen.o rnd.o varsub.o permute.o text.o
speed_seed.o
#
HDR3 = tdatsql.h tsqlt.h sql.h sqlext.h sqltypes.h
SRC3 = tpcddriver.c tdatsql.c tsqlt.c
OBJ3 = build.o tpcddriver.o bm_utils.o rnd.o vsub.o bcd2.o
tdatsql.o tsqlt.o \
       tdatload.o permute.o text.o common.o speed_seed.o
LIB3 =  -lcliv2 -ltdusr -lsocket -lnsl -lx
#
HDR4 = pf.h
SRC4 = blkexit.c tdinload.c fastslav.c tester.c
OBJ4 = build.o bm_utils.o rnd.o print.o tdinload.o bcd2.o
speed_seed.o \
       fastslav.o text.o permute.o common.o
LIB4 = -lcliv2 -ltdusr -lsocket -lnsl -lgen
#
HDRS = $(HDR1) $(HDR2) $(HDR3) $(HDR4)
SRCS = $(SRC1) $(SRC2) $(SRC3) $(SRC4)
OBJS = $(OBJ1) $(OBJ2) $(OBJ3) $(OBJ4)
JUNK = part.o partsupp.o order.o lineitem.o supplier.o customer.o
nation.o \
       region.o tester
#
SETS = dists.dss
DDL  = dss.ddl dss.ri
OTHER=makefile $(SETS) $(DDL)
DOC=README HISTORY PORTING.NOTES
#
DBGENSRC=$(SRCS) $(HDRS) $(OTHER) $(DOC)
ALLSRC=$(SRCS) $(HDRS) $(OTHER) $(DOC)

#
##
# PROGRAM TARGETS
##
all: $(PROGS)
pfast: $(PROG4)
tester: order.o tester.c $(OBJ4)
       $(CC) $(CFLAGS) -DPFAST -o tester tester.c lineitem.o \
              build.o bm_utils.o rnd.o print.o tdinload.o bcd2.o
\
              speed_seed.o text.o common.o permute.o \
              -lcliv2 -ltdusr -lsocket -lnsl -lm -lc -lgen
#
$(PROG1): $(OBJ1) $(SETS)
       $(CC) $(LDFLAGS) -o $@ $(OBJ1) $(LIBS)

$(PROG2): $(OBJ2) permute.h
       $(CC) $(LDFLAGS) -o $@ $(OBJ2) $(LIBS)
```

```
$(PROG3): $(OBJ3) $(SETS) permute.h
	$(CC) $(LDFLAGS) -o $@ $(OBJ3) $(LIBS) $(LIB3)

$(PROG4): $$@.o $(OBJ4)
	$(CC) $(LDFLAGS) -o $@ $@.o $(OBJ4) $(LIB4) $(LIBS)
##
# Utility Targets
##
clean:
	rm -f $(PROGS) $(OBJS) $(JUNK)
lint:
	lint $(CFLAGS) $(LDFLAGS) $(SRC3)
tar: $(DBGENSRC)
	tar cvhf $(PROG1).tar $(DBGENSRC)
dbgenshar: $(DBGENSRC)
	shar -o dbgen.shar $(DBGENSRC)
dbgendisk: $(DBGENSRC)
	for f in $(DBGENSRC) ; \
	 do  \
	 unix2dos $$f /pcfs/$$f ; \
	 done
portable:
	for f in $(DBGENSRC) ; \
	 do  \
	 expand $$f > /tmp/foo; \
	 mv -f /tmp/foo $$f; \
	 awk 'length > 72 { print FILENAME ":" NR " too long " }'
$$f ; \
	 done
release: $(ALLSRC) .release
	for f in $(ALLSRC)  ; \
	do \
	get -e -r`cat .branch` -b SCCS/s.$$f ; \
	delta  -r`cat .release`.1  -y"creating a new release"
SCCS/s.$$f ; \
	done
	mv .release .branch
##
# Dependencies
##
rnd.o: rnd.h
vsub.o: varsub.c
	$(CC) $(CFLAGS) -c -o vsub.o -DTDAT_LOADER varsub.c
$(OBJ1): config.h makefile
$(OBJ1): dss.h dsstypes.h
$(OBJ2): dss.h tpcd.h config.h
$(OBJ3): dss.h tpcd.h config.h dsstypes.h tdatsql.h
$(OBJ4): dss.h rnd.h config.h dsstypes.h shared.h bcd2.h
# inmod dependencies
fastslav.o: fastslav.c
	$(CC) -c  -O fastslav.c
lineitem.o: blkexit.c dss.h dsstypes.h config.h blkexit.c
	$(CC) $(CFLAGS) -DPFAST -DTABLE=LINE -o $@ -c blkexit.c
order.o: blkexit.c dss.h dsstypes.h config.h blkexit.c
	$(CC) $(CFLAGS) -DPFAST -DTABLE=ORDER -o $@ -c blkexit.c
part.o: blkexit.c dss.h dsstypes.h config.h blkexit.c
	$(CC) $(CFLAGS) -DPFAST -DTABLE=PART -o $@ -c blkexit.c
partsupp.o: blkexit.c dss.h dsstypes.h config.h blkexit.c
	$(CC) $(CFLAGS) -DPFAST -DTABLE=PSUPP -o $@ -c blkexit.c
supplier.o: blkexit.c dss.h dsstypes.h config.h blkexit.c
	$(CC) $(CFLAGS) -O -DPFAST -DTABLE=SUPP -o $@ -c blkexit.c
customer.o: blkexit.c dss.h dsstypes.h config.h blkexit.c
	$(CC) $(CFLAGS) -O -DPFAST -DTABLE=CUST -o $@ -c blkexit.c
region.o: blkexit.c dss.h dsstypes.h config.h blkexit.c
	$(CC) $(CFLAGS) -O -DPFAST -DTABLE=REGION -o $@ -c
blkexit.c
nation.o: blkexit.c dss.h dsstypes.h config.h blkexit.c
	$(CC) $(CFLAGS) -O -DPFAST -DTABLE=NATION -o $@ -c
blkexit.c
$(ALLSRC):
	get -s -r`cat .branch` SCCS/s.$@
```

blkexit.c

```
/* @(#)blkexit.c     2.1.2.2 */
/*************************************************************
This is a Teradata-specific version of the DBGEN program for TPC-
D.
This file replaces driver.c from the original DBGEN program.
This
file is used in conjunction with tdatload.c, which replaces the
file
load_stub.c.  load_stub.c is suppossed to be customized for each
DB.

Note that there are NO teradata specific changes
made to any of the header (.h) or other source (.c) files,
including
those that actually generate the data (such as build.c).

Replacing driver.c is necessary because rather than a main
program,
we want this routine to be a subroutine that can be called by the
```

```
Teradata load utility (FASTLOAD).  Such routines are called
"INMOD"s.

Although we a replacing driver.c, much of the driver.c source is
embedded in this file unchanged.  I've marked what parts are
copied
straight from driver.c, and which parts are Teradata specific
changes.

Since an FASTLOAD can only load one table per run, this INMOD
needs
to know which file to generate rows for.  This is handled by a
define called "TABLE".  It must be defined to be one of the table
constants PART,PSUPP,SUPP,CUST,ORDER,LINE,TIME,NATION,REGION.
It can be defined as a compiler option -DTABLE=CUST, or it
defaults
to LINE via the define just below this comment.

Also, because we have a special version of FASTLOAD for loading
large amounts of data (called PFAST) that requires slightly
different
INMODs, you can define PFAST before compiling to get an inmod
designed
for PFAST. Note that PFAST has a strange restriction:  INMODs
must
NOT write to stdout.  So I changed all printfs to go to stderr.

Because we aren't a main program, we can't expect command-line
arguments, so we read the information we need from a file called
"inmod.info" in the current directory.  This file needs to
contain
three numbers:  The scale factor, the total number of child
processes
being run, and which step we are generating for.  These are the
same
as the command line arguments -s, -C, and -S.
If the step is 0 or -1, we generate the entire table.
************************************************************/
#ifndef TABLE
#define TABLE LINE
#endif

/*** The following code is from driver.c with no Teradata
modifications: */
/* main driver for dss banchmark */
#define DECLARER                          /* EXTERN references get
defined here */
#define NO_FUNC (int (*) ()) NULL /* to clean up tdefs */
#define NO_LFUNC (long (*) ()) NULL             /* to clean up
tdefs */

#include "config.h"
#include <stdlib.h>
#if (defined(_POSIX_)||!defined(WIN32))         /* Change for
Windows NT */
#include <unistd.h>
#include <sys/wait.h>
#endif /* WIN32 */
#include <stdio.h>      /* */
#include <limits.h>
#include <math.h>
#include <ctype.h>
#include <signal.h>
#include <string.h>
#include <time.h>
#ifdef HP
#include <strings.h>
#endif
#if (defined(_POSIX_)||!defined(WIN32))   /* Change for Windows
NT */
#include <unistd.h>
#include <sys/wait.h>
#include <sys/times.h>
#ifndef CLK_TCK
#define CLK_TCK _sysconf(3)     /* 3B2 clock ticks per second */
/* 3 is _SC_CLK_TCK */
#endif
#endif
#if (defined(WIN32)&&!defined(_POSIX_))
#include <process.h>
#include <signal.h>
#include <errno.h>

#endif

/* Ok, here are a few lines added for Teradata */
/* Some extra header files */
#include <stdlib.h>
#include <time.h>

#ifdef WIN32
/* Stuff needed to get process-specific times    */
```

```
typedef unsigned long DWORD;
typedef int BOOL;
#define WINAPI __stdcall
#define VOID void
#define DECLSPEC_IMPORT __declspec(dllimport)
#define STRICT
typedef __int64 LONGLONG;
typedef unsigned __int64 DWORDLONG;

typedef void *HANDLE;

#define WINBASEAPI DECLSPEC_IMPORT

typedef struct _FILETIME {
    DWORD dwLowDateTime;
    DWORD dwHighDateTime;
} FILETIME, *PFILETIME, *LPFILETIME;

WINBASEAPI
HANDLE
WINAPI
GetCurrentProcess(
    VOID
    );
WINBASEAPI
BOOL
WINAPI
GetProcessTimes(
    HANDLE hProcess,
    LPFILETIME lpCreationTime,
    LPFILETIME lpExitTime,
    LPFILETIME lpKernelTime,
    LPFILETIME lpUserTime
    );

#endif
char date[40];

#undef VERSION
#include <coptypes.h>  /* a Teradata specific include file */
/* undef VERSION which coptypes.h defined, since config.h will
define it*/
#undef VERSION

#define  EM_OK    0
#define  FILERR               400
#define  FILEOF               401
```

```
#define ROWSIZE 32750
#define MAXRECLEN 260

#ifdef WIN32
#pragma pack(1)
#endif

Int32 result;
typedef struct inmod_struct {
#ifdef PFAST
   Int16 Length;
#else
   Int32 ReturnCode;
   Int32 Length;
#endif
   char  Body[ROWSIZE];
} inmdtyp,*inmdptr;
inmdptr inmodptr;

#ifdef WIN32
#pragma pack(4)
#endif

#ifdef PFAST
char   DummyBuf[32767];



//FILE   *jobptr;
#define  EOBUF   -1
#endif
char   checkpointfile[255];


/* p1 is the pointer to the place in the parcel we are building
   where the next column should be copied. */
char *p1;

long i = 1;
long reccnt = 0;            /* Record generated by inmod */
long lineitem_in_order = 99999;   /* State tracking */
long supplier_in_part = 99999;
long nextrec = 0;            /* next record to generate */

size_t templen;

long chkpnt;
```

```
FILE * f2;    /* For reading and writing checkpoint information
*/

#ifndef WIN32
struct tms starttime, endtime;   /* For timings */
time_t timeStart, timeEnd, usrtime, systime;
#else
FILETIME ProcCreated, ProcExited,     StartKernelTime,
StartUserTime, EndKernelTime, EndUserTime;
time_t timeStart, timeEnd;
double usrtime, systime;
#endif

/* End of Teradata specific changes, back to standard DBGEN
driver.c code */

#include "dss.h"
#include "dsstypes.h"
#include "bcd2.h"

/*
* Function prototypes
*/
void usage (void);
int prep_direct (char *);
int close_direct (void);
void kill_load (void);
int pload (int tbl);
void gen_tbl (int tnum, long start, long count, long upd_num);
int pr_drange (int tbl, long min, long cnt, long num);
int set_files (int t, int pload);
int partial (int, int);
void gen_seeds (int start, int s);


extern int optind, opterr;
extern char *optarg;

long rowcnt = 0,
     extra_rows = 0,
     minrow = 0;

long upd_num = 0;
double flt_scale;
#if (defined(WIN32)&&!defined(_POSIX_))
char *spawn_args[25];
#endif
/*
* general table descriptions. See dss.h for details on structure
* NOTE: tables with no scaling info are scaled according to
* another table
*
*
* the following is based on the tdef structure defined in dss.h
as:
* typedef struct
* {
* char     *name;          -- name of the table;
*                             flat file output in <name>.tbl
* long      base;          -- base scale rowcount of table;
*                             0 if derived
* int       (*header) ();  -- function to prep output
* int       (*loader[2]) ();  -- functions to present output
* long      (*gen_seed) ();  -- functions to seed the RNG
* int       child;           -- non-zero if there is an
associated
detail table
* }         tdef;
*
*/

/*
* flat file print functions; used with -F(lat) option
*/
int pr_cust (customer_t * c, int mode);
int pr_line (order_t * o, int mode);
int pr_order (order_t * o, int mode);
int pr_part (part_t * p, int mode);
int pr_psupp (part_t * p, int mode);
int pr_supp (supplier_t * s, int mode);
int pr_order_line (order_t * o, int mode);
int pr_part_psupp (part_t * p, int mode);
int pr_nation (code_t * c, int mode);
int pr_region (code_t * c, int mode);

/*
* inline load functions; used with -D(irect) option
*/
int ld_cust (customer_t * c, int mode);
int ld_line (order_t * o, int mode);
int ld_order (order_t * o, int mode);
```

```
int ld_part (part_t * p, int mode);
int ld_psupp (part_t * p, int mode);
int ld_supp (supplier_t * s, int mode);
int ld_order_line (order_t * o, int mode);
int ld_part_psupp (part_t * p, int mode);
int ld_nation (code_t * c, int mode);
int ld_region (code_t * c, int mode);

/*
* seed generation functions; used with '-O s' option
*/
long sd_cust (long skip_count);
long sd_line (long skip_count);
long sd_order (long skip_count);
long sd_part (long skip_count);
long sd_psupp (long skip_count);
long sd_supp (long skip_count);

/*
* header output functions); used with -h(eader) option
*/
int hd_cust (FILE * f);
int hd_line (FILE * f);
int hd_order (FILE * f);
int hd_part (FILE * f);
int hd_psupp (FILE * f);
int hd_supp (FILE * f);
int hd_order_line (FILE * f);
int hd_part_psupp (FILE * f);
int hd_nation (FILE * f);
int hd_region (FILE * f);

/*
* data verfication functions; used with -O v option
*/
int vrf_cust (customer_t * c, int mode);
int vrf_line (order_t * o, int mode);
int vrf_order (order_t * o, int mode);
int vrf_part (part_t * p, int mode);
int vrf_psupp (part_t * p, int mode);
int vrf_supp (supplier_t * s, int mode);
int vrf_order_line (order_t * o, int mode);
int vrf_part_psupp (part_t * p, int mode);
int vrf_nation (code_t * c, int mode);
int vrf_region (code_t * c, int mode);

tdef tdefs[] =
        {
                {"part.tbl", "part table", 200000, hd_part,
                        {pr_part, ld_part}, sd_part, vrf_part,
PSUPP, 0},
                {"partsupp.tbl", "partsupplier table", 200000,
hd_psupp,
                        {pr_psupp, ld_psupp}, sd_psupp, vrf_psupp,
NONE, 0},
                {"supplier.tbl", "suppliers table", 10000, hd_supp,
                        {pr_supp, ld_supp}, sd_supp, vrf_supp, NONE,
0},
                {"customer.tbl", "customers table", 150000,
hd_cust,
                        {pr_cust, ld_cust}, sd_cust, vrf_cust, NONE,
0},
                {"orders.tbl", "order table", 150000, hd_order,
                        {pr_order, ld_order}, sd_order, vrf_order,
LINE, 0},
                {"lineitem.tbl", "lineitem table", 150000, hd_line,
                        {pr_line, ld_line}, sd_line, vrf_line, NONE,
0},
                {"orders.tbl", "order/lineitem tables", 150000,
hd_order_line,
                        {pr_order_line, ld_order_line}, sd_order,
vrf_order_line, LINE, 0},
                {"part.tbl", "part/partsupplier tables", 200000,
hd_part_psupp,
                        {pr_part_psupp, ld_part_psupp}, sd_part,
vrf_part_psupp, NONE, 0},
                {"nation.tbl", "nation table", NATIONS_MAX,
hd_nation,
                        {pr_nation, ld_nation}, NO_LFUNC,
vrf_nation, NONE, 0},
                {"region.tbl", "region table", NATIONS_MAX,
hd_region,
                        {pr_region, ld_region}, NO_LFUNC,
vrf_region, NONE, 0}
        };


int *pids;
void mk_sparse(long i, DSS_HUGE *res, long seq);

/*
 * re-set default output file names
 */
int
```

```
set_files(int i, int pload)
{
    char line[80], *new_name;

    if (table & (1 << i))
child_table:
        {
        if (pload != -1)
            sprintf(line, "%s.%d", tdefs[i].name, pload + 1);
        else
            {
            fprintf(stderr,"Enter new destination for %s data: ",
                tdefs[i].name);
            if (fgets(line, sizeof(line), stdin) == NULL)
                return(-1);;
            if ((new_name = strchr(line, '\n')) != NULL)
                *new_name = '\0';
            if (strlen(line) == 0)
                return(0);
            }
        new_name = (char *)malloc(strlen(line) + 1);
        MALLOC_CHECK(new_name);
        strcpy(new_name, line);
        tdefs[i].name = new_name;
        if (tdefs[i].child != NONE)
            {
            i = tdefs[i].child;
            tdefs[i].child = NONE;
            goto child_table;
            }
        }

    return(0);
}
/*
 * read the distributions needed in the benchamrk
 */
void
load_dists (void)
       {
       read_dist (env_config (DIST_TAG, DIST_DFLT), "p_cntr",
&p_cntr_set);
       read_dist (env_config (DIST_TAG, DIST_DFLT), "colors",
&colors);
       read_dist (env_config (DIST_TAG, DIST_DFLT), "p_types",
&p_types_set);
       read_dist (env_config (DIST_TAG, DIST_DFLT), "nations",
&nations);
       read_dist (env_config (DIST_TAG, DIST_DFLT), "regions",
&regions);
       read_dist (env_config (DIST_TAG, DIST_DFLT), "o_oprio",
              &o_priority_set);
       read_dist (env_config (DIST_TAG, DIST_DFLT), "instruct",
              &l_instruct_set);
       read_dist (env_config (DIST_TAG, DIST_DFLT), "smode",
&l_smode_set);
       read_dist (env_config (DIST_TAG, DIST_DFLT), "category",
              &l_category_set);
       read_dist (env_config (DIST_TAG, DIST_DFLT), "rflag",
&l_rflag_set);
       read_dist (env_config (DIST_TAG, DIST_DFLT), "msegmnt",
&c_mseg_set);

    /* load the distributions that contain text generation */
    read_dist (env_config (DIST_TAG, DIST_DFLT), "nouns",
&nouns);
    read_dist (env_config (DIST_TAG, DIST_DFLT), "verbs",
&verbs);
    read_dist (env_config (DIST_TAG, DIST_DFLT), "adjectives",
&adjectives);
    read_dist (env_config (DIST_TAG, DIST_DFLT), "adverbs",
&adverbs);
    read_dist (env_config (DIST_TAG, DIST_DFLT), "auxillaries",
&auxillaries);
    read_dist (env_config (DIST_TAG, DIST_DFLT), "terminators",
&terminators);
    read_dist (env_config (DIST_TAG, DIST_DFLT), "articles",
&articles);
    read_dist (env_config (DIST_TAG, DIST_DFLT), "prepositions",
&prepositions);
    read_dist (env_config (DIST_TAG, DIST_DFLT), "grammar",
&grammar);
    read_dist (env_config (DIST_TAG, DIST_DFLT), "np", &np);
    read_dist (env_config (DIST_TAG, DIST_DFLT), "vp", &vp);

       }



/*
 * generate a particular table
 */
```

```
/* This has been changed so that instead of generating the whole
table,
   this routine generates one row for the table and then returns.
   nextrec is used to track which record we are generating.
   order and part must be static, since each contain multiple
rows */

order_t         o;
part_t          part;
supplier_t      supp;
customer_t      cust;
DSS_HUGE *sk;


void
gen_h_tbl (int tnum, long sf, long c, long step, long upd_num)
{
    static DSS_HUGE *i;
    static DSS_HUGE *count;
    static long rem;
    static int init = 0;

    if (init == 0)
    {
        INIT_HUGE(i);
        INIT_HUGE(count);
        INIT_HUGE(sk);
        INIT_HUGE(o.okey);
        for (rem=0; rem < O_LCNT_MAX; rem++)
            INIT_HUGE(o.l[rem].okey);
        init = 1;

       LONG2HUGE(tdefs[tnum].base, i);
       HUGE_MUL(i, sf);
       rem = (long)HUGE_MOD(i, c); /* rem holds the extra rows
for the last child */
       HUGE_DIV(i, c);         /* i holds the step size */
       HUGE_SET(i, count);
       HUGE_MUL(i, step);
       if (step == c - 1)      /* the last child picks up the
remainder */
           HUGE_ADD(count, rem, count);
       HUGE_ADD(i, 1, i);      /* i holds the start point */
#ifdef LASTHUNK /* tweek to do only last 500 */
       HUGE_SUB (count, 70312000, count);
       HUGE_ADD (i, 70312000, i);
#endif
       }


       if (tnum == LINE)
              {
              lineitem_in_order++;
              if (o.lines>lineitem_in_order)
                     {
                  /* We already have it generated */
                  ld_line (&o, upd_num);
                  return;
                  }
                    else
                  lineitem_in_order=0;
                    }

    if (HUGE_CMP (count, 0) > 0)
        {
        nextrec++;
        if (((nextrec % 10000) == 0) && verbose) fprintf(stderr,
".");
        HUGE_SET (i, sk);
        HUGE_DIV (sk, 1 << SPARSE_KEEP);
        HUGE_MUL (sk, 1 << SPARSE_BITS);
        HUGE_ADD (sk, upd_num, sk);
        HUGE_MUL (sk, 1 << SPARSE_KEEP);
#ifndef SUPPORT_64BITS
        bcd2_bin(&rem, *i);
        rem &= (1 << SPARSE_KEEP) - 1;
        HUGE_ADD (sk, rem, sk);
        bcd2_bin(&rem, *sk);
        *sk = rem;
        bcd2_bin(&rem, *(sk+1));
        *(sk+1) = rem;
#else
        rem = (long)(*i & ((1 << SPARSE_KEEP) - 1));
        HUGE_ADD (sk, rem, sk);
#endif
        mk_order (sk, &o);
        tdefs[tnum].loader[direct] (&o, upd_num);
        HUGE_SUB (count, 1, count);
        HUGE_ADD (i, 1, i);
        }
    return;
}
```

```
void
gen_tbl(int tnum, long start, long count, long upd_num)
{
    code_t code;
    static int initdone = 0;
    static int completed = 0;
    long i;


    if (initdone==0)
    {
    INIT_HUGE(o.okey);
       INIT_HUGE(sk);


       for (i=0; i < O_LCNT_MAX; i++)
              INIT_HUGE(o.l[i].okey);
    initdone = 1;
    }

#ifdef TESTER
fprintf(stderr, "into gen_tbl -- 1\n");
#endif
   if (tnum == LINE)
      {
         lineitem_in_order++;
         if (o.lines>lineitem_in_order)
            {
            /* We already have it generated */
            ld_line (&o, upd_num);

            return;
            }
         else
            lineitem_in_order=0;
      }
   else if (tnum == PSUPP)
      {
         supplier_in_part++;
         if (SUPP_PER_PART>supplier_in_part)
            {
            /* We already have it generated */
            ld_psupp (&part, upd_num);

            return;
            }
         else
            supplier_in_part=0;
      }

#ifdef TESTER
fprintf(stderr, "into gen_tbl -- 2\n");
#endif
   nextrec++;
    i = nextrec + start - 1;
    if (nextrec <= count)
        {
        LIFENOISE(10000, i);
        switch(tnum)
            {
            case LINE:
            case ORDER:
            case ORDER_LINE:
                mk_sparse(i,
                    sk, (upd_num == 0)?0:1 + upd_num/(10000 /
refresh));
#ifdef TESTER
fprintf(stderr, "into gen_tbl -- 3\n");
#endif
                mk_order(sk, &o);
#ifdef TESTER
fprintf(stderr, "into gen_tbl -- 4\n");
#endif
                tdefs[tnum].loader[direct] (&o, upd_num);
                break;
            case SUPP:
                mk_supp(i, &supp);
                tdefs[tnum].loader[direct] (&supp, upd_num);
                break;
            case CUST:
                mk_cust(i, &cust);
                tdefs[tnum].loader[direct] (&cust, upd_num);
                break;
            case PSUPP:
            case PART:
            case PART_PSUPP:
                mk_part(i, &part);
                tdefs[tnum].loader[direct] (&part, upd_num);
                break;
            case NATION:
                mk_nation(i, &code);
                tdefs[tnum].loader[direct] (&code, 0);
                break;
```

```
            case REGION:
                mk_region(i, &code);
                tdefs[tnum].loader[direct] (&code, 0);
                break;
            default:
                            fprintf(stderr,"%s cannot be built
this way yet\n", tdefs[tnum].name);
                            exit(1);
                            break;
            }
        }

    /*completed |= 1 << tnum;  */
}


void
usage(void)
{
    /* This isn't a main(), so no usage stuff */
}

/*
 * pload() -- handle the parallel loading of tables
 */
#ifndef DOS

int
partial (int tbl, int s)
    {
    char fname[80];

    if (verbose)
        {
        fprintf (stderr, "Starting to load stage %d of %d of
%s...",
            s + 1, children, tdefs[tbl].comment);
        }
    if (direct == 0)
        set_files (tbl, s);

    rowcnt = set_state(TABLE, scale, children, s+1, &extra_rows);
    minrow = rowcnt * s + 1;
/* JMS */ fprintf(stderr, "stage s is loading %d rows starting at
%d\n",
              rowcnt, minrow);
        /*
    rowcnt = tdefs[tbl].base * scale;
    extrarows = rowcnt % children;
    rowcnt /= children;
    minrow = rowcnt * s + 1;
    if (s == children - 1)
        rowcnt += extrarows;
       */

    if (verbose)
        fprintf (stderr, "done.\n");

    return (0);
    }


#ifdef UNDEF

int
partial(int tbl, int s)
{

    char fname[80];

    rowcnt = tdefs[tbl].base * scale;
    if (rowcnt % children)
        {
        fprintf(stderr, "'-C' cannot split load equally\n");
        exit(-1);
        }
    else
        rowcnt /= children;
    /*if (verbose) */
        {
        fprintf(stderr, "Starting to load stage %d of %d of
%s...",
            s + 1, children, tdefs[tbl].comment);
        }
    minrow = rowcnt * s + 1;
    if (direct == 0)
        set_files(tbl, s);

    return(0);
}

#endif

#ifdef NEVER
```

```
int
pload(int tbl)
{
    rowcnt = tdefs[tbl].base * scale;
    if (rowcnt % children)
        {
        fprintf(stderr, "'-C' cannot split load equally\n");
        exit(-1);
        }
    else
        rowcnt /= children;
    /* not used by the INMOD */
    return(0);
}
#endif /* !DOS */
#endif

int stream;
/* Because we aren't a main() program, we cant use getopt or
options
   on the command line... So, we replace process_options with the
   ability to get some of this information from files on disk */
int
process_options(void)
{
    FILE * fptr;
    char    sclfile[] = "inmod.info";

    if ( !(fptr=fopen(sclfile, "r")) ) {
        fprintf(stderr, "open failed -- %s\n", sclfile);
      fprintf(stderr, "You MUST create this file, and specify the
scale factor\n");
      exit(1);
        //return(FILERR);
    }
   children = 1;
   step = -1;
    fscanf(fptr, "%lf %d %d\n", &flt_scale, &children, &step);
    fclose(fptr);

           if (flt_scale < 1.0)
            {
            int i;

            scale = 1;
            for (i=PART; i <= LINE; i++)
                {
                tdefs[i].base = (long)(tdefs[i].base *
flt_scale);
                if (tdefs[i].base < 1)
                    tdefs[i].base = 1;
                }
            }
        else
            scale = (long)flt_scale;
        if (scale < 1)
            {
            fprintf(stderr,
            "WARNING: Scale set to its lower bound (1)\n");
            scale = 1;
            }

    if (children > 999 && step < 0)             /* limitation of
current seed file names */
                {
                fprintf (stderr, "Child process counts of > 999
not supported.\n");
                exit (1);
                }
         if (children > 1 && step >= 0)
                pids = malloc (children * sizeof (pid_t));

    fprintf(stderr,"\n     SCALE = %f\n", flt_scale);

    if (children <= 1)
      children = 1;

    fprintf(stderr,"    children (total streams) = %d\n",
children);
  if (children == 1)
      step = -1;

  fprintf(stderr,"      Step = %d\n", step);
  if (step >= 0)
         step--;


  return(0);
}


/* The next routine is an extract of some, but not all, of the
   code from DBGEN's driver.c main() routine.  Because we are
going
```

```
   to be a subroutine, we aren't going to have a main(), but we
   still need to run some of this initialization code */


int
main_stuff()
{
    int i;

 /*   table = (1 << CUST) |
            (1 << SUPP) |
            (1 << NATION) |
            (1 << REGION) |
            (1 << PART_PSUPP) |
            (1 << ORDER_LINE);      */
   /* This tells us what table to generate.  Inmods can only do
one at a time.*/
   table = (1 << TABLE);

    force = 0;
    verbose = 1;
    columnar = 0;
    header = 0;
    direct = 1;
    scale = 1;
    flt_scale = 1.0;
    updates = 0;
    refresh = UPD_PCT;
    resume = -1;
    step = -1;

   /* Because we might need to reinitialize, let's set these here
*/
   tdefs[PART].base = 200000;
   tdefs[PSUPP].base = 200000;
   tdefs[SUPP].base = 10000;
   tdefs[CUST].base = 150000;
   tdefs[ORDER].base = 150000;
   tdefs[LINE].base = 150000;
   tdefs[ORDER_LINE].base = 150000;
   tdefs[PART_PSUPP].base = 200000;


    tdefs[ORDER].base *=
        ORDERS_PER_CUST; /* have to do this after init */
    tdefs[LINE].base *=
        ORDERS_PER_CUST; /* have to do this after init */
    tdefs[ORDER_LINE].base *=
        ORDERS_PER_CUST; /* have to do this after init */
    fnames = 0;
    db_name = NULL;
    gen_sql = 0;
    gen_rng = 0;
    children = 1;
   minrow = 1;

    load_dists();
    i= process_options();
    if (i!=0)
      {
      fprintf(stderr, "Warning, initialization failed to work
right %d\n", i);
       /*return(i);*/
      }

    fprintf(stderr,
        "TPC %s Population Generator (Version %d.%d.%d%c)\n",
            NAME, VERSION,RELEASE, MODIFICATION,PATCH);
    fprintf(stderr, "Copyright %s %s\n", TPC, C_DATES);


    /* have to do this after init */
    tdefs[NATION].base = nations.count;
    tdefs[REGION].base = regions.count;
   o.lines = 0;

/**
 ** actual data generation section starts here
 **/
/*
 * open database connection or set all the file names, as
appropriate
 */
    if (direct)
        prep_direct((db_name)?db_name:DBNAME);
    else
        if (fnames)
            for (i=PART; i <= REGION; i++)
                {
                if (table & (1 << i))
                    if (set_files(i, -1))
                        {
                        fprintf(stderr, "Load aborted!\n");
                        exit(1);
```

```
                    }
                }
/* So, now we are initialized, and ready to being the
   actual loading... At this point, we exit, since we
   are a subroutine which will get called once per row
   that needs to get generated */

    return (0);
}



/* Ok, that's it for source code taken from DBGEN's driver.c.
   After this point in the file, everything is Teradata specific
   code that is basic INMOD structure.  We don't do anything
   involving row generation after this point.  */



/*************************************************************
*
*   MakeRecord - Generate a record
*
*      Once a row has been successfully built and saved to a row
*      buffer, the row buffer is then copied to the main buffer
*      and returnd to Fastload.
*
*************************************************************/
int
MakeRecord()
{

   p1 = inmodptr->Body;
   reccnt++;   /* This counts which row we are generating */

    if (TABLE >= ORDER && TABLE <= ORDER_LINE && scale >
MAX_32B_SCALE)
        gen_h_tbl(TABLE, scale, children, step, upd_num);
       else
        gen_tbl(TABLE, minrow, rowcnt, upd_num);

   /* end */


#ifdef PFAST
   inmodptr->Length = (Int16)(p1-(char *)inmodptr);
#else
      inmodptr->Length = p1-inmodptr->Body;
#endif

      if ((reccnt % 100000 == 0 )&&(inmodptr->Length>0)) {
          fprintf(stderr, " *** INMOD sent %ld to fastload\n",
reccnt);
      }

#ifndef PFAST
      inmodptr->ReturnCode = 0;
   if (inmodptr->Length==0)
#else
      if (inmodptr->Length<=2)
#endif
      {
     if (inmodptr->Length<0 || inmodptr->Length > 32760)
        fprintf(stderr," !!! Bug!, inmodptr->Length =
%d\n",inmodptr->Length);

#ifdef PFAST
     if (inmodptr->Length >= MAXRECLEN)
      fprintf(stderr," !!! Bug!, inmodptr->Length =
%d\n",inmodptr->Length);
#endif
     inmodptr->Length = 0;
      reccnt--;
      fprintf(stderr," *** INMOD reached End of file\n");
      fprintf(stderr, " *** INMOD sent %d records to
fastload\n",reccnt);
     timeEnd = time(NULL);
      strftime(date, 35, "%a %b %d %H:%M:%S %Z %Y",
localtime(&timeEnd));
      fprintf(stderr," Finish making records: %s\n", date);


#ifndef WIN32
          if (times(&endtime) == -1) {
             fprintf(stderr,"times() fails\n");
#else
        if
(!GetProcessTimes(GetCurrentProcess(),&ProcCreated,&ProcExited,&E
ndKernelTime,&EndUserTime)) {
                fprintf(stderr,"GetProcessTimes() fails\n");

#endif
             //exit(1);
          } else {
```

```
#ifndef WIN32
              usrtime = endtime.tms_utime - starttime.tms_utime;
              systime = endtime.tms_stime - starttime.tms_stime;
           fprintf(stderr,"user time = %10.2lf secs, system time
= %10.2lf secs\n",
                     ((double) usrtime / CLK_TCK), ((double)
systime / CLK_TCK));
              fprintf(stderr,"time per request = %10.10lf secs
\n",
                        ( ( (double) (usrtime + systime) /
reccnt) / CLK_TCK ));
#else
           /* Times are in 100 nanosecond units! */
            usrtime = (*(LONGLONG*)&EndUserTime -
*(LONGLONG*)&StartUserTime)/10000000.0;
           systime = (*(LONGLONG*)&EndKernelTime -
*(LONGLONG*)&StartKernelTime)/10000000.0;
           fprintf(stderr,"user time = %10.2f secs, system time =
%10.2lf secs\n",
                     ( usrtime ), ( systime ));
              fprintf(stderr,"time per request = %10.6lf
microsecs \n",
                        ( ( (usrtime + systime)*1000000.0 /
reccnt) ));
#endif

          }
     fprintf(stderr,"Clock time per request = %10.6lf millisecs
\n",difftime(timeEnd,timeStart)*1000.0/ reccnt);

#ifndef PFAST
      inmodptr->ReturnCode = FILEOF;
#endif
      return(FILEOF);
      }

   return(EM_OK);
}


Int32 OpenSource()
{
   int rc;

#ifdef PFAST
   if(getenv("HOSTNUMB") == NULL) {
      fprintf(stderr, "can not file HOSTNUMB var");
      return(FILEOF);
      }
    sprintf(checkpointfile, "./checkpoint.%ld",
atoi(getenv("HOSTNUMB")) );
    f2 = fopen(checkpointfile,"wb");
#else
    f2 = fopen("./checkpoint.dat","wb");
#endif

    if (f2==0)
        {
            fprintf(stderr,"Can't open the checkpoint file\n");
#ifndef PFAST
            inmodptr->ReturnCode = FILEOF;
#endif
            return(FILEOF);
        }

    reccnt = 0L;
   lineitem_in_order = 99999;   /* State tracking */
   supplier_in_part = 99999;
   nextrec = 0;

    fwrite(&reccnt,4,1,f2); /* mark that we are at the start */
    fclose(f2);
   f2 = NULL;

    rc = main_stuff();    /* Initialize everything */
   if (rc!=0)
      fprintf(stderr,"Main routine initialization failure\n");

   if (children > 1 && TABLE <= LINE)
   {
      fprintf(stderr," Generating partial data for partitioned
load\n");
        if (step >= 0)
            partial(TABLE, step);
      else
         {
            fprintf(stderr," Don't know which step I'm supposed
to load\n");
            exit(1);
         }
   }
   else
   {
   if (TABLE < LINE)
```

```
         rowcnt = tdefs[TABLE].base * scale;
    else
         rowcnt = tdefs[TABLE].base;
   }

    if (verbose)
         fprintf(stderr, "Generating data for %s [pid: %d] \n",
                                      tdefs[TABLE].comment,
DSS_PROC );


      timeEnd = timeStart = time(NULL);
      strftime(date, 35, "%a %b %d %H:%M:%S %Z %Y",
localtime(&timeEnd));
#ifndef WIN32
        if (times(&starttime) == -1) {
                fprintf(stderr,"times() fails\n");
               // exit(1);
        }
#else
       if
(!GetProcessTimes(GetCurrentProcess(),&ProcCreated,&ProcExited,&S
tartKernelTime,&StartUserTime)) {
                fprintf(stderr,"GetProcessTimes() fails\n");
                //exit(1);
        }
#endif


        fprintf(stderr,"\n  Start making records: %s\n", date);

   return(0);

}


/*************************************************************
 * HostRestart - Host restarted, rest and start sending data
 *               from the begining.

*************************************************************/
Int32 HostRestart()
{
    int oldchkpnt;

#ifdef PFAST
     /* Notice how I use DummyBuf!  For restart calls the user
doesn't  */
     /* pass a big buffer for me to fill, I gotta use one on the
stack. */
     /* If I don't then GetReco() is gonna die like a stuck pig!
*/

      inmodptr = (struct inmod_struct *) DummyBuf;

   if(getenv("HOSTNUMB") == NULL) {
      fprintf(stderr, "can not file HOSTNUMB var");
      return(FILEOF);
      }
    sprintf(checkpointfile, "./checkpoint.%ld",
atoi(getenv("HOSTNUMB")) );
    f2 = fopen(checkpointfile,"rb");
#else
    f2 = fopen("./checkpoint.dat","rb");
#endif



                if (f2==0)
                   {
                       fprintf(stderr,"Can't open the checkpoint
file\n");
#ifndef PFAST
                       inmodptr->ReturnCode = FILEOF;
#endif
                       return(FILEOF);
                   }
                fread(&oldchkpnt,4,1,f2); /* mark that we are at
the start */
                fclose(f2);
             f2 = NULL;

    chkpnt = oldchkpnt;

    result = OpenSource();
    if (result!=EM_OK)
        return(result);

    reccnt = 0;
   lineitem_in_order = 99999;   /* State tracking */
   supplier_in_part = 99999;
   nextrec = 0;
```

```
    while(reccnt < oldchkpnt)
        {
            result = MakeRecord();
            if (result!=EM_OK)
                return(result);
        }

    return(EM_OK);
}

/*****************************************************************
 * CheckPoint - Save checkpoint

*****************************************************************/
Int32 CheckPoint()
{
    chkpnt = reccnt;

#ifdef PFAST
    f2 = fopen(checkpointfile,"wb");
#else
    f2 = fopen("./checkpoint.dat","wb");
#endif



                if (f2==0)
                   {
                       fprintf(stderr,"Can't open the checkpoint
file\n");
#ifndef PFAST
                       inmodptr->ReturnCode = FILEOF;
#endif
                       return(FILEOF);
                   }
                fwrite(&chkpnt,4,1,f2); /* mark that we are at
the start */
                fclose(f2);
             f2 = NULL;
    return(EM_OK);
}

/*****************************************************************
 * DBCRestart - DBC restarted, do what you have to do.

*****************************************************************/
Int32 DBCRestart()
{
int oldchkpnt;

#ifdef PFAST
     /* Notice how I use DummyBuf!  For restart calls the user
doesn't  */
     /* pass a big buffer for me to fill, I gotta use one on the
stack. */
     /* If I don't then GetReco() is gonna die like a stuck pig!
*/

     inmodptr = (struct inmod_struct *) DummyBuf;
    f2 = fopen(checkpointfile,"rb");
#else
    f2 = fopen("./checkpoint.dat","rb");
#endif



                if (f2==0)
                   {
                       fprintf(stderr,"Can't open the checkpoint
file\n");
#ifndef PFAST
                       inmodptr->ReturnCode = FILEOF;
#endif
                       return(FILEOF);
                   }
                fread(&oldchkpnt,4,1,f2); /* mark that we are at
the start */
                fclose(f2);
             f2 = NULL;


    if (oldchkpnt!=chkpnt)
        {
            fprintf(stderr," **** Something is wrong trying to
restart at checkpoint\n");
        }

    result = OpenSource();
    if (result!=EM_OK)
        return(result);
    reccnt = 0;
    while(reccnt < oldchkpnt)
        {
```

```
            result = MakeRecord();
            if (result!=EM_OK)
                return(result);
        }


    return(EM_OK);
}

/*****************************************************************
 * CleanUp - Do cleanup.

*****************************************************************/
Int32 CleanUp()
{
   if (verbose)
        fprintf(stderr, "done.\n");


    if (direct)
        close_direct();
   if (f2)
      fclose(f2);
    fprintf(stderr," *** INMOD Done\n");
    return(EM_OK);
}

/*****************************************************************
 * InvalidCode - Invalid inmod code returned.

*****************************************************************/
Int32 InvalidCode()
{
    fprintf(stderr, "*** Invalid Inmod code\n");
    return(EM_OK);
}


/*****************************************************************
*
*   BLKEXIT - Start processing
*
*      This is the main module which contains the checks for
*      number of records generated and buffer filling.  This
*      module also sends the filled buffer to the DBC.
*
*****************************************************************/
#ifdef PFAST
Int32 BLKEXIT(int Function, char * tblptr, Int32 BufLen)
#else
Int32 BLKEXIT(char * tblptr)
#endif
{

   Int32 result;

   inmodptr = (struct inmod_struct *)tblptr;

#ifdef PFAST
   switch (Function) {
#else
    switch (inmodptr->ReturnCode) {
#endif

        case 0:  result=OpenSource();
                 if (EM_OK==result)
                    fprintf(stderr," *** INMOD starting....\n");
                 else
                    break;



        case 1:
#ifdef PFAST
             if (BufLen < MAXRECLEN + 2)
                    return(EOBUF);             /* not enough room
in buffer */
#endif
               result = MakeRecord();
                  break;
        case 2:
                  result = HostRestart();
                    break;
        case 3:  result = CheckPoint();
                    break;
        case 4:  result = DBCRestart();
                    break;
        case 5:  result = CleanUp();
                    break;
        default: result = InvalidCode();
    }

    return(result);
}
```

tdinload.c

```
/*************************************************************
*
 *  Title:      load_stub.c
 *  Sccsid:     @(#)tdinload.c    2.1.2.2
 *  Description:
 *              stub routines for:
 *          inline load of dss benchmark
 *          header creation for dss benchmark
 *

*************************************************************
 */

#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#include <errno.h>

#ifdef WIN32
#define INLINE _inline
#else
#define INLINE _Inline
#include <unistd.h>
#endif
#include "config.h"
#include "dss.h"
#include "dsstypes.h"

/* Start of Teradata specific code... These are the routines from
   load_stub.c, which are intended to be customized.  */




/*char buffer[32760]; */
extern char *p1;
char * p1;


extern long reccnt;                     /* Record generated by
inmod */
extern long lineitem_in_order;    /* State tracking */
extern long supplier_in_part;
extern long nextrec;



/* First, some helper routines to copy data into the parcel we
are building */
INLINE
void DR_Strt()
{
/*     p1 = buffer + 2;*/   /* Skip 2 for the length field */
       if (p1==NULL)
              fprintf(stderr," Error: tdinload.c called when p1
is null");
}
INLINE
void DR_End(int t)
{
       if(t);
}

INLINE
void DR_Int(long x)
{
       memcpy(p1,&x,4);
       p1 += 4;
}

/* Used only for orderkey, which gets > 32 bits at times */
INLINE
static void DR_Huge(DSS_HUGE * data)
{
/*
 * below 300G, 32 bits will hold all orderkeys. If the platform
support 64b,
 * then trust the compiler's cast to allow storage of just 32b.
If the platform
 * doesn't support 64 bit data types, then they are implemented
as a pair of
```

```
 * longs, with the LSBs in the first long, so the pointer
reference is still
 * ok.
 *
 * above 300G, 64 bit platforms are still fine. 32 bit platforms
have to work
 * harder. I have not tested this code, but am told that the 32
bit support
 * worked. (jms, 981124)
 */
       long value;

       if (scale < 300)
              {
              value = (long)*data; /* below 300G 32b is
sufficient */
              memcpy(p1,&value,4);
              p1+=4;
              }
       else
#ifdef SUPPORT_64BITS
              {
              memcpy(p1,data,8);
              p1+=8;
              }
#else
       {
       double tempx;
       unsigned long templ;
       long temph;
       if (*(data+1) ==0)
              {
                     memcpy(p1,*data,4);
                     p1 += 4;
                     memcpy(p1,*(data+1),4);
                     p1 += 4;
              }
       else
              {
                     /* Sigh, don't have an Int64 type, so need
to use double and convert to 2 longs */
                     tempx = *(data+1)*10000000.0+*data;
                     temph = (long)(tempx/4294967296.0);
                     templ = (unsigned long)(tempx-
temph*4294967296.0);
                     memcpy(p1,&templ,4);
                     p1 += 4;
                     memcpy(p1,&temph,4);
                     p1 += 4;

              }
       }
#endif
}

INLINE
void DR_VStr(char * x)
{
       short len;
       len=(short)strlen(x);
       memcpy(p1,&len,2);
       p1 += 2;
       memcpy(p1,x,len);
       p1 += len;
}
INLINE
void DR_Str(char * x,size_t y)
{
       memset(p1,' ',y);
       memcpy(p1,x,strlen(x));
       p1+=y;
}
INLINE
void DR_Money(long x)
{
       long temp=0;

       if (x<0)
              temp = -1;
       /*sprintf(p1, "%13.2f", x * 0.01);
       p1+=13;  */
       memcpy(p1,&x,4);
       p1 += 4;
       memcpy(p1,&temp,4);
       p1 += 4;

}
INLINE
void DR_Char(char x)
{
       *p1 = x; p1++;
}
INLINE
void DR_Date(char * x)
```

```
{
       long tempdate;
       int y,m,d;
       /*memset(p1,' ',10);
       memcpy(p1,x,strlen(x));
       p1+=10;*/
       y=atoi(x);
       m=atoi(x+5);
       d=atoi(x+8);
/*     if (y<1800 || y>2200 || m<1 || m>12 || d<1 || d>31)
              {
              fprintf(stderr," Help! I can't interpret the date
%s\n",x);
              exit(1);
              } */
       tempdate=(y-1900)*10000+m*100+d;
       memcpy(p1,&tempdate,4);
       p1 += 4;

}

/*now the routines from load_stub.c */

int
close_direct(void)
{
       fprintf(stderr," **** Done with direct loading ****\n");
    return(0);
}

int
prep_direct(char * dbnamestr)
{

    /* any preload prep goes here */
       if(dbnamestr);
    return(0);
}

int
hd_cust (FILE *f)
{
    static int count = 0;
       if (f);

    if (! count++)
        fprintf(stderr,"No header has been defined for the
customer table\n");

    return(0);
}

/*
CREATE TABLE TPCD.CUSTOMER ( C_CUSTKEY     INTEGER NOT NULL,
                             C_NAME        VARCHAR(25) NOT NULL,
                             C_ADDRESS     VARCHAR(40) NOT NULL,
                             C_NATIONKEY   INTEGER NOT NULL,
                             C_PHONE       CHAR(15) NOT NULL,
                             C_ACCTBAL     DECIMAL(15,2)   NOT
NULL,
                             C_MKTSEGMENT  CHAR(10) NOT NULL,
                             C_COMMENT     VARCHAR(117) NOT
NULL);
*/

int
ld_cust (customer_t *cp, int mode)
{
       if(mode);
       DR_Strt();
       DR_Int(cp->custkey);
    DR_VStr(cp->name);
       DR_VStr(cp->address);
       DR_Int(cp->nation_code);
       DR_Str(cp->phone,PHONE_LEN);
       DR_Money(cp->acctbal);
       DR_Str(cp->mktsegment,10);
       DR_VStr(cp->comment);
       DR_End(CUST);
       return(0);
}


int
hd_part (FILE *f)
{
    static int count = 0;
       if(f);

    if (! count++)
        fprintf(stderr,"No header has been defined for the part
table\n");
```

```
    return(0);
}

/*
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 DECIMAL(15,2) NOT NULL,
                          P_COMMENT     VARCHAR(23) NOT NULL );
*/
int
ld_part (part_t *pp, int mode)
{

       if(mode);
       DR_Strt();
       DR_Int(pp->partkey);
       DR_VStr(pp->name);
       DR_Str(pp->mfgr,P_MFG_LEN);
       DR_Str(pp->brand,P_BRND_LEN);
       DR_VStr(pp->type);
       DR_Int(pp->size);
       DR_Str(pp->container,P_CNTR_LEN);
       DR_Money(pp->retailprice);
       DR_VStr(pp->comment);
       DR_End(PART);
       return(0);

}

/*
CREATE TABLE TPCD.PARTSUPP ( PS_PARTKEY     INTEGER NOT NULL,
                             PS_SUPPKEY     INTEGER NOT NULL,
                             PS_AVAILQTY    INTEGER NOT NULL,
                             PS_SUPPLYCOST  DECIMAL(15,2)  NOT
NULL,
                             PS_COMMENT     VARCHAR(199) NOT NULL
);
*/

int
ld_psupp (part_t *pp, int mode)
{
       int i;
       if(mode);
       i = supplier_in_part;
       /*for (i = 0; i < SUPP_PER_PART; i++)    */
      {
              DR_Strt();
              DR_Int(pp->s[i].partkey);
              DR_Int(pp->s[i].suppkey);
              DR_Int(pp->s[i].qty);
              DR_Money(pp->s[i].scost);
              DR_VStr(pp->s[i].comment);
              DR_End(PSUPP);
       }
       return(0);

}

int
hd_time (FILE *f)
{
    static int count = 0;
       if(f);

    if (! count++)
        fprintf(stderr,"No header has been defined for the time
table\n");

    return(0);
}


int
hd_supp (FILE *f)
{
    static int count = 0;
       if(f);

    if (! count++)
        fprintf(stderr,"No header has been defined for the
supplier table\n");

    return(0);
}

/*
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     DECIMAL(15,2) NOT
NULL,
                        S_COMMENT     VARCHAR(101) NOT
NULL);
*/

int
ld_supp (supplier_t *sp, int mode)
{
       if(mode);
       DR_Strt();
       DR_Int(sp->suppkey);
    DR_Str(sp->name,25);
       DR_VStr(sp->address);
       DR_Int(sp->nation_code);
       DR_Str(sp->phone,15);
       DR_Money(sp->acctbal);
       DR_VStr(sp->comment);
       DR_End(SUPP);
    return(0);
}


int
hd_order (FILE *f)
{
    static int count = 0;
       if(f);

    if (! count++)
        fprintf(stderr,"No header has been defined for the order
table\n");

    return(0);
}

/*
CREATE TABLE TPCD.ORDER  ( O_ORDERKEY       INTEGER NOT NULL,
                           O_CUSTKEY        INTEGER NOT NULL,
                           O_ORDERSTATUS    CHAR(1) NOT NULL,
                           O_TOTALPRICE     DECIMAL(15,2) NOT
NULL,
                           O_ORDERDATE      DATE NOT NULL,
                           O_ORDERPRIORITY  CHAR(15) NOT NULL,  -
- R
                           O_CLERK          CHAR(15) NOT NULL,  -
- R
                           O_SHIPPRIORITY   INTEGER NOT NULL,
                           O_COMMENT        VARCHAR(79) NOT
NULL);
*/

int
ld_order (order_t *p, int mode)
{
       if(mode);
       DR_Strt();

       DR_Huge(p->okey);

       DR_Int(p->custkey);
       DR_Char(p->orderstatus);
       DR_Money(p->totalprice);
       DR_Date(p->odate);
       DR_Str(p->opriority,O_OPRIO_LEN);
       DR_Str(p->clerk,O_CLRK_LEN);
       DR_Int(p->spriority);
       DR_VStr(p->comment);
       DR_End(ORDER);
    return(0);
}

/*
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    DECIMAL(15,2) NOT
NULL,
                             L_EXTENDEDPRICE  DECIMAL(15,2) NOT
NULL,
                             L_DISCOUNT    DECIMAL(15,2) NOT
NULL,
                             L_TAX         DECIMAL(15,2) 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,  -
- R
                            L_SHIPMODE     CHAR(10) NOT NULL,  -
- R
                            L_COMMENT      VARCHAR(44) NOT
NULL);
*/
ld_line (order_t *p, int mode)
{
       int i;
    if(mode);
       i = lineitem_in_order;
       /*for (i = 0; i < p->lines; i++)  */
        {
       DR_Strt();
       DR_Huge(p->l[i].okey);

       DR_Int(p->l[i].partkey);
       DR_Int(p->l[i].suppkey);
       DR_Int(p->l[i].lcnt);
       DR_Int(p->l[i].quantity);
       DR_Money(p->l[i].eprice);
       DR_Money(p->l[i].discount);
       DR_Money(p->l[i].tax);
       DR_Char(p->l[i].rflag[0]);
       DR_Char(p->l[i].lstatus[0]);
       DR_Date(p->l[i].sdate);
       DR_Date(p->l[i].cdate);
       DR_Date(p->l[i].rdate);
       DR_Str(p->l[i].shipinstruct, L_INST_LEN);
       DR_Str(p->l[i].shipmode, L_SMODE_LEN);
       DR_VStr(p->l[i].comment);
       DR_End(LINE);
       }
    return(0);
}



int
hd_psupp (FILE *f)
{
    static int count = 0;
       if(f);

    if (! count++)
        fprintf(stderr,"%s %s\n",
                "No header has been defined for the",
                "part supplier table");

    return(0);
}


int
hd_line (FILE *f)
{
    static int count = 0;
       if(f);

    if (! count++)
        fprintf(stderr,"No header has been defined for the
lineitem table\n");

    return(0);
}

int
hd_nation (FILE *f)
{
    static int count = 0;
       if(f);

    if (! count++)
        fprintf(stderr,"No header has been defined for the nation
table\n");

    return(0);
}

/*
CREATE TABLE TPCD.NATION  ( N_NATIONKEY  INTEGER NOT NULL,
                            N_NAME       CHAR(25) NOT NULL,
                            N_REGIONKEY  INTEGER NOT NULL,
                            N_COMMENT    VARCHAR(152));
*/

int
ld_nation (code_t *cp, int mode)
{
       if(mode);
       DR_Strt();
       DR_Int(cp->code);
    DR_Str(cp->text,NATION_LEN);
```

```
       DR_Int(cp->join);
       DR_VStr(cp->comment);
       DR_End(NATION);
       return(0);
}

int
hd_region (FILE *f)
{
    static int count = 0;
       if(f);

    if (! count++)
        fprintf(stderr,"No header has been defined for the region
table\n");

    return(0);
}

/*
CREATE TABLE TPCD.REGION  ( R_REGIONKEY  INTEGER NOT NULL,
                            R_NAME       CHAR(25) NOT NULL,
                            R_COMMENT    VARCHAR(152));
*/

int
ld_region (code_t *cp, int mode)
{
       if(mode);
       DR_Strt();
       DR_Int(cp->code);
    DR_Str(cp->text,REGION_LEN);
/*     DR_Int(cp->join);  *** ac4 */
       DR_VStr(cp->comment);
       DR_End(REGION);

    return(0);
}

int
ld_order_line (order_t *p, int mode)
{

    ld_order(p, mode);
    ld_line (p, mode);

    return(0);
}

int
hd_order_line (FILE *f)
{

    hd_order(f);
    hd_line (f);

    return(0);
}

int
ld_part_psupp (part_t *p, int mode)
{
    ld_part(p, mode);
    ld_psupp (p, mode);

    return(0);
}

int
hd_part_psupp (FILE *f)
{
    hd_part(f);
    hd_psupp(f);

    return(0);
}
```

E.2 Source Code for Pipeline-to-FastLoad Approach

In this approach to loading, DBGEN is basically unmodified from the standard TPC distribution. All that has been done is to replace the load_stub.c file with one specific for Teradata.

tdatload.c

```
/*************************************************************
*
 *  Title:      load_stub.c
 *  Sccsid:     @(#)tdatload.c    2.1.2.2
 *  Description:
 *              stub routines for:
 *          inline load of dss benchmark
 *          header creation for dss benchmark
 *

*************************************************************
 */

#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#include <errno.h>

#ifdef WIN32
#include <process.h>
#define WIN32_LEAN_AND_MEAN
#define NOATOM
#define NOGDICAPMASKS
#define NOMETAFILE
#define NOMINMAX
#define NOMSG
#define NOOPENFILE
#define NORASTEROPS
#define NOSCROLL
#define NOSOUND
#define NOSYSMETRICS
#define NOTEXTMETRIC
#define NOWH
#define NOCOMM
#define NOKANJI
#define NOMCX
#define INLINE _inline
#pragma warning(disable:4201)
#pragma warning(disable:4214)
#pragma warning(disable:4514)
#include <windows.h>
#else
#define INLINE _Inline
#include <unistd.h>
#include <sys/wait.h>
#endif
#include "config.h"
#include "dss.h"
#include "dsstypes.h"

/* Start of Teradata specific code... These are the routines from
   load_stub.c, which are intended to be customized.  */
int prep_direct(char *);


#ifndef WIN32
FILE * pipefile[20];
#else
HANDLE pipehandle[20];
HANDLE processhandle[20];
#endif

char logonstr[256] = { 0 };
char pipename[120];
char fastname[120];
char buffer[32760];
/*extern*/
char * p1;
int reccnt = 0;
int loadinprogress = 0;
int fastloadsstarted = 0;

typedef struct COLUMN_T
       {
       int tbl;            /* table */
       char *name;         /* column name */
       char *dtype;  /* data type */
       char *ltype;  /* load type */
       char *format; /* format qualifier */
       char *other;  /* other qualifier */
       } column_t;

/*
 * one entry for each column in the schema. Note: orderkey is
purposefully left
 * out of order and lineitem since it changes with scale factor
 */
column_t columns[] =
{
{CUST,  "C_CUSTKEY",      "INTEGER","INTEGER","", ""},
{CUST,  "C_NAME",
"VARCHAR(25)","VARCHAR(25)","","CASESPECIFIC"},
{CUST,  "C_ADDRESS",
"VARCHAR(40)","VARCHAR(40)","","CASESPECIFIC"},
```

```
{CUST,  "C_NATIONKEY",    "INTEGER","INTEGER","",""},
#ifdef VC
{CUST,  "C_PHONE",
"VARCHAR(15)","CHAR(15)","","CASESPECIFIC"},
#else
{CUST,  "C_PHONE",
"CHAR(15)","CHAR(15)","","CASESPECIFIC"},
#endif
{CUST,  "C_ACCTBAL",      "DECIMAL(15,2)","DECIMAL(15,2)","",""},
#ifdef VC
{CUST,  "C_MKTSEGMENT",
"VARCHAR(10)","CHAR(10)","","CASESPECIFIC"},
#else
{CUST,  "C_MKTSEGMENT",
"CHAR(10)","CHAR(10)","","CASESPECIFIC"},
#endif
{CUST,  "C_COMMENT",
"VARCHAR(117)","VARCHAR(117)","","CASESPECIFIC"},
{LINE,  "L_PARTKEY",      "INTEGER","INTEGER","",""},
{LINE,  "L_SUPPKEY",      "INTEGER","INTEGER","",""},
{LINE,  "L_LINENUMBER",   "INTEGER","INTEGER","",""},
{LINE,  "L_QUANTITY",     "DECIMAL(15,2)","INTEGER","",""},
{LINE,  "L_EXTENDEDPRICE","DECIMAL(15,2)","DECIMAL(15,2)","",""},
{LINE,  "L_DISCOUNT",     "DECIMAL(15,2)","DECIMAL(15,2)","",""},
{LINE,  "L_TAX",          "DECIMAL(15,2)","DECIMAL(15,2)","",""},
#ifdef VC
{LINE,  "L_RETURNFLAG",
"VARCHAR(1)","CHAR(1)","","CASESPECIFIC"},
#else
{LINE,  "L_RETURNFLAG",   "CHAR(1)","CHAR(1)","","CASESPECIFIC"},
#endif
#ifdef VC
{LINE,  "L_LINESTATUS",
"VARCHAR(1)","CHAR(1)","","CASESPECIFIC"},
#else
{LINE,  "L_LINESTATUS",   "CHAR(1)","CHAR(1)","","CASESPECIFIC"},
#endif
{LINE,  "L_SHIPDATE",     "DATE","DATE","FORMAT 'yyyy-mm-
dd'","",""},
{LINE,  "L_COMMITDATE",   "DATE","DATE","FORMAT 'yyyy-mm-
dd'","",""},
{LINE,  "L_RECEIPTDATE",  "DATE","DATE","FORMAT 'yyyy-mm-
dd'","",""},
#ifdef VC
{LINE,  "L_SHIPINSTRUCT",
"VARCHAR(25)","CHAR(25)","","CASESPECIFIC"},
#else
{LINE,  "L_SHIPINSTRUCT",
"CHAR(25)","CHAR(25)","","CASESPECIFIC"},
#endif
#ifdef VC
{LINE,  "L_SHIPMODE",
"VARCHAR(10)","CHAR(10)","","CASESPECIFIC"},
#else
{LINE,  "L_SHIPMODE",
"CHAR(10)","CHAR(10)","","CASESPECIFIC"},
#endif
{LINE,  "L_COMMENT",
"VARCHAR(44)","VARCHAR(44)","","CASESPECIFIC"},
{NATION,"N_NATIONKEY",    "INTEGER","INTEGER","",""},
#ifdef VC
{NATION,"N_NAME",
"VARCHAR(25)","CHAR(25)","","CASESPECIFIC"},
#else
{NATION,"N_NAME",
"CHAR(25)","CHAR(25)","","CASESPECIFIC"},
#endif
{NATION,"N_REGIONKEY",    "INTEGER","INTEGER","",""},
{NATION,"N_COMMENT",
"VARCHAR(152)","VARCHAR(152)","","CASESPECIFIC"},
{ORDER, "O_CUSTKEY",      "INTEGER","INTEGER","",""},
#ifdef VC
{ORDER, "O_ORDERSTATUS",
"VARCHAR(1)","CHAR(1)","","CASESPECIFIC"},
#else
{ORDER, "O_ORDERSTATUS",  "CHAR(1)","CHAR(1)","","CASESPECIFIC"},
#endif
{ORDER, "O_TOTALPRICE",   "DECIMAL(15,2)","DECIMAL(15,2)","",""},
{ORDER, "O_ORDERDATE",    "DATE","DATE","FORMAT 'yyyy-mm-
dd'","",""},
#ifdef VC
{ORDER,
"O_ORDERPRIORITY","VARCHAR(15)","CHAR(15)","","CASESPECIFIC"},
#else
{ORDER,
"O_ORDERPRIORITY","CHAR(15)","CHAR(15)","","CASESPECIFIC"},
#endif
#ifdef VC
{ORDER, "O_CLERK",
"VARCHAR(15)","CHAR(15)","","CASESPECIFIC"},
#else
{ORDER, "O_CLERK",
"CHAR(15)","CHAR(15)","","CASESPECIFIC"},
#endif
```

```
{ORDER, "O_SHIPPRIORITY", "INTEGER","INTEGER","",""},
{ORDER, "O_COMMENT",
"VARCHAR(79)","VARCHAR(79)","","CASESPECIFIC"},
{PART,  "P_PARTKEY",      "INTEGER","INTEGER","",""},
{PART,  "P_NAME",
"VARCHAR(55)","VARCHAR(55)","","CASESPECIFIC"},
#ifdef VC
{PART,  "P_MFGR",
"VARCHAR(25)","CHAR(25)","","CASESPECIFIC"},
#else
{PART,  "P_MFGR",
"CHAR(25)","CHAR(25)","","CASESPECIFIC"},
#endif
#ifdef VC
{PART,  "P_BRAND",
"VARCHAR(10)","CHAR(10)","","CASESPECIFIC"},
#else
{PART,  "P_BRAND",
"CHAR(10)","CHAR(10)","","CASESPECIFIC"},
#endif
{PART,  "P_TYPE",
"VARCHAR(25)","VARCHAR(25)","","CASESPECIFIC"},
{PART,  "P_SIZE",         "INTEGER","INTEGER","",""},
#ifdef VC
{PART,  "P_CONTAINER",
"VARCHAR(10)","CHAR(10)","","CASESPECIFIC"},
#else
{PART,  "P_CONTAINER",
"CHAR(10)","CHAR(10)","","CASESPECIFIC"},
#endif
{PART,  "P_RETAILPRICE",  "DECIMAL(15,2)","DECIMAL(15,2)","",""},
{PART,  "P_COMMENT",
"VARCHAR(23)","VARCHAR(23)","","CASESPECIFIC"},
{PSUPP, "PS_PARTKEY",     "INTEGER","INTEGER","",""},
{PSUPP, "PS_SUPPKEY",     "INTEGER","INTEGER","",""},
{PSUPP, "PS_AVAILQTY",    "INTEGER","INTEGER","",""},
{PSUPP, "PS_SUPPLYCOST",  "DECIMAL(15,2)","DECIMAL(15,2)","",""},
{PSUPP, "PS_COMMENT",
"VARCHAR(199)","VARCHAR(199)","","CASESPECIFIC"},
{REGION,"R_REGIONKEY",    "INTEGER","INTEGER","",""},
#ifdef VC
{REGION,"R_NAME",
"VARCHAR(25)","CHAR(25)","","CASESPECIFIC"},
#else
{REGION,"R_NAME",
"CHAR(25)","CHAR(25)","","CASESPECIFIC"},
#endif
{REGION,"R_COMMENT",
"VARCHAR(152)","VARCHAR(152)","","CASESPECIFIC"},
{SUPP,  "S_SUPPKEY",      "INTEGER","INTEGER","",""},
#ifdef VC
{SUPP,  "S_NAME",
"VARCHAR(25)","CHAR(25)","","CASESPECIFIC"},
#else
{SUPP,  "S_NAME",
"CHAR(25)","CHAR(25)","","CASESPECIFIC"},
#endif
{SUPP,  "S_ADDRESS",
"VARCHAR(40)","VARCHAR(40)","","CASESPECIFIC"},
{SUPP,  "S_NATIONKEY",    "INTEGER","INTEGER","",""},
#ifdef VC
{SUPP,  "S_PHONE",
"VARCHAR(15)","CHAR(15)","","CASESPECIFIC"},
#else
{SUPP,  "S_PHONE",
"CHAR(15)","CHAR(15)","","CASESPECIFIC"},
#endif
{SUPP,  "S_ACCTBAL",      "DECIMAL(15,2)","DECIMAL(15,2)","",""},
{SUPP,  "S_COMMENT",
"VARCHAR(101)","VARCHAR(101)","","CASESPECIFIC"},
{-1,"","","",""}
};

int
gen_schema(FILE *fp, int t, int flags)
{
        int i,
                colcount;

        colcount = 0;
        for (i=0; columns[i].tbl >= 0; i++)
                if (columns[i].tbl == t)
                        {
                        if (t == ORDER || t == LINE)
                                colcount = 1;
                        if (colcount)
                                fprintf(fp, ",");
                        switch(flags)
                        {
                        case 0:
                                fprintf(fp, "%s\n", columns[i].name);
                                break;
                        case 1:
                                fprintf(fp, "F_%s\t(%s)\n",
```

```
                                columns[i].name,
                                columns[i].ltype);
                        break;
                case 2:
                        fprintf(fp, ":F_%s\n",
columns[i].name);
                        break;
                case 3:
                        fprintf(fp, "%s\t%s\t%s NOT NULL
%s\n",
                                columns[i].name,
                                columns[i].dtype,
                                columns[i].format,
                                columns[i].other);
                        break;
                }
                colcount++;
                }
        return(0);
}

void WriteFastloadJob(int t,int mode)
{

  FILE * fastjob;
  char tablename[60];

  tablename[0] ='\0';
  if (t==19)
  {
         strcpy(tablename,"KEYS_TO_DELETE");
  }
  else
  switch(t)   {
    case PART: strcpy(tablename,"PARTTBL"); break;
    case PSUPP:  strcpy(tablename,"PARTSUPP");  break;
    case  SUPP: strcpy(tablename,"SUPPLIER"); break;
       case  CUST: strcpy(tablename,"CUSTOMER"); break;
       case  ORDER: strcpy(tablename,"ORDERTBL");  break;
       case  LINE: strcpy(tablename,"LINEITEM");  break;
       case  NATION: strcpy(tablename,"NATION");  break;
       case  REGION: strcpy(tablename,"REGION");  break;
       case  ORDER_LINE:
       case  PART_PSUPP:
       case  NONE:
       default: fprintf(stderr," Illegal table to load\n");
              exit(1);
        }
if (mode>0 && t!=19)
        strcat(tablename,"_UPDATES");

if (logonstr[0] == '\0' && db_name[0] != '\0')
        prep_direct(db_name);

if (verbose)
        fprintf(stderr," Opening %s for write\n",fastname);
fastjob = fopen(fastname,"w");
if (fastjob==NULL)
        {
                fprintf(stderr," Cannot create the fastload input
job stream for %s\n",fastname);
                return;
        }
if (fprintf(fastjob,"\n")<=0)
        fprintf(stderr," Cannot write the fastload input job
stream\n");
fprintf(fastjob,"\n");
fprintf(fastjob,"SESSIONS 30;\n");
fprintf(fastjob,"LOGON %s;\n",logonstr);
fprintf(fastjob,"\n");
fprintf(fastjob,"DROP TABLE %s;\n",tablename);
fprintf(fastjob,"DROP TABLE ERR%s1;\n",tablename);
fprintf(fastjob,"DROP TABLE ERR%s2;\n",tablename);
fprintf(fastjob,"\n");
#ifdef WIN32
fprintf(fastjob,"CREATE TABLE %s\n",tablename);
#else
fprintf(fastjob,"CREATE MULTISET TABLE %s\n",tablename);
#endif
fprintf(fastjob,"  (\n");
switch(t) {
case 19:
        if (scale>300) /* uncommented by ac4 on 5-31-98  */
                fprintf(fastjob,"    ORDERKEY       DECIMAL(15,0)
NOT NULL\n");
        else  /* this line and following uncommented by ac4 on 5-
31-98 */
                fprintf(fastjob,"    ORDERKEY       INTEGER NOT
NULL\n");
        fprintf(fastjob,"  )\n");
        fprintf(fastjob,"UNIQUE PRIMARY INDEX( ORDERKEY );\n");
        break;
case CUST:
        gen_schema(fastjob, CUST, 3);
```

```
       fprintf(fastjob,"  )\n");
       fprintf(fastjob,"UNIQUE PRIMARY INDEX( C_CUSTKEY );\n");
       break;
case LINE:
       if (scale>300)  /* uncommented by ac4 on 5-31-98 */
              fprintf(fastjob,"    L_ORDERKEY       DECIMAL(15,0)
NOT NULL\n");
       else  /* this line and the following uncommented by ac4 on
5-31-98 */
              fprintf(fastjob,"    L_ORDERKEY       INTEGER NOT
NULL\n");
       gen_schema(fastjob, LINE, 3);
       fprintf(fastjob,"  )\n");
       fprintf(fastjob,";\n");
       break;
case NATION:
       gen_schema(fastjob, NATION, 3);
       fprintf(fastjob,"  )\n");
#ifdef TPCR
       fprintf(fastjob,"PRIMARY INDEX( N_NAME )\n");
#else
        fprintf(fastjob,"PRIMARY INDEX( N_NATIONKEY )\n");
#endif
       fprintf(fastjob,";\n");
       break;
case ORDER:
       if (scale>300)  /* uncommented by ac4 on 5-31-98 */
              fprintf(fastjob,"    O_ORDERKEY       DECIMAL(15,0)
NOT NULL\n");
       else  /* this line and the following uncommented by ac4 on
5-31-98 */
              fprintf(fastjob,"    O_ORDERKEY       INTEGER NOT
NULL\n");
       gen_schema(fastjob, ORDER, 3);
       fprintf(fastjob,"  )\n");
       fprintf(fastjob,"UNIQUE PRIMARY INDEX( O_ORDERKEY );\n");
       break;
case PART:
       gen_schema(fastjob, PART, 3);
       fprintf(fastjob,"  )\n");
       fprintf(fastjob,"UNIQUE PRIMARY INDEX( P_PARTKEY );\n");
       break;
case PSUPP:
       gen_schema(fastjob, PSUPP, 3);
       fprintf(fastjob,"  )\n");
       /* Default to non-unique primary index on PS_PARTKEY */
       fprintf(fastjob,";\n");
       break;
case REGION:
       gen_schema(fastjob, REGION, 3);
       fprintf(fastjob,"  )\n");
       fprintf(fastjob,"UNIQUE PRIMARY INDEX( R_REGIONKEY );\n");
       break;
case SUPP:
       gen_schema(fastjob, SUPP, 3);
       fprintf(fastjob,"  )\n");
       fprintf(fastjob,"UNIQUE PRIMARY INDEX( S_SUPPKEY );\n");
       break;
}

fprintf(fastjob,"\n");
fprintf(fastjob,"BEGIN LOADING %s\n",tablename);
fprintf(fastjob,"      ERRORFILES ERR%s1,
ERR%s2;\n",tablename,tablename);
fprintf(fastjob,"\n");
fprintf(fastjob,"DEFINE\n");
switch (t) {
case 19:
       if (scale>300) /* uncommented by ac4 5-31-98 */
              fprintf(fastjob,"    F_ORDERKEY
(DECIMAL(15,0))\n");
       else /* this line and the following uncommented by ac4 */
              fprintf(fastjob,"    F_ORDERKEY
(INTEGER)\n");
       break;
case LINE:
       if (scale>300)  /* uncommented by ac4 on 5-31-98 */
              fprintf(fastjob,"    F_L_ORDERKEY
(DECIMAL(15,0))\n");
       else /* this line and the following uncommented by ac4 on
5-31-98 */
              fprintf(fastjob,"    F_L_ORDERKEY
(INTEGER)\n");
       gen_schema(fastjob, LINE, 1);
       break;
case ORDER:
       if (scale>300)  /* this line uncommented by ac4 on 5-31-98
*/
              fprintf(fastjob,"    F_O_ORDERKEY
(DECIMAL(15,0))\n");
       else  /* this line and the following uncommented by ac4 on
5-31-98 */
              fprintf(fastjob,"    F_O_ORDERKEY
(INTEGER)\n");
```

```
       gen_schema(fastjob, ORDER, 1);
       break;
case CUST:
case NATION:
case PART:
case PSUPP:
case REGION:
case SUPP:
       gen_schema(fastjob, t, 1);
       break;
default:
       exit(-999);   /* bad table name */
       break;
}

fprintf(fastjob,"FILE=%s;\n",pipename);

fprintf(fastjob,"\n");
fprintf(fastjob,"SHOW;\n");
fprintf(fastjob,"\n");
fprintf(fastjob,"INSERT INTO %s\n",tablename);
fprintf(fastjob,"  (\n");
switch (t) {
case 19:
       fprintf(fastjob,"    ORDERKEY\n");
       fprintf(fastjob,"  )\n");
       fprintf(fastjob,"VALUES\n");
       fprintf(fastjob,"  (\n");
       fprintf(fastjob,"   :F_ORDERKEY\n");
       break;
case LINE:
       fprintf(fastjob,"    L_ORDERKEY\n");
       gen_schema(fastjob, LINE, 0);
       fprintf(fastjob,"  )\n");
       fprintf(fastjob,"VALUES\n");
       fprintf(fastjob,"  (\n");
       fprintf(fastjob,"    :F_L_ORDERKEY\n");
       gen_schema(fastjob, LINE, 2);
       break;
case ORDER:
       fprintf(fastjob,"    O_ORDERKEY\n");
       gen_schema(fastjob, ORDER, 0);
       fprintf(fastjob,"  )\n");
       fprintf(fastjob,"VALUES\n");
       fprintf(fastjob,"  (\n");
       fprintf(fastjob,"    :F_O_ORDERKEY\n");
       gen_schema(fastjob, ORDER, 2);
       break;
case NATION:
case CUST:
case PART:
case PSUPP:
case REGION:
case SUPP:
       gen_schema(fastjob, t, 0);
       fprintf(fastjob,"  )\n");
       fprintf(fastjob,"VALUES\n");
       fprintf(fastjob,"  (\n");
       gen_schema(fastjob, t, 2);
       break;
default:
       exit(-999);   /* bad table name */
       break;
}

fprintf(fastjob,"  );\n");
fprintf(fastjob,"\n");
fprintf(fastjob,"END LOADING;\n");
fprintf(fastjob,"\n");
fprintf(fastjob,"LOGOFF;\n");

fflush(fastjob);

if (fclose(fastjob)!=0)
       fprintf(stderr, " Error closing fastjob file\n");
if (verbose)
fprintf(stderr," Closed %s and ready for fastload to read
it\n",fastname);

}

int
end_load(void)
{
#ifndef WIN32
       char temp[200];
#endif
       if (loadinprogress==0) return(0);

       if (loadinprogress==PART_PSUPP)
              {
#ifdef WIN32
                     FlushFileBuffers(pipehandle[PART]);
                     //DisconnectNamedPipe(pipehandle[PART]);
```

```
                    CloseHandle(pipehandle[PART]);
                    FlushFileBuffers(pipehandle[PSUPP]);
                    //DisconnectNamedPipe(pipehandle[PSUPP]);
                    CloseHandle(pipehandle[PSUPP]);

      WaitForSingleObject(processhandle[PSUPP],9999999);
#else
             fclose(pipefile[PART]);
                    fclose(pipefile[PSUPP]);
                    system("rm part.tbl.pipe");
                    system("rm partsupp.tbl.pipe");
#endif
                    fprintf(stderr," Sent all rows for part and
partsupp tables...\n");
             }
      else if (loadinprogress==ORDER_LINE)
             {
#ifdef WIN32
                    FlushFileBuffers(pipehandle[ORDER]);
                    //DisconnectNamedPipe(pipehandle[ORDER]);
                    CloseHandle(pipehandle[ORDER]);
                    FlushFileBuffers(pipehandle[LINE]);
                    //DisconnectNamedPipe(pipehandle[LINE]);
                    CloseHandle(pipehandle[LINE]);

      WaitForSingleObject(processhandle[LINE],9999999);
#else
             fclose(pipefile[ORDER]);
                    fclose(pipefile[LINE]);
                    system("rm order.tbl.pipe");
                    system("rm lineitem.tbl.pipe");
#endif
                    fprintf(stderr," Sent all rows for order and
lineitem tables...\n");
             }
      else
             {
#ifdef WIN32

      FlushFileBuffers(pipehandle[loadinprogress]);

      //DisconnectNamedPipe(pipehandle[loadinprogress]);
                    CloseHandle(pipehandle[loadinprogress]);

      WaitForSingleObject(processhandle[loadinprogress],9999999)
;
#else
             fclose(pipefile[loadinprogress]);
                    strcpy(temp,"rm ");
                    strcat(temp,pipename);
                    system(temp);
#endif
                    if (loadinprogress==19)
                    {
                           fprintf(stderr," Sent all keys for
deletes ...\n");
                           system("rm deletes.fastload");
                    }
                    else
                           fprintf(stderr," Sent all rows for %s
...\n",tdefs[loadinprogress].name);
             }
      if (verbose)
             fprintf(stderr, " Closed the pipe...\n");
      loadinprogress = 0;
   return(0);
}



int
start_load2(int t,int mode)
{
      int rc;

      char temp[120];

#ifdef WIN32
      STARTUPINFO startinfo;
      PROCESS_INFORMATION procinfo;
#else
      pid_t fpid;
#endif

      pipename[0] = '\0';
#ifdef WIN32
      strcpy(pipename,"\\\\.\\pipe\\");
#endif
      if (t==19)
      {
             strcat(pipename,"deletes.pipe");
             strcpy(fastname,"deletes.fastload");
      }
      else
```

```
	{
		strcat(pipename,tdefs[t].name);
		strcat(pipename,".pipe");

		strcpy(fastname,tdefs[t].name);
		strcat(fastname,".fastload");
	}


	WriteFastloadJob(t,mode);

#ifdef WIN32
if (verbose)
	fprintf(stderr," Creating the named pipe... \n");

pipehandle[t] = CreateNamedPipe(pipename,
	PIPE_ACCESS_DUPLEX,
	PIPE_TYPE_BYTE | PIPE_READMODE_BYTE | PIPE_WAIT,
	3,
	32000,
	32000,
	1800000 /* 30 minutes */,NULL);

if (pipehandle[t]==INVALID_HANDLE_VALUE)
	{
	rc = GetLastError();
	fprintf(stderr," CreateNamedPipe error was %d\n",rc);
	exit(rc);
	}

fprintf(stderr," Spawning a copy of fastload...\n");


startinfo.cb = sizeof(STARTUPINFO);
startinfo.lpReserved = NULL;
startinfo.lpDesktop = NULL;
startinfo.lpTitle = NULL;
startinfo.dwFlags =0;
startinfo.cbReserved2 =0;
startinfo.lpReserved2 =0;
startinfo.hStdInput = NULL;
startinfo.hStdOutput = NULL;
startinfo.hStdError = NULL;

//if (! CreateProcess(NULL,"cmd /K fastload < custinmod.txt >
test.out 2>&1",
//  NULL,NULL,FALSE,CREATE_NEW_CONSOLE | NORMAL_PRIORITY_CLASS,
//  NULL,NULL,&startinfo,&procinfo))
//     {
//     fprintf(stderr," Spawn of fastload failed,
rc=%d\n",GetLastError());
//     }

strcpy(temp,"cmd /K fastload.exe < ");
strcat(temp,fastname);
fprintf(stderr,"Running> %s\n",temp);

if (! CreateProcess(NULL,temp,
  NULL,NULL,FALSE, CREATE_NEW_CONSOLE|NORMAL_PRIORITY_CLASS,
  NULL,NULL,&startinfo,&procinfo))
	{
	rc = GetLastError();
	if (rc==ERROR_FILE_NOT_FOUND)
		fprintf(stderr," Spawn of fastload failed, file not
found\n");
	else
		fprintf(stderr," Spawn of fastload failed,
rc=%d\n",rc);
	}
processhandle[t] = procinfo.hProcess;


fprintf(stderr," Waiting for Fastload to connect to the pipe...
\n");
if (!ConnectNamedPipe(pipehandle[t],NULL))
	{
	rc = GetLastError();
	if (rc==ERROR_CALL_NOT_IMPLEMENTED)
		fprintf(stderr," Can't run this program on Win95
because server side pipes don't exist\n");
	else
		fprintf(stderr," ConnectNamedPipe Error was
%d\n",rc);
	exit(rc);
	}
fprintf(stderr," Pipe is connected... \n");

#else
	if (verbose)
		fprintf(stderr," Creating the named pipe\n");


	strcpy(temp,"mkfifo ");
	strcat(temp,pipename);
```

```
	if (verbose)
		fprintf(stderr,"%s\n",temp);
	rc= system(temp);
	if (rc!=0)
		{
			if (rc==-1)
				{
					fprintf(stderr," Error %d
trying to create the pipe\n",errno);
				}
			else
				{
					if (rc!=256)
					fprintf(stderr," Create pipe
returned %d\n",rc);
				}
		}

	if (verbose)
		fprintf(stderr," Spawning a copy of fastload for
%s...\n",fastname);
	if((fpid=fork())==0)
		{
			strcpy(temp,"/usr/bin/fastload < ");
			strcat(temp,fastname);
			strcat(temp," > ");
			strcat(temp,fastname);
			strcat(temp,".out 2>&1");
			if (verbose)
				fprintf(stderr,"/usr/bin/sh -c
%s\n",temp);
			execlp("/usr/bin/sh","/usr/bin/sh","-
c",temp,(char *)0);
			fprintf(stderr, "spawn of fastload faild,
%d\n",errno);
			fprintf(stderr, "You must start fastload
manually, using the following command:\n");
			fprintf(stderr, "%s\n",temp);
			exit(errno);
		}
	fastloadsstarted++;
	fprintf(stderr," Spawned a copy of fastload for %s, pid =
%d\n",fastname,fpid);

	if (verbose)
		fprintf(stderr," Connecting to the pipe for %s
(%s)... \n",fastname,pipename);
	pipefile[t] = fopen(pipename,"wb");
	if (pipefile[t]==NULL)
		{
			rc = errno;
			fprintf(stderr," Unable to open output file
for direct load\n");
			fprintf(stderr," Error code = %d\n",rc);
			exit(rc);
		}
	else
		{
			if (verbose)
				fprintf(stderr," Opened the pipe for
direct loading of %s\n",fastname);

		}

#endif
    return(0);
}

int
start_load(int t,int mode)
{

	if (loadinprogress!=0) end_load();
	if (t==PART_PSUPP)
		{
			start_load2(PART,mode);
			start_load2(PSUPP,mode);
		}
	else if (t==ORDER_LINE)
		{
			start_load2(ORDER,mode);
			start_load2(LINE,mode);
		}
	else
		start_load2(t,mode);

	loadinprogress = t;
	return(0);
}


/* First, some helper routines to copy data into the parcel we
are building */
static void DR_Strt()
```

```
{
       p1 = buffer + 2;     /* Skip 2 for the length field */
}

static void DR_End(int t)
{
       /* We must write to the pipe with a single I/O call, else
we
          could get interleave problems when there are multiple
writers */
#ifdef WIN32
       unsigned long byteswritten;
#endif
       int len;
       int rc;
       reccnt++;

       *p1 = 0x0A; p1++;  /* Stick end-of-line in the buffer */
       len = (int)(p1-buffer);

       *((short *)buffer) =(short)(len-3);  /* Fill in length */

       #ifndef WIN32
       rc = fwrite(buffer,1,len,pipefile[t]);
       if (rc != len)
              {
                     fprintf(stderr, " Write to pipe or file
failed, errno=%d.\n",errno);
                     exit(1);
              }
       #else
       if
(WriteFile(pipehandle[t],&buffer,len,&byteswritten,NULL))
              {
                     if (byteswritten!=(unsigned long)(len))
                            {
                            fprintf(stderr, " Byteswritten =
%d\n",byteswritten);
                            }

              }
       else
              {
              rc = GetLastError();
              if (rc==ERROR_BROKEN_PIPE)
                     fprintf(stderr, " Fastload broke the pipe
prematurely\n");
              else
                     fprintf(stderr, " unknown pipe error =
%d\n",rc);
              fprintf(stderr, " when trying to set row
%d\n",reccnt);
              CloseHandle(pipehandle[t]);
              //fclose(pipefile);
              if (rc==0) rc++;
              exit(rc);
              }
       #endif
}

INLINE
static void DR_Int(long x)
{
       memcpy(p1,&x,4);
       p1 += 4;
}



/* Used only for orderkey, which gets > 32 bits at times */
INLINE
static void DR_Huge(DSS_HUGE * data)
{
       long value;

/*
 * below 300G, 32 bits will hold all orderkeys. If the platform
support 64b,
 * then trust the compiler's cast to allow storage of just 32b.
If the platform
 * doesn't support 64 bit data types, then they are implemented
as a pair of
 * longs, with the LSBs in the first long, so the pointer
reference is still
 * ok.
 *
 * above 300G, 64 bit platforms are still fine. 32 bit platforms
have to work
 * harder. I have not tested this code, but am told that the 32
bit support
 * worked. (jms, 981124)
 */
       if (scale < 300)
              {
```

```
              value = (long)*data;
              memcpy(p1,&value,4);
              p1+=4;
              }
       else
              {
#ifdef SUPPORT_64BITS
              memcpy(p1,data,8);
              p1+=8;
#else
              double tempx;
              unsigned long templ;
              long temph;
              if (*(data+1) ==0)
                     {
                     memcpy(p1,*data,4);
                     p1 += 4;
                     memcpy(p1,*(data+1),4);
                     p1 += 4;
                     }
              else
                     {
/* Sigh, don't have an Int64 type; need to use double and convert
to 2 longs */
                     tempx = *(data+1)*10000000.0+*data;
                     temph = (long)(tempx/4294967296.0);
                     templ = (unsigned long)(tempx-
temph*4294967296.0);
                     memcpy(p1,&templ,4);
                     p1 += 4;
                     memcpy(p1,&temph,4);
                     p1 += 4;
                     }
#endif
              }
}
INLINE
static void DR_VStr(char * x)
{
       short len;
       len=(short)strlen(x);
       memcpy(p1,&len,2);
       p1 += 2;
       memcpy(p1,x,len);
       p1 += len;
}
INLINE
static void DR_Str(char * x,size_t y)
{
       memset(p1,' ',y);
       memcpy(p1,x,strlen(x));
       p1+=y;
}
INLINE
static void DR_Money(long x)
{
       long temp = 0;
       if (x<0)
              temp = -1;
       /*sprintf(p1, "%13.2f", x * 0.01);
       p1+=13;  */
       memcpy(p1,&x,4);
       p1 += 4;
       memcpy(p1,&temp,4);
       p1 += 4;

}
INLINE
static void DR_Char(char x)
{
       *p1 = x; p1++;
}
INLINE
static void DR_Date(char * x)
{
       long tempdate;
       int y,m,d;
       /*memset(p1,' ',10);
       memcpy(p1,x,strlen(x));
       p1+=10;*/
       y=atoi(x);
       m=atoi(x+5);
       d=atoi(x+8);
       if (y<1800 || y>2200 || m<1 || m>12 || d<1 || d>31)
              {
              fprintf(stderr," Help! I can't interpret the date
%s\n",x);
              exit(1);
              }
       tempdate=(y-1900)*10000+m*100+d;
       memcpy(p1,&tempdate,4);
       p1 += 4;

}
```

```
/*now the routines from load_stub.c */

int
close_direct(void)
{
#ifndef WIN32
       int c;
       int i;
       int status;
#endif
       if (loadinprogress!=0) end_load();

       loadinprogress = 0;

#ifndef WIN32
       c = fastloadsstarted;
       fprintf(stderr," Finished sending all rows to all
tables.\n");
       fprintf(stderr," Now waiting for all fastloads to
end...\n");
    while (c)
        {
        i = wait(&status);
        if (i == -1 && fastloadsstarted)
            {
            fprintf(stderr, "We lost one of the fastloads?\n");
            return(-2);
            }
        if (status & 0xFF)
            {
            if (status & 0xFF == 0117)
                fprintf(stderr,"Fastload Process %d: STOPPED\n",
i);
            else
                fprintf(stderr,"Fastload Process %d: rcvd signal
%d\n",
                    i, status&0x7F);
            }
        c--;
        }
#else
       Sleep(1000);
#endif
#ifdef WIN32
       system("erase *.tbl.pipe");
       system("erase *.tbl.fastload");
#else
       /*system("rm *.tbl.pipe");   */
       system("rm *.tbl.fastload");
#endif
       fprintf(stderr," **** Done with direct loading ****\n");
    return(0);
}

int
prep_direct(char * dbnamestr)
{

       fastloadsstarted = 0;
       strcpy(logonstr,dbnamestr);
       if (strcmp(logonstr,"dss")==0 || strcmp(logonstr,"")==0)
              {
                     fprintf(stderr," You MUST use the -n option
to define the Teradata logon string\n");
                     exit(1);
              }
       if (verbose)
              fprintf(stderr," Teradata logon is
%s\n",dbnamestr);
       if (loadinprogress!=0) end_load();

    /* any preload prep goes here */
    return(0);
}

int
hd_cust (FILE *f)
{
    static int count = 0;
       if (f);

    if (! count++)
        printf("No header has been defined for the customer
table\n");

    return(0);
}

/*
CREATE TABLE TPCD.CUSTOMER ( C_CUSTKEY     INTEGER NOT NULL,
                             C_NAME        VARCHAR(25) NOT NULL,
                             C_ADDRESS     VARCHAR(40) NOT NULL,
                             C_NATIONKEY   INTEGER NOT NULL,
```

```
                        C_PHONE       CHAR(15) NOT NULL,
                        C_ACCTBAL     DECIMAL(15,2)   NOT
NULL,
                        C_MKTSEGMENT  CHAR(10) NOT NULL,
                        C_COMMENT     VARCHAR(117) NOT
NULL);
*/

int
ld_cust (customer_t *cp, int mode)
{
       if(mode);
       if (loadinprogress!=CUST) start_load(CUST,mode);
       DR_Strt();
       DR_Int(cp->custkey);
    DR_VStr(cp->name);
       DR_VStr(cp->address);
       DR_Int(cp->nation_code);
       DR_Str(cp->phone,PHONE_LEN);
       DR_Money(cp->acctbal);
       DR_Str(cp->mktsegment,10);
       DR_VStr(cp->comment);
       DR_End(CUST);
       return(0);
}


int
hd_part (FILE *f)
{
    static int count = 0;
       if(f);

    if (! count++)
        printf("No header has been defined for the part
table\n");

    return(0);
}

/*
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 DECIMAL(15,2) NOT NULL,
                          P_COMMENT     VARCHAR(23) NOT NULL );
*/
int
ld_part (part_t *pp, int mode)
{

       if(mode);
       if (loadinprogress!=PART && loadinprogress!=PART_PSUPP)
start_load(PART,mode);
       DR_Strt();
       DR_Int(pp->partkey);
       DR_VStr(pp->name);
       DR_Str(pp->mfgr,P_MFG_LEN);
       DR_Str(pp->brand,P_BRND_LEN);
       DR_VStr(pp->type);
       DR_Int(pp->size);
       DR_Str(pp->container,P_CNTR_LEN);
       DR_Money(pp->retailprice);
       DR_VStr(pp->comment);
       DR_End(PART);
       return(0);

}

/*
CREATE TABLE TPCD.PARTSUPP ( PS_PARTKEY     INTEGER NOT NULL,
                             PS_SUPPKEY     INTEGER NOT NULL,
                             PS_AVAILQTY    INTEGER NOT NULL,
                             PS_SUPPLYCOST  DECIMAL(15,2)  NOT
NULL,
                             PS_COMMENT     VARCHAR(199) NOT NULL
);
*/

int
ld_psupp (part_t *pp, int mode)
{
       int i;
       if(mode);
       if (loadinprogress!=PSUPP && loadinprogress!=PART_PSUPP)
start_load(PSUPP,mode);
       for (i = 0; i < SUPP_PER_PART; i++)
      {
              DR_Strt();
              DR_Int(pp->s[i].partkey);
```

```
            DR_Int(pp->s[i].suppkey);
            DR_Int(pp->s[i].qty);
            DR_Money(pp->s[i].scost);
            DR_VStr(pp->s[i].comment);
            DR_End(PSUPP);
      }
       return(0);

}

int
hd_supp (FILE *f)
{
    static int count = 0;
       if(f);

    if (! count++)
        printf("No header has been defined for the supplier
table\n");

    return(0);
}

/*
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     DECIMAL(15,2) NOT
NULL,
                             S_COMMENT     VARCHAR(101) NOT
NULL);
*/

int
ld_supp (supplier_t *sp, int mode)
{
       if(mode);
       if (loadinprogress!=SUPP) start_load(SUPP,mode);
       DR_Strt();
       DR_Int(sp->suppkey);
    DR_Str(sp->name,25);
       DR_VStr(sp->address);
       DR_Int(sp->nation_code);
       DR_Str(sp->phone,15);
       DR_Money(sp->acctbal);
       DR_VStr(sp->comment);
       DR_End(SUPP);
    return(0);
}


int
hd_order (FILE *f)
{
    static int count = 0;
       if(f);

    if (! count++)
        printf("No header has been defined for the order
table\n");

    return(0);
}

/*
CREATE TABLE TPCD.ORDER  ( O_ORDERKEY       DECIMAL(15,0) NOT
NULL,
                           O_CUSTKEY        INTEGER NOT NULL,
                           O_ORDERSTATUS    CHAR(1) NOT NULL,
                           O_TOTALPRICE     DECIMAL(15,2) NOT
NULL,
                           O_ORDERDATE      DATE NOT NULL,
                           O_ORDERPRIORITY  CHAR(15) NOT NULL,  -
- R
                           O_CLERK          CHAR(15) NOT NULL,  -
- R
                           O_SHIPPRIORITY   INTEGER NOT NULL,
                           O_COMMENT        VARCHAR(79) NOT
NULL);
*/

int
ld_order (order_t *p, int mode)
{
       if(mode);
       if (loadinprogress!=ORDER && loadinprogress!=ORDER_LINE)
              start_load(ORDER,mode);
       DR_Strt();
       DR_Huge(p->okey); /* even at SF < 300 okey is defined HUGE
*/
       DR_Int(p->custkey);
       DR_Char(p->orderstatus);
```

```
       DR_Money(p->totalprice);
       DR_Date(p->odate);
       DR_Str(p->opriority,O_OPRIO_LEN);
       DR_Str(p->clerk,O_CLRK_LEN);
       DR_Int(p->spriority);
#ifdef _WIN32
       if (strlen(p->comment)<0||strlen(p->comment)>79)
             __asm int 3;
#endif
       DR_VStr(p->comment);
       DR_End(ORDER);
    return(0);
}

/*
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    DECIMAL(15,2) NOT
NULL,
                             L_EXTENDEDPRICE  DECIMAL(15,2) NOT
NULL,
                             L_DISCOUNT    DECIMAL(15,2) NOT
NULL,
                             L_TAX         DECIMAL(15,2) 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,  -
- R
                             L_SHIPMODE     CHAR(10) NOT NULL,  -
- R
                             L_COMMENT      VARCHAR(44) NOT
NULL);
*/
int
ld_line (order_t *p, int mode)
{
       int i;
    if(mode);
       if (loadinprogress!=LINE && loadinprogress!=ORDER_LINE)
start_load(LINE,mode);
       for (i = 0; i < p->lines; i++)
        {
       DR_Strt();
       DR_Huge(p->l[i].okey); /* note: SF is not a factor yet */
       DR_Int(p->l[i].partkey);
       DR_Int(p->l[i].suppkey);
       DR_Int(p->l[i].lcnt);
       DR_Int(p->l[i].quantity);
       DR_Money(p->l[i].eprice);
       DR_Money(p->l[i].discount);
       DR_Money(p->l[i].tax);
       DR_Char(p->l[i].rflag[0]);
       DR_Char(p->l[i].lstatus[0]);
       DR_Date(p->l[i].sdate);
       DR_Date(p->l[i].cdate);
       DR_Date(p->l[i].rdate);
       DR_Str(p->l[i].shipinstruct, L_INST_LEN);
       DR_Str(p->l[i].shipmode, L_SMODE_LEN);
       DR_VStr(p->l[i].comment);
       DR_End(LINE);
       }
    return(0);
}


int
hd_psupp (FILE *f)
{
    static int count = 0;
       if(f);

    if (! count++)
        printf("%s %s\n",
            "No header has been defined for the",
            "part supplier table");

    return(0);
}


int
hd_line (FILE *f)
{
    static int count = 0;
       if(f);

    if (! count++)
```

```
        printf("No header has been defined for the lineitem
table\n");

    return(0);
}

int
hd_nation (FILE *f)
{
    static int count = 0;
       if(f);

    if (! count++)
        printf("No header has been defined for the nation
table\n");

    return(0);
}

/*
CREATE TABLE TPCD.NATION  ( N_NATIONKEY  INTEGER NOT NULL,
                            N_NAME       CHAR(25) NOT NULL,
                            N_REGIONKEY  INTEGER NOT NULL,
                            N_COMMENT    VARCHAR(152));
*/

int
ld_nation (code_t *cp, int mode)
{
       if(mode);
       if (loadinprogress!=NATION) start_load(NATION,mode);
       DR_Strt();
       DR_Int(cp->code);
    DR_Str(cp->text,NATION_LEN);
       DR_Int(cp->join);
       DR_VStr(cp->comment);
       DR_End(NATION);
       return(0);
}

int
hd_region (FILE *f)
{
    static int count = 0;
       if(f);

    if (! count++)
        printf("No header has been defined for the region
table\n");

    return(0);
}

/*
CREATE TABLE TPCD.REGION  ( R_REGIONKEY  INTEGER NOT NULL,
                            R_NAME       CHAR(25) NOT NULL,
                            R_COMMENT    VARCHAR(152));
*/

int
ld_region (code_t *cp, int mode)
{
       if(mode);
       if (loadinprogress!=REGION) start_load(REGION,mode);
       DR_Strt();
       DR_Int(cp->code);
       DR_Str(cp->text,REGION_LEN);
       DR_VStr(cp->comment);
       DR_End(REGION);

    return(0);
}

int
ld_order_line (order_t *p, int mode)
{
       if (loadinprogress!=ORDER_LINE)
start_load(ORDER_LINE,mode);

    ld_order(p, mode);
    ld_line (p, mode);

    return(0);
}

int
hd_order_line (FILE *f)
{

    hd_order(f);
    hd_line (f);

    return(0);
}
```

```
int
ld_part_psupp (part_t *p, int mode)
{
       if (loadinprogress!=PART_PSUPP)
start_load(PART_PSUPP,mode);
    ld_part(p, mode);
    ld_psupp (p, mode);

    return(0);
}

int
hd_part_psupp (FILE *f)
{
    hd_part(f);
    hd_psupp(f);

    return(0);
}

int
ld_deletes (DSS_HUGE * okey, int mode)
{
       if(mode);
       if (loadinprogress!=19) start_load(19,mode);
       DR_Strt();
       DR_Huge(okey);
       DR_End(19);
    return(0);
}
```

E.3 Load Scripts

```
Text of Main Load Script
------------------------

#!/bin/sh
#
#
#   Variables describing current system
#
system=local
SF=`cat SF`
logon="${system}/tpcd${SF}g,tpcd${SF}g"
Logon=".logon $logon"
dbclogon=${system}/dbc,dbc
D=/home2/tpcd
O=${D}/run1
#
#
pernode=2           #number of loaders/node to use
nodes=`egrep -cv '^#|^$' $D/script/LoaderNodes`
children=`expr ${nodes} \* ${pernode}`
#
QUIT=$D/script/quit
#
#
ulimit -n 500
ulimit -f unlimited
ulimit -v unlimited
ulimit -a
#
#
echo "\n------------DBS SETTINGS----------------\n"
/tpasw/bin/dbscontrol << INS1
mo in=t
mo ge 13=18
mo fi 1=40
mo fi 3=255
write
di
quit
q
INS1
echo "\n------------CTL SETTINGS----------------\n"
/usr/ntos/bin/xctl -nw << INS1
hardware
screen version
screen dbs
screen debug
screen rss
exit
INS1
#
#
#
echo "\n----------------------------------------\n"
#
#   Start
```

```
#
echo "Running with Scale Factor $SF on `uname -a`, pid=$$"
#
# Setup inmods for current scale factor
#
echo `date "+%m/%d/%Y %T " `":  Setting up load..."
if [  $SF -gt 300  ]; then
       cp -p $D/pfast/master/MASTER/GT300G/*
$D/pfast/master/MASTER
else
       cp -p $D/pfast/master/MASTER/LE300G/*
$D/pfast/master/MASTER
fi
#
mv $D/pfast/master/REMOTES $D/pfast/master/REMOTES.old
echo `date "+%m/%d/%Y %T " `":  Loading SF=${SF}G with ${nodes}
nodes and ${pernode} loaders per node"
node=0
for i in `egrep -v '^#|^$' $D/script/LoaderNodes`; do
 echo `date "+%m/%d/%Y %T " `":  Setting up node $i as loader
node ${node}...\c"
 /usr/bin/rsh $i "cd $D/pfast/inmod;./setuplocal ${SF} ${node}
${children} ${pernode}"
 echo "Done"
 echo "REMOTE " $i " root $D/pfast/inmod/{TBL}/{TBL};"  >>
$D/pfast/master/REMOTES
 j=1
 while [ $j -lt $pernode ]; do
   echo "REMOTE " $i " root $D/pfast/inmod/{TBL}${j}/{TBL};"  >>
$D/pfast/master/REMOTES
   j=`expr $j + 1`
 done
 node=`expr $node + 1`
done
#
#************END OF LOAD SETUP*****************************
#************************************************************
#
# Then go and load the tables
#
echo `date "+%m/%d/%Y %T " `":  Starting Load of Teradata TPC
Benchmark Database..."

cd $D/pfast/master
echo "LOGON $logon;" > LOGON

cd $D/pfast/master
for i in lineitem order partsupp part supplier customer nation
region; do
  echo `date "+%m/%d/%Y %T " `":  Starting load of ${i} table"
  ./Build ${i}
  ./fastload < inmod.${i} > inmod.${i}.out 2> inmod.${i}.err
done


cd $D/preps
echo `date "+%m/%d/%Y %T " `':  Starting base prep...'
echo $Logon | cat - prep_base.sql | bteq > prep_base.out 2>&1
echo `date "+%m/%d/%Y %T " `':  Starting l_fpk2 prep job...'
echo $Logon | cat - l_fpk2.sql | bteq > l_fpk2.out 2>&1
echo `date "+%m/%d/%Y %T " `':  Starting o_fpk2 prep job...'
echo $Logon | cat - o_fpk2.sql | bteq > o_fpk2.out 2>&1
echo `date "+%m/%d/%Y %T " `':  Prep complete, load complete.'

SEED=`date +%m%d%H%M%S`
echo `date "+%m/%d/%Y %T " `":  preps Complete. SEED will be
$SEED"

cd $D/audit
echo $SEED > SEED_FROM_LOAD
echo `date "+%m/%d/%Y %T " `':  Running Audit scripts...'
echo ".logon $dbclogon" | cat - space.txt | bteq >
space.${SF}Gload.out 2>space.${SF}Gload.err
echo $Logon | cat - audit.sql | bteq > audit.sql.${SF}Gload.out
2> audit.sql.${SF}Gload.err
echo $Logon | cat - table_contents | bteq  >
table_contents.${SF}Gload.out 2> table_contents.${SF}Gload.err
echo `date "+%m/%d/%Y %T " `':  Audit scripts complete.'

echo `date "+%m/%d/%Y %T " `':  Exiting'

Text of SF Script:
--------------------

3000

Text of Build Script:
--------------------

#!/bin/sh
#
if [ $# != 1 ]; then
       echo "usage: $0 <TPC-D table name>" 1>&2
       exit 1
```

```
fi
tbl=$1
DFLTSESS=1280

if [ \( $tbl = "nation" \) -o \( $tbl = "region" \) ]; then
       sed "s/{TBL}/$1/g" REMOTES | head -1 > R.tmp
       echo "" >> R.tmp
       echo "SESSIONS 1;\n" > S.tmp
else
#
#  Get Common REMOTE commands from master directory
#  Modify to apply to particular table we are doing
#
       sed "s/{TBL}/${tbl}/g" REMOTES > R.tmp
#
#  If master inmod script has a session declaration
#  use it, otherwise use default defined above
#
       egrep -i SESSION MASTER/inmod.${tbl} > S.tmp
       if [ $? -ne 0 ]; then
         echo "SESSIONS ${DFLTSESS};\n" > S.tmp
       fi
fi
#
#  Put the new script together
#  SESSIONS,REMOTE, LOGON,INMOD (sans SESSION)
#
cat S.tmp R.tmp LOGON > inmod.${tbl}
#
#  add all of the master script sans any SESSION
#  statements
egrep -v -i SESSION MASTER/inmod.${tbl} >> inmod.${tbl}
#
#  Finally get rid of the tmp files
rm -f S.tmp R.tmp

INMOD FILES CREATED BY THE Build SCRIPT:
----------------------------------------


----------------------------------------
inmod.lineitem
----------------------------------------

SESSIONS 1280;
```

```
REMOTE  bynetcop1  root
/home2/tpcd/pfast/inmod/lineitem/lineitem;
REMOTE  bynetcop1  root
/home2/tpcd/pfast/inmod/lineitem1/lineitem;
REMOTE  bynetcop2  root
/home2/tpcd/pfast/inmod/lineitem/lineitem;
REMOTE  bynetcop2  root
/home2/tpcd/pfast/inmod/lineitem1/lineitem;
REMOTE  bynetcop3  root
/home2/tpcd/pfast/inmod/lineitem/lineitem;
REMOTE  bynetcop3  root
/home2/tpcd/pfast/inmod/lineitem1/lineitem;
REMOTE  bynetcop4  root
/home2/tpcd/pfast/inmod/lineitem/lineitem;
REMOTE  bynetcop4  root
/home2/tpcd/pfast/inmod/lineitem1/lineitem;
REMOTE  bynetcop5  root
/home2/tpcd/pfast/inmod/lineitem/lineitem;
REMOTE  bynetcop5  root
/home2/tpcd/pfast/inmod/lineitem1/lineitem;
REMOTE  bynetcop6  root
/home2/tpcd/pfast/inmod/lineitem/lineitem;
REMOTE  bynetcop6  root
/home2/tpcd/pfast/inmod/lineitem1/lineitem;
REMOTE  bynetcop7  root
/home2/tpcd/pfast/inmod/lineitem/lineitem;
REMOTE  bynetcop7  root
/home2/tpcd/pfast/inmod/lineitem1/lineitem;
REMOTE  bynetcop8  root
/home2/tpcd/pfast/inmod/lineitem/lineitem;
REMOTE  bynetcop8  root
/home2/tpcd/pfast/inmod/lineitem1/lineitem;
REMOTE  bynetcop9  root
/home2/tpcd/pfast/inmod/lineitem/lineitem;
REMOTE  bynetcop9  root
/home2/tpcd/pfast/inmod/lineitem1/lineitem;
REMOTE  bynetcop10  root
/home2/tpcd/pfast/inmod/lineitem/lineitem;
REMOTE  bynetcop10  root
/home2/tpcd/pfast/inmod/lineitem1/lineitem;
REMOTE  bynetcop11  root
/home2/tpcd/pfast/inmod/lineitem/lineitem;
REMOTE  bynetcop11  root
/home2/tpcd/pfast/inmod/lineitem1/lineitem;
REMOTE  bynetcop12  root
/home2/tpcd/pfast/inmod/lineitem/lineitem;
```

```
REMOTE  bynetcop12  root
/home2/tpcd/pfast/inmod/lineitem1/lineitem;
REMOTE  bynetcop13  root
/home2/tpcd/pfast/inmod/lineitem/lineitem;
REMOTE  bynetcop13  root
/home2/tpcd/pfast/inmod/lineitem1/lineitem;
REMOTE  bynetcop14  root
/home2/tpcd/pfast/inmod/lineitem/lineitem;
REMOTE  bynetcop14  root
/home2/tpcd/pfast/inmod/lineitem1/lineitem;
REMOTE  bynetcop15  root
/home2/tpcd/pfast/inmod/lineitem/lineitem;
REMOTE  bynetcop15  root
/home2/tpcd/pfast/inmod/lineitem1/lineitem;
REMOTE  bynetcop16  root
/home2/tpcd/pfast/inmod/lineitem/lineitem;
REMOTE  bynetcop16  root
/home2/tpcd/pfast/inmod/lineitem1/lineitem;
REMOTE  bynetcop17  root
/home2/tpcd/pfast/inmod/lineitem/lineitem;
REMOTE  bynetcop17  root
/home2/tpcd/pfast/inmod/lineitem1/lineitem;
REMOTE  bynetcop18  root
/home2/tpcd/pfast/inmod/lineitem/lineitem;
REMOTE  bynetcop18  root
/home2/tpcd/pfast/inmod/lineitem1/lineitem;
REMOTE  bynetcop19  root
/home2/tpcd/pfast/inmod/lineitem/lineitem;
REMOTE  bynetcop19  root
/home2/tpcd/pfast/inmod/lineitem1/lineitem;
REMOTE  bynetcop20  root
/home2/tpcd/pfast/inmod/lineitem/lineitem;
REMOTE  bynetcop20  root
/home2/tpcd/pfast/inmod/lineitem1/lineitem;
REMOTE  bynetcop21  root
/home2/tpcd/pfast/inmod/lineitem/lineitem;
REMOTE  bynetcop21  root
/home2/tpcd/pfast/inmod/lineitem1/lineitem;
REMOTE  bynetcop22  root
/home2/tpcd/pfast/inmod/lineitem/lineitem;
REMOTE  bynetcop22  root
/home2/tpcd/pfast/inmod/lineitem1/lineitem;
REMOTE  bynetcop23  root
/home2/tpcd/pfast/inmod/lineitem/lineitem;
REMOTE  bynetcop23  root
/home2/tpcd/pfast/inmod/lineitem1/lineitem;
REMOTE  bynetcop24  root
/home2/tpcd/pfast/inmod/lineitem/lineitem;
REMOTE  bynetcop24  root
/home2/tpcd/pfast/inmod/lineitem1/lineitem;
REMOTE  bynetcop25  root
/home2/tpcd/pfast/inmod/lineitem/lineitem;
REMOTE  bynetcop25  root
/home2/tpcd/pfast/inmod/lineitem1/lineitem;
REMOTE  bynetcop26  root
/home2/tpcd/pfast/inmod/lineitem/lineitem;
REMOTE  bynetcop26  root
/home2/tpcd/pfast/inmod/lineitem1/lineitem;
REMOTE  bynetcop27  root
/home2/tpcd/pfast/inmod/lineitem/lineitem;
REMOTE  bynetcop27  root
/home2/tpcd/pfast/inmod/lineitem1/lineitem;
REMOTE  bynetcop28  root
/home2/tpcd/pfast/inmod/lineitem/lineitem;
REMOTE  bynetcop28  root
/home2/tpcd/pfast/inmod/lineitem1/lineitem;
REMOTE  bynetcop29  root
/home2/tpcd/pfast/inmod/lineitem/lineitem;
REMOTE  bynetcop29  root
/home2/tpcd/pfast/inmod/lineitem1/lineitem;
REMOTE  bynetcop30  root
/home2/tpcd/pfast/inmod/lineitem/lineitem;
REMOTE  bynetcop30  root
/home2/tpcd/pfast/inmod/lineitem1/lineitem;
REMOTE  bynetcop31  root
/home2/tpcd/pfast/inmod/lineitem/lineitem;
REMOTE  bynetcop31  root
/home2/tpcd/pfast/inmod/lineitem1/lineitem;
REMOTE  bynetcop32  root
/home2/tpcd/pfast/inmod/lineitem/lineitem;
REMOTE  bynetcop32  root
/home2/tpcd/pfast/inmod/lineitem1/lineitem;
REMOTE  bynetcop33  root
/home2/tpcd/pfast/inmod/lineitem/lineitem;
REMOTE  bynetcop33  root
/home2/tpcd/pfast/inmod/lineitem1/lineitem;
REMOTE  bynetcop34  root
/home2/tpcd/pfast/inmod/lineitem/lineitem;
REMOTE  bynetcop34  root
/home2/tpcd/pfast/inmod/lineitem1/lineitem;
REMOTE  bynetcop35  root
/home2/tpcd/pfast/inmod/lineitem/lineitem;
```

```
REMOTE  bynetcop35  root
/home2/tpcd/pfast/inmod/lineitem1/lineitem;
REMOTE  bynetcop36  root
/home2/tpcd/pfast/inmod/lineitem/lineitem;
REMOTE  bynetcop36  root
/home2/tpcd/pfast/inmod/lineitem1/lineitem;
REMOTE  bynetcop37  root
/home2/tpcd/pfast/inmod/lineitem/lineitem;
REMOTE  bynetcop37  root
/home2/tpcd/pfast/inmod/lineitem1/lineitem;
REMOTE  bynetcop38  root
/home2/tpcd/pfast/inmod/lineitem/lineitem;
REMOTE  bynetcop38  root
/home2/tpcd/pfast/inmod/lineitem1/lineitem;
REMOTE  bynetcop39  root
/home2/tpcd/pfast/inmod/lineitem/lineitem;
REMOTE  bynetcop39  root
/home2/tpcd/pfast/inmod/lineitem1/lineitem;
REMOTE  bynetcop40  root
/home2/tpcd/pfast/inmod/lineitem/lineitem;
REMOTE  bynetcop40  root
/home2/tpcd/pfast/inmod/lineitem1/lineitem;
REMOTE  bynetcop41  root
/home2/tpcd/pfast/inmod/lineitem/lineitem;
REMOTE  bynetcop41  root
/home2/tpcd/pfast/inmod/lineitem1/lineitem;
REMOTE  bynetcop42  root
/home2/tpcd/pfast/inmod/lineitem/lineitem;
REMOTE  bynetcop42  root
/home2/tpcd/pfast/inmod/lineitem1/lineitem;
REMOTE  bynetcop43  root
/home2/tpcd/pfast/inmod/lineitem/lineitem;
REMOTE  bynetcop43  root
/home2/tpcd/pfast/inmod/lineitem1/lineitem;
REMOTE  bynetcop44  root
/home2/tpcd/pfast/inmod/lineitem/lineitem;
REMOTE  bynetcop44  root
/home2/tpcd/pfast/inmod/lineitem1/lineitem;
REMOTE  bynetcop45  root
/home2/tpcd/pfast/inmod/lineitem/lineitem;
REMOTE  bynetcop45  root
/home2/tpcd/pfast/inmod/lineitem1/lineitem;
REMOTE  bynetcop46  root
/home2/tpcd/pfast/inmod/lineitem/lineitem;
REMOTE  bynetcop46  root
/home2/tpcd/pfast/inmod/lineitem1/lineitem;
REMOTE  bynetcop47  root
/home2/tpcd/pfast/inmod/lineitem/lineitem;
REMOTE  bynetcop47  root
/home2/tpcd/pfast/inmod/lineitem1/lineitem;
REMOTE  bynetcop48  root
/home2/tpcd/pfast/inmod/lineitem/lineitem;
REMOTE  bynetcop48  root
/home2/tpcd/pfast/inmod/lineitem1/lineitem;
REMOTE  bynetcop49  root
/home2/tpcd/pfast/inmod/lineitem/lineitem;
REMOTE  bynetcop49  root
/home2/tpcd/pfast/inmod/lineitem1/lineitem;
REMOTE  bynetcop50  root
/home2/tpcd/pfast/inmod/lineitem/lineitem;
REMOTE  bynetcop50  root
/home2/tpcd/pfast/inmod/lineitem1/lineitem;
REMOTE  bynetcop51  root
/home2/tpcd/pfast/inmod/lineitem/lineitem;
REMOTE  bynetcop51  root
/home2/tpcd/pfast/inmod/lineitem1/lineitem;
REMOTE  bynetcop52  root
/home2/tpcd/pfast/inmod/lineitem/lineitem;
REMOTE  bynetcop52  root
/home2/tpcd/pfast/inmod/lineitem1/lineitem;
REMOTE  bynetcop53  root
/home2/tpcd/pfast/inmod/lineitem/lineitem;
REMOTE  bynetcop53  root
/home2/tpcd/pfast/inmod/lineitem1/lineitem;
REMOTE  bynetcop54  root
/home2/tpcd/pfast/inmod/lineitem/lineitem;
REMOTE  bynetcop54  root
/home2/tpcd/pfast/inmod/lineitem1/lineitem;
REMOTE  bynetcop55  root
/home2/tpcd/pfast/inmod/lineitem/lineitem;
REMOTE  bynetcop55  root
/home2/tpcd/pfast/inmod/lineitem1/lineitem;
REMOTE  bynetcop56  root
/home2/tpcd/pfast/inmod/lineitem/lineitem;
REMOTE  bynetcop56  root
/home2/tpcd/pfast/inmod/lineitem1/lineitem;
REMOTE  bynetcop57  root
/home2/tpcd/pfast/inmod/lineitem/lineitem;
REMOTE  bynetcop57  root
/home2/tpcd/pfast/inmod/lineitem1/lineitem;
REMOTE  bynetcop58  root
/home2/tpcd/pfast/inmod/lineitem/lineitem;
```

```
REMOTE  bynetcop58  root
/home2/tpcd/pfast/inmod/lineitem1/lineitem;
REMOTE  bynetcop59  root
/home2/tpcd/pfast/inmod/lineitem/lineitem;
REMOTE  bynetcop59  root
/home2/tpcd/pfast/inmod/lineitem1/lineitem;
REMOTE  bynetcop60  root
/home2/tpcd/pfast/inmod/lineitem/lineitem;
REMOTE  bynetcop60  root
/home2/tpcd/pfast/inmod/lineitem1/lineitem;
REMOTE  bynetcop61  root
/home2/tpcd/pfast/inmod/lineitem/lineitem;
REMOTE  bynetcop61  root
/home2/tpcd/pfast/inmod/lineitem1/lineitem;
REMOTE  bynetcop62  root
/home2/tpcd/pfast/inmod/lineitem/lineitem;
REMOTE  bynetcop62  root
/home2/tpcd/pfast/inmod/lineitem1/lineitem;
REMOTE  bynetcop63  root
/home2/tpcd/pfast/inmod/lineitem/lineitem;
REMOTE  bynetcop63  root
/home2/tpcd/pfast/inmod/lineitem1/lineitem;
REMOTE  bynetcop64  root
/home2/tpcd/pfast/inmod/lineitem/lineitem;
REMOTE  bynetcop64  root
/home2/tpcd/pfast/inmod/lineitem1/lineitem;
LOGON local/tpcd3000g,tpcd3000g;

DROP TABLE LINEITEM;
DROP TABLE ERRLINEITEM1;
DROP TABLE ERRLINEITEM2;

CREATE MULTISET TABLE LINEITEM, DATABLOCKSIZE=112 KILOBYTES
  (
    L_ORDERKEY       DECIMAL(15,0) not null
   ,L_PARTKEY        INTEGER not null
   ,L_SUPPKEY        INTEGER not null
   ,L_LINENUMBER     INTEGER not null
   ,L_QUANTITY       DECIMAL(15,2) not null
   ,L_EXTENDEDPRICE  DECIMAL(15,2) not null
   ,L_DISCOUNT       DECIMAL(15,2) not null
   ,L_TAX            DECIMAL(15,2) not null
   ,L_RETURNFLAG     CHAR(1) CASESPECIFIC not null
   ,L_LINESTATUS     CHAR(1) CASESPECIFIC not null
   ,L_SHIPDATE       DATE FORMAT 'yyyy-mm-dd' not null
   ,L_COMMITDATE     DATE FORMAT 'yyyy-mm-dd' not null
   ,L_RECEIPTDATE    DATE FORMAT 'yyyy-mm-dd' not null
   ,L_SHIPINSTRUCT   CHAR(25) CASESPECIFIC not null
   ,L_SHIPMODE       CHAR(10) CASESPECIFIC not null
   ,L_COMMENT        VARCHAR(44) CASESPECIFIC not null)
 PRIMARY INDEX (l_orderkey)
       PARTITION BY (RANGE_N
               ( L_ShipDate Between
                  * AND DATE '1992-12-31',
   DATE '1993-01-01' AND DATE '1993-12-31',
   DATE '1994-01-01' AND DATE '1994-12-31',
   DATE '1995-01-01' AND DATE '1995-12-31',
   DATE '1996-01-01' AND DATE '1996-12-31',
   DATE '1997-01-01' AND DATE '1997-12-31',
   DATE '1998-01-01' AND * ));

BEGIN LOADING LINEITEM
      ERRORFILES ERRLINEITEM1, ERRLINEITEM2
      checkpoint 300;

DEFINE
    F_L_ORDERKEY       (DECIMAL(15,0))
   ,F_L_PARTKEY        (INTEGER)
   ,F_L_SUPPKEY        (INTEGER)
   ,F_L_LINENUMBER     (INTEGER)
   ,F_L_QUANTITY       (INTEGER)
   ,F_L_EXTENDEDPRICE  (DECIMAL(15,2))
   ,F_L_DISCOUNT       (DECIMAL(15,2))
   ,F_L_TAX            (DECIMAL(15,2))
   ,F_L_RETURNFLAG     (CHAR(1))
   ,F_L_LINESTATUS     (CHAR(1))
   ,F_L_SHIPDATE       (DATE)
   ,F_L_COMMITDATE     (DATE)
   ,F_L_RECEIPTDATE    (DATE)
   ,F_L_SHIPINSTRUCT   (CHAR(25))
   ,F_L_SHIPMODE       (CHAR(10))
   ,F_L_COMMENT        (VARCHAR(44))
INMOD=BLKEXIT;

SHOW;

INSERT INTO LINEITEM
  (
    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
  )
VALUES
  (
   :F_L_ORDERKEY,
   :F_L_PARTKEY,
   :F_L_SUPPKEY,
   :F_L_LINENUMBER,
   :F_L_QUANTITY,
   :F_L_EXTENDEDPRICE,
   :F_L_DISCOUNT,
   :F_L_TAX,
   :F_L_RETURNFLAG,
   :F_L_LINESTATUS,
   :F_L_SHIPDATE,
   :F_L_COMMITDATE,
   :F_L_RECEIPTDATE,
   :F_L_SHIPINSTRUCT,
   :F_L_SHIPMODE,
   :F_L_COMMENT
  );

END LOADING;

LOGOFF;

----------------------------------------
inmod.order
----------------------------------------

SESSIONS 1280;

REMOTE  bynetcop1  root /home2/tpcd/pfast/inmod/order/order;
REMOTE  bynetcop1  root /home2/tpcd/pfast/inmod/order1/order;
REMOTE  bynetcop2  root /home2/tpcd/pfast/inmod/order/order;
REMOTE  bynetcop2  root /home2/tpcd/pfast/inmod/order1/order;
REMOTE  bynetcop3  root /home2/tpcd/pfast/inmod/order/order;
REMOTE  bynetcop3  root /home2/tpcd/pfast/inmod/order1/order;
REMOTE  bynetcop4  root /home2/tpcd/pfast/inmod/order/order;
REMOTE  bynetcop4  root /home2/tpcd/pfast/inmod/order1/order;
REMOTE  bynetcop5  root /home2/tpcd/pfast/inmod/order/order;
REMOTE  bynetcop5  root /home2/tpcd/pfast/inmod/order1/order;
REMOTE  bynetcop6  root /home2/tpcd/pfast/inmod/order/order;
REMOTE  bynetcop6  root /home2/tpcd/pfast/inmod/order1/order;
REMOTE  bynetcop7  root /home2/tpcd/pfast/inmod/order/order;
REMOTE  bynetcop7  root /home2/tpcd/pfast/inmod/order1/order;
REMOTE  bynetcop8  root /home2/tpcd/pfast/inmod/order/order;
REMOTE  bynetcop8  root /home2/tpcd/pfast/inmod/order1/order;
REMOTE  bynetcop9  root /home2/tpcd/pfast/inmod/order/order;
REMOTE  bynetcop9  root /home2/tpcd/pfast/inmod/order1/order;
REMOTE  bynetcop10  root /home2/tpcd/pfast/inmod/order/order;
REMOTE  bynetcop10  root /home2/tpcd/pfast/inmod/order1/order;
REMOTE  bynetcop11  root /home2/tpcd/pfast/inmod/order/order;
REMOTE  bynetcop11  root /home2/tpcd/pfast/inmod/order1/order;
REMOTE  bynetcop12  root /home2/tpcd/pfast/inmod/order/order;
REMOTE  bynetcop12  root /home2/tpcd/pfast/inmod/order1/order;
REMOTE  bynetcop13  root /home2/tpcd/pfast/inmod/order/order;
REMOTE  bynetcop13  root /home2/tpcd/pfast/inmod/order1/order;
REMOTE  bynetcop14  root /home2/tpcd/pfast/inmod/order/order;
REMOTE  bynetcop14  root /home2/tpcd/pfast/inmod/order1/order;
REMOTE  bynetcop15  root /home2/tpcd/pfast/inmod/order/order;
REMOTE  bynetcop15  root /home2/tpcd/pfast/inmod/order1/order;
REMOTE  bynetcop16  root /home2/tpcd/pfast/inmod/order/order;
REMOTE  bynetcop16  root /home2/tpcd/pfast/inmod/order1/order;
REMOTE  bynetcop17  root /home2/tpcd/pfast/inmod/order/order;
REMOTE  bynetcop17  root /home2/tpcd/pfast/inmod/order1/order;
REMOTE  bynetcop18  root /home2/tpcd/pfast/inmod/order/order;
REMOTE  bynetcop18  root /home2/tpcd/pfast/inmod/order1/order;
REMOTE  bynetcop19  root /home2/tpcd/pfast/inmod/order/order;
REMOTE  bynetcop19  root /home2/tpcd/pfast/inmod/order1/order;
REMOTE  bynetcop20  root /home2/tpcd/pfast/inmod/order/order;
REMOTE  bynetcop20  root /home2/tpcd/pfast/inmod/order1/order;
REMOTE  bynetcop21  root /home2/tpcd/pfast/inmod/order/order;
REMOTE  bynetcop21  root /home2/tpcd/pfast/inmod/order1/order;
REMOTE  bynetcop22  root /home2/tpcd/pfast/inmod/order/order;
REMOTE  bynetcop22  root /home2/tpcd/pfast/inmod/order1/order;
REMOTE  bynetcop23  root /home2/tpcd/pfast/inmod/order/order;
REMOTE  bynetcop23  root /home2/tpcd/pfast/inmod/order1/order;
REMOTE  bynetcop24  root /home2/tpcd/pfast/inmod/order/order;
REMOTE  bynetcop24  root /home2/tpcd/pfast/inmod/order1/order;
REMOTE  bynetcop25  root /home2/tpcd/pfast/inmod/order/order;
REMOTE  bynetcop25  root /home2/tpcd/pfast/inmod/order1/order;
REMOTE  bynetcop26  root /home2/tpcd/pfast/inmod/order/order;
REMOTE  bynetcop26  root /home2/tpcd/pfast/inmod/order1/order;
REMOTE  bynetcop27  root /home2/tpcd/pfast/inmod/order/order;
```

```
REMOTE  bynetcop27  root /home2/tpcd/pfast/inmod/order1/order;
REMOTE  bynetcop28  root /home2/tpcd/pfast/inmod/order/order;
REMOTE  bynetcop28  root /home2/tpcd/pfast/inmod/order1/order;
REMOTE  bynetcop29  root /home2/tpcd/pfast/inmod/order/order;
REMOTE  bynetcop29  root /home2/tpcd/pfast/inmod/order1/order;
REMOTE  bynetcop30  root /home2/tpcd/pfast/inmod/order/order;
REMOTE  bynetcop30  root /home2/tpcd/pfast/inmod/order1/order;
REMOTE  bynetcop31  root /home2/tpcd/pfast/inmod/order/order;
REMOTE  bynetcop31  root /home2/tpcd/pfast/inmod/order1/order;
REMOTE  bynetcop32  root /home2/tpcd/pfast/inmod/order/order;
REMOTE  bynetcop32  root /home2/tpcd/pfast/inmod/order1/order;
REMOTE  bynetcop33  root /home2/tpcd/pfast/inmod/order/order;
REMOTE  bynetcop33  root /home2/tpcd/pfast/inmod/order1/order;
REMOTE  bynetcop34  root /home2/tpcd/pfast/inmod/order/order;
REMOTE  bynetcop34  root /home2/tpcd/pfast/inmod/order1/order;
REMOTE  bynetcop35  root /home2/tpcd/pfast/inmod/order/order;
REMOTE  bynetcop35  root /home2/tpcd/pfast/inmod/order1/order;
REMOTE  bynetcop36  root /home2/tpcd/pfast/inmod/order/order;
REMOTE  bynetcop36  root /home2/tpcd/pfast/inmod/order1/order;
REMOTE  bynetcop37  root /home2/tpcd/pfast/inmod/order/order;
REMOTE  bynetcop37  root /home2/tpcd/pfast/inmod/order1/order;
REMOTE  bynetcop38  root /home2/tpcd/pfast/inmod/order/order;
REMOTE  bynetcop38  root /home2/tpcd/pfast/inmod/order1/order;
REMOTE  bynetcop39  root /home2/tpcd/pfast/inmod/order/order;
REMOTE  bynetcop39  root /home2/tpcd/pfast/inmod/order1/order;
REMOTE  bynetcop40  root /home2/tpcd/pfast/inmod/order/order;
REMOTE  bynetcop40  root /home2/tpcd/pfast/inmod/order1/order;
REMOTE  bynetcop41  root /home2/tpcd/pfast/inmod/order/order;
REMOTE  bynetcop41  root /home2/tpcd/pfast/inmod/order1/order;
REMOTE  bynetcop42  root /home2/tpcd/pfast/inmod/order/order;
REMOTE  bynetcop42  root /home2/tpcd/pfast/inmod/order1/order;
REMOTE  bynetcop43  root /home2/tpcd/pfast/inmod/order/order;
REMOTE  bynetcop43  root /home2/tpcd/pfast/inmod/order1/order;
REMOTE  bynetcop44  root /home2/tpcd/pfast/inmod/order/order;
REMOTE  bynetcop44  root /home2/tpcd/pfast/inmod/order1/order;
REMOTE  bynetcop45  root /home2/tpcd/pfast/inmod/order/order;
REMOTE  bynetcop45  root /home2/tpcd/pfast/inmod/order1/order;
REMOTE  bynetcop46  root /home2/tpcd/pfast/inmod/order/order;
REMOTE  bynetcop46  root /home2/tpcd/pfast/inmod/order1/order;
REMOTE  bynetcop47  root /home2/tpcd/pfast/inmod/order/order;
REMOTE  bynetcop47  root /home2/tpcd/pfast/inmod/order1/order;
REMOTE  bynetcop48  root /home2/tpcd/pfast/inmod/order/order;
REMOTE  bynetcop48  root /home2/tpcd/pfast/inmod/order1/order;
REMOTE  bynetcop49  root /home2/tpcd/pfast/inmod/order/order;
REMOTE  bynetcop49  root /home2/tpcd/pfast/inmod/order1/order;
REMOTE  bynetcop50  root /home2/tpcd/pfast/inmod/order/order;
REMOTE  bynetcop50  root /home2/tpcd/pfast/inmod/order1/order;
REMOTE  bynetcop51  root /home2/tpcd/pfast/inmod/order/order;
REMOTE  bynetcop51  root /home2/tpcd/pfast/inmod/order1/order;
REMOTE  bynetcop52  root /home2/tpcd/pfast/inmod/order/order;
REMOTE  bynetcop52  root /home2/tpcd/pfast/inmod/order1/order;
REMOTE  bynetcop53  root /home2/tpcd/pfast/inmod/order/order;
REMOTE  bynetcop53  root /home2/tpcd/pfast/inmod/order1/order;
REMOTE  bynetcop54  root /home2/tpcd/pfast/inmod/order/order;
REMOTE  bynetcop54  root /home2/tpcd/pfast/inmod/order1/order;
REMOTE  bynetcop55  root /home2/tpcd/pfast/inmod/order/order;
REMOTE  bynetcop55  root /home2/tpcd/pfast/inmod/order1/order;
REMOTE  bynetcop56  root /home2/tpcd/pfast/inmod/order/order;
REMOTE  bynetcop56  root /home2/tpcd/pfast/inmod/order1/order;
REMOTE  bynetcop57  root /home2/tpcd/pfast/inmod/order/order;
REMOTE  bynetcop57  root /home2/tpcd/pfast/inmod/order1/order;
REMOTE  bynetcop58  root /home2/tpcd/pfast/inmod/order/order;
REMOTE  bynetcop58  root /home2/tpcd/pfast/inmod/order1/order;
REMOTE  bynetcop59  root /home2/tpcd/pfast/inmod/order/order;
REMOTE  bynetcop59  root /home2/tpcd/pfast/inmod/order1/order;
REMOTE  bynetcop60  root /home2/tpcd/pfast/inmod/order/order;
REMOTE  bynetcop60  root /home2/tpcd/pfast/inmod/order1/order;
REMOTE  bynetcop61  root /home2/tpcd/pfast/inmod/order/order;
REMOTE  bynetcop61  root /home2/tpcd/pfast/inmod/order1/order;
REMOTE  bynetcop62  root /home2/tpcd/pfast/inmod/order/order;
REMOTE  bynetcop62  root /home2/tpcd/pfast/inmod/order1/order;
REMOTE  bynetcop63  root /home2/tpcd/pfast/inmod/order/order;
REMOTE  bynetcop63  root /home2/tpcd/pfast/inmod/order1/order;
REMOTE  bynetcop64  root /home2/tpcd/pfast/inmod/order/order;
REMOTE  bynetcop64  root /home2/tpcd/pfast/inmod/order1/order;
LOGON local/tpcd3000g,tpcd3000g;

DROP TABLE ORDERTBL;
DROP TABLE ERRORDERTBL1;
DROP TABLE ERRORDERTBL2;

CREATE MULTISET TABLE ORDERTBL, DATABLOCKSIZE=112 KILOBYTES
  (
    O_ORDERKEY       DECIMAL(15,0) not null
   ,O_CUSTKEY        INTEGER not null
   ,O_ORDERSTATUS    CHAR(1) CASESPECIFIC not null
   ,O_TOTALPRICE     DECIMAL(15,2) not null
   ,O_ORDERDATE      DATE FORMAT 'yyyy-mm-dd' not null
   ,O_ORDERPRIORITY  CHAR(15) CASESPECIFIC not null
   ,O_CLERK          CHAR(15) CASESPECIFIC not null
   ,O_SHIPPRIORITY   INTEGER not null
   ,O_COMMENT        VARCHAR(79) CASESPECIFIC not null
  )
PRIMARY INDEX( O_ORDERKEY )
```

```
 PARTITION BY (RANGE_N
                ( O_OrderDate Between
                   * AND DATE '1992-12-31',
   DATE '1993-01-01' AND DATE '1993-12-31',
   DATE '1994-01-01' AND DATE '1994-12-31',
   DATE '1995-01-01' AND DATE '1995-12-31',
   DATE '1996-01-01' AND DATE '1996-12-31',
   DATE '1997-01-01' AND DATE '1997-12-31',
   DATE '1998-01-01' AND * ));


BEGIN LOADING ORDERTBL
      ERRORFILES ERRORDERTBL1, ERRORDERTBL2
      checkpoint 300;

DEFINE
    F_O_ORDERKEY       (DECIMAL(15,0))
   ,F_O_CUSTKEY        (INTEGER)
   ,F_O_ORDERSTATUS    (CHAR(1))
   ,F_O_TOTALPRICE     (DECIMAL(15,2))
   ,F_O_ORDERDATE      (DATE)
   ,F_O_ORDERPRIORITY  (CHAR(15))
   ,F_O_CLERK          (CHAR(15))
   ,F_O_SHIPPRIORITY   (INTEGER)
   ,F_O_COMMENT        (VARCHAR(79))
INMOD=BLKEXIT;

SHOW;

INSERT INTO ORDERTBL
  (
    O_ORDERKEY
   ,O_CUSTKEY
   ,O_ORDERSTATUS
   ,O_TOTALPRICE
   ,O_ORDERDATE
   ,O_ORDERPRIORITY
   ,O_CLERK
   ,O_SHIPPRIORITY
   ,O_COMMENT
  )
VALUES
  (
   :F_O_ORDERKEY,
   :F_O_CUSTKEY,
   :F_O_ORDERSTATUS,
   :F_O_TOTALPRICE,
   :F_O_ORDERDATE,
   :F_O_ORDERPRIORITY,
   :F_O_CLERK,
   :F_O_SHIPPRIORITY,
   :F_O_COMMENT
  );

END LOADING;

LOGOFF;
```

```
----------------------------------------
inmod.partsupp
----------------------------------------

SESSIONS 1280;

REMOTE  bynetcop1  root
/home2/tpcd/pfast/inmod/partsupp/partsupp;
REMOTE  bynetcop1  root
/home2/tpcd/pfast/inmod/partsupp1/partsupp;
REMOTE  bynetcop2  root
/home2/tpcd/pfast/inmod/partsupp/partsupp;
REMOTE  bynetcop2  root
/home2/tpcd/pfast/inmod/partsupp1/partsupp;
REMOTE  bynetcop3  root
/home2/tpcd/pfast/inmod/partsupp/partsupp;
REMOTE  bynetcop3  root
/home2/tpcd/pfast/inmod/partsupp1/partsupp;
REMOTE  bynetcop4  root
/home2/tpcd/pfast/inmod/partsupp/partsupp;
REMOTE  bynetcop4  root
/home2/tpcd/pfast/inmod/partsupp1/partsupp;
REMOTE  bynetcop5  root
/home2/tpcd/pfast/inmod/partsupp/partsupp;
REMOTE  bynetcop5  root
/home2/tpcd/pfast/inmod/partsupp1/partsupp;
REMOTE  bynetcop6  root
/home2/tpcd/pfast/inmod/partsupp/partsupp;
REMOTE  bynetcop6  root
/home2/tpcd/pfast/inmod/partsupp1/partsupp;
REMOTE  bynetcop7  root
/home2/tpcd/pfast/inmod/partsupp/partsupp;
REMOTE  bynetcop7  root
/home2/tpcd/pfast/inmod/partsupp1/partsupp;
REMOTE  bynetcop8  root
/home2/tpcd/pfast/inmod/partsupp/partsupp;
```

```
REMOTE  bynetcop8  root
/home2/tpcd/pfast/inmod/partsupp1/partsupp;
REMOTE  bynetcop9  root
/home2/tpcd/pfast/inmod/partsupp/partsupp;
REMOTE  bynetcop9  root
/home2/tpcd/pfast/inmod/partsupp1/partsupp;
REMOTE  bynetcop10  root
/home2/tpcd/pfast/inmod/partsupp/partsupp;
REMOTE  bynetcop10  root
/home2/tpcd/pfast/inmod/partsupp1/partsupp;
REMOTE  bynetcop11  root
/home2/tpcd/pfast/inmod/partsupp/partsupp;
REMOTE  bynetcop11  root
/home2/tpcd/pfast/inmod/partsupp1/partsupp;
REMOTE  bynetcop12  root
/home2/tpcd/pfast/inmod/partsupp/partsupp;
REMOTE  bynetcop12  root
/home2/tpcd/pfast/inmod/partsupp1/partsupp;
REMOTE  bynetcop13  root
/home2/tpcd/pfast/inmod/partsupp/partsupp;
REMOTE  bynetcop13  root
/home2/tpcd/pfast/inmod/partsupp1/partsupp;
REMOTE  bynetcop14  root
/home2/tpcd/pfast/inmod/partsupp/partsupp;
REMOTE  bynetcop14  root
/home2/tpcd/pfast/inmod/partsupp1/partsupp;
REMOTE  bynetcop15  root
/home2/tpcd/pfast/inmod/partsupp/partsupp;
REMOTE  bynetcop15  root
/home2/tpcd/pfast/inmod/partsupp1/partsupp;
REMOTE  bynetcop16  root
/home2/tpcd/pfast/inmod/partsupp/partsupp;
REMOTE  bynetcop16  root
/home2/tpcd/pfast/inmod/partsupp1/partsupp;
REMOTE  bynetcop17  root
/home2/tpcd/pfast/inmod/partsupp/partsupp;
REMOTE  bynetcop17  root
/home2/tpcd/pfast/inmod/partsupp1/partsupp;
REMOTE  bynetcop18  root
/home2/tpcd/pfast/inmod/partsupp/partsupp;
REMOTE  bynetcop18  root
/home2/tpcd/pfast/inmod/partsupp1/partsupp;
REMOTE  bynetcop19  root
/home2/tpcd/pfast/inmod/partsupp/partsupp;
REMOTE  bynetcop19  root
/home2/tpcd/pfast/inmod/partsupp1/partsupp;
REMOTE  bynetcop20  root
/home2/tpcd/pfast/inmod/partsupp/partsupp;
REMOTE  bynetcop20  root
/home2/tpcd/pfast/inmod/partsupp1/partsupp;
REMOTE  bynetcop21  root
/home2/tpcd/pfast/inmod/partsupp/partsupp;
REMOTE  bynetcop21  root
/home2/tpcd/pfast/inmod/partsupp1/partsupp;
REMOTE  bynetcop22  root
/home2/tpcd/pfast/inmod/partsupp/partsupp;
REMOTE  bynetcop22  root
/home2/tpcd/pfast/inmod/partsupp1/partsupp;
REMOTE  bynetcop23  root
/home2/tpcd/pfast/inmod/partsupp/partsupp;
REMOTE  bynetcop23  root
/home2/tpcd/pfast/inmod/partsupp1/partsupp;
REMOTE  bynetcop24  root
/home2/tpcd/pfast/inmod/partsupp/partsupp;
REMOTE  bynetcop24  root
/home2/tpcd/pfast/inmod/partsupp1/partsupp;
REMOTE  bynetcop25  root
/home2/tpcd/pfast/inmod/partsupp/partsupp;
REMOTE  bynetcop25  root
/home2/tpcd/pfast/inmod/partsupp1/partsupp;
REMOTE  bynetcop26  root
/home2/tpcd/pfast/inmod/partsupp/partsupp;
REMOTE  bynetcop26  root
/home2/tpcd/pfast/inmod/partsupp1/partsupp;
REMOTE  bynetcop27  root
/home2/tpcd/pfast/inmod/partsupp/partsupp;
REMOTE  bynetcop27  root
/home2/tpcd/pfast/inmod/partsupp1/partsupp;
REMOTE  bynetcop28  root
/home2/tpcd/pfast/inmod/partsupp/partsupp;
REMOTE  bynetcop28  root
/home2/tpcd/pfast/inmod/partsupp1/partsupp;
REMOTE  bynetcop29  root
/home2/tpcd/pfast/inmod/partsupp/partsupp;
REMOTE  bynetcop29  root
/home2/tpcd/pfast/inmod/partsupp1/partsupp;
REMOTE  bynetcop30  root
/home2/tpcd/pfast/inmod/partsupp/partsupp;
REMOTE  bynetcop30  root
/home2/tpcd/pfast/inmod/partsupp1/partsupp;
REMOTE  bynetcop31  root
/home2/tpcd/pfast/inmod/partsupp/partsupp;
```

```
REMOTE  bynetcop31  root
/home2/tpcd/pfast/inmod/partsupp1/partsupp;
REMOTE  bynetcop32  root
/home2/tpcd/pfast/inmod/partsupp/partsupp;
REMOTE  bynetcop32  root
/home2/tpcd/pfast/inmod/partsupp1/partsupp;
REMOTE  bynetcop33  root
/home2/tpcd/pfast/inmod/partsupp/partsupp;
REMOTE  bynetcop33  root
/home2/tpcd/pfast/inmod/partsupp1/partsupp;
REMOTE  bynetcop34  root
/home2/tpcd/pfast/inmod/partsupp/partsupp;
REMOTE  bynetcop34  root
/home2/tpcd/pfast/inmod/partsupp1/partsupp;
REMOTE  bynetcop35  root
/home2/tpcd/pfast/inmod/partsupp/partsupp;
REMOTE  bynetcop35  root
/home2/tpcd/pfast/inmod/partsupp1/partsupp;
REMOTE  bynetcop36  root
/home2/tpcd/pfast/inmod/partsupp/partsupp;
REMOTE  bynetcop36  root
/home2/tpcd/pfast/inmod/partsupp1/partsupp;
REMOTE  bynetcop37  root
/home2/tpcd/pfast/inmod/partsupp/partsupp;
REMOTE  bynetcop37  root
/home2/tpcd/pfast/inmod/partsupp1/partsupp;
REMOTE  bynetcop38  root
/home2/tpcd/pfast/inmod/partsupp/partsupp;
REMOTE  bynetcop38  root
/home2/tpcd/pfast/inmod/partsupp1/partsupp;
REMOTE  bynetcop39  root
/home2/tpcd/pfast/inmod/partsupp/partsupp;
REMOTE  bynetcop39  root
/home2/tpcd/pfast/inmod/partsupp1/partsupp;
REMOTE  bynetcop40  root
/home2/tpcd/pfast/inmod/partsupp/partsupp;
REMOTE  bynetcop40  root
/home2/tpcd/pfast/inmod/partsupp1/partsupp;
REMOTE  bynetcop41  root
/home2/tpcd/pfast/inmod/partsupp/partsupp;
REMOTE  bynetcop41  root
/home2/tpcd/pfast/inmod/partsupp1/partsupp;
REMOTE  bynetcop42  root
/home2/tpcd/pfast/inmod/partsupp/partsupp;
REMOTE  bynetcop42  root
/home2/tpcd/pfast/inmod/partsupp1/partsupp;
REMOTE  bynetcop43  root
/home2/tpcd/pfast/inmod/partsupp/partsupp;
REMOTE  bynetcop43  root
/home2/tpcd/pfast/inmod/partsupp1/partsupp;
REMOTE  bynetcop44  root
/home2/tpcd/pfast/inmod/partsupp/partsupp;
REMOTE  bynetcop44  root
/home2/tpcd/pfast/inmod/partsupp1/partsupp;
REMOTE  bynetcop45  root
/home2/tpcd/pfast/inmod/partsupp/partsupp;
REMOTE  bynetcop45  root
/home2/tpcd/pfast/inmod/partsupp1/partsupp;
REMOTE  bynetcop46  root
/home2/tpcd/pfast/inmod/partsupp/partsupp;
REMOTE  bynetcop46  root
/home2/tpcd/pfast/inmod/partsupp1/partsupp;
REMOTE  bynetcop47  root
/home2/tpcd/pfast/inmod/partsupp/partsupp;
REMOTE  bynetcop47  root
/home2/tpcd/pfast/inmod/partsupp1/partsupp;
REMOTE  bynetcop48  root
/home2/tpcd/pfast/inmod/partsupp/partsupp;
REMOTE  bynetcop48  root
/home2/tpcd/pfast/inmod/partsupp1/partsupp;
REMOTE  bynetcop49  root
/home2/tpcd/pfast/inmod/partsupp/partsupp;
REMOTE  bynetcop49  root
/home2/tpcd/pfast/inmod/partsupp1/partsupp;
REMOTE  bynetcop50  root
/home2/tpcd/pfast/inmod/partsupp/partsupp;
REMOTE  bynetcop50  root
/home2/tpcd/pfast/inmod/partsupp1/partsupp;
REMOTE  bynetcop51  root
/home2/tpcd/pfast/inmod/partsupp/partsupp;
REMOTE  bynetcop51  root
/home2/tpcd/pfast/inmod/partsupp1/partsupp;
REMOTE  bynetcop52  root
/home2/tpcd/pfast/inmod/partsupp/partsupp;
REMOTE  bynetcop52  root
/home2/tpcd/pfast/inmod/partsupp1/partsupp;
REMOTE  bynetcop53  root
/home2/tpcd/pfast/inmod/partsupp/partsupp;
REMOTE  bynetcop53  root
/home2/tpcd/pfast/inmod/partsupp1/partsupp;
REMOTE  bynetcop54  root
/home2/tpcd/pfast/inmod/partsupp/partsupp;
```

```
REMOTE  bynetcop54  root
/home2/tpcd/pfast/inmod/partsupp1/partsupp;
REMOTE  bynetcop55  root
/home2/tpcd/pfast/inmod/partsupp/partsupp;
REMOTE  bynetcop55  root
/home2/tpcd/pfast/inmod/partsupp1/partsupp;
REMOTE  bynetcop56  root
/home2/tpcd/pfast/inmod/partsupp/partsupp;
REMOTE  bynetcop56  root
/home2/tpcd/pfast/inmod/partsupp1/partsupp;
REMOTE  bynetcop57  root
/home2/tpcd/pfast/inmod/partsupp/partsupp;
REMOTE  bynetcop57  root
/home2/tpcd/pfast/inmod/partsupp1/partsupp;
REMOTE  bynetcop58  root
/home2/tpcd/pfast/inmod/partsupp/partsupp;
REMOTE  bynetcop58  root
/home2/tpcd/pfast/inmod/partsupp1/partsupp;
REMOTE  bynetcop59  root
/home2/tpcd/pfast/inmod/partsupp/partsupp;
REMOTE  bynetcop59  root
/home2/tpcd/pfast/inmod/partsupp1/partsupp;
REMOTE  bynetcop60  root
/home2/tpcd/pfast/inmod/partsupp/partsupp;
REMOTE  bynetcop60  root
/home2/tpcd/pfast/inmod/partsupp1/partsupp;
REMOTE  bynetcop61  root
/home2/tpcd/pfast/inmod/partsupp/partsupp;
REMOTE  bynetcop61  root
/home2/tpcd/pfast/inmod/partsupp1/partsupp;
REMOTE  bynetcop62  root
/home2/tpcd/pfast/inmod/partsupp/partsupp;
REMOTE  bynetcop62  root
/home2/tpcd/pfast/inmod/partsupp1/partsupp;
REMOTE  bynetcop63  root
/home2/tpcd/pfast/inmod/partsupp/partsupp;
REMOTE  bynetcop63  root
/home2/tpcd/pfast/inmod/partsupp1/partsupp;
REMOTE  bynetcop64  root
/home2/tpcd/pfast/inmod/partsupp/partsupp;
REMOTE  bynetcop64  root
/home2/tpcd/pfast/inmod/partsupp1/partsupp;
LOGON local/tpcd3000g,tpcd3000g;

DROP TABLE PARTSUPP;
DROP TABLE ERRPARTSUPP1;
DROP TABLE ERRPARTSUPP2;

CREATE MULTISET TABLE PARTSUPP
  (
    PS_PARTKEY     INTEGER not null
   ,PS_SUPPKEY     INTEGER not null
   ,PS_AVAILQTY    INTEGER not null
   ,PS_SUPPLYCOST  DECIMAL(15,2) not null
   ,PS_COMMENT     VARCHAR(199) CASESPECIFIC not null
  );

BEGIN LOADING PARTSUPP
      ERRORFILES ERRPARTSUPP1, ERRPARTSUPP2
      checkpoint 120;

DEFINE
    F_PS_PARTKEY     (INTEGER)
   ,F_PS_SUPPKEY     (INTEGER)
   ,F_PS_AVAILQTY    (INTEGER)
   ,F_PS_SUPPLYCOST  (DECIMAL(15,2))
   ,F_PS_COMMENT     (VARCHAR(199))
INMOD=BLKEXIT;

SHOW;

INSERT INTO PARTSUPP
  (
    PS_PARTKEY
   ,PS_SUPPKEY
   ,PS_AVAILQTY
   ,PS_SUPPLYCOST
   ,PS_COMMENT
  )
VALUES
  (
   :F_PS_PARTKEY,
   :F_PS_SUPPKEY,
   :F_PS_AVAILQTY,
   :F_PS_SUPPLYCOST,
   :F_PS_COMMENT
  );

END LOADING;

LOGOFF;

---------------------------------------
inmod.part
```

```
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SESSIONS 1280;

REMOTE  bynetcop1  root /home2/tpcd/pfast/inmod/part/part;
REMOTE  bynetcop1  root /home2/tpcd/pfast/inmod/part1/part;
REMOTE  bynetcop2  root /home2/tpcd/pfast/inmod/part/part;
REMOTE  bynetcop2  root /home2/tpcd/pfast/inmod/part1/part;
REMOTE  bynetcop3  root /home2/tpcd/pfast/inmod/part/part;
REMOTE  bynetcop3  root /home2/tpcd/pfast/inmod/part1/part;
REMOTE  bynetcop4  root /home2/tpcd/pfast/inmod/part/part;
REMOTE  bynetcop4  root /home2/tpcd/pfast/inmod/part1/part;
REMOTE  bynetcop5  root /home2/tpcd/pfast/inmod/part/part;
REMOTE  bynetcop5  root /home2/tpcd/pfast/inmod/part1/part;
REMOTE  bynetcop6  root /home2/tpcd/pfast/inmod/part/part;
REMOTE  bynetcop6  root /home2/tpcd/pfast/inmod/part1/part;
REMOTE  bynetcop7  root /home2/tpcd/pfast/inmod/part/part;
REMOTE  bynetcop7  root /home2/tpcd/pfast/inmod/part1/part;
REMOTE  bynetcop8  root /home2/tpcd/pfast/inmod/part/part;
REMOTE  bynetcop8  root /home2/tpcd/pfast/inmod/part1/part;
REMOTE  bynetcop9  root /home2/tpcd/pfast/inmod/part/part;
REMOTE  bynetcop9  root /home2/tpcd/pfast/inmod/part1/part;
REMOTE  bynetcop10  root /home2/tpcd/pfast/inmod/part/part;
REMOTE  bynetcop10  root /home2/tpcd/pfast/inmod/part1/part;
REMOTE  bynetcop11  root /home2/tpcd/pfast/inmod/part/part;
REMOTE  bynetcop11  root /home2/tpcd/pfast/inmod/part1/part;
REMOTE  bynetcop12  root /home2/tpcd/pfast/inmod/part/part;
REMOTE  bynetcop12  root /home2/tpcd/pfast/inmod/part1/part;
REMOTE  bynetcop13  root /home2/tpcd/pfast/inmod/part/part;
REMOTE  bynetcop13  root /home2/tpcd/pfast/inmod/part1/part;
REMOTE  bynetcop14  root /home2/tpcd/pfast/inmod/part/part;
REMOTE  bynetcop14  root /home2/tpcd/pfast/inmod/part1/part;
REMOTE  bynetcop15  root /home2/tpcd/pfast/inmod/part/part;
REMOTE  bynetcop15  root /home2/tpcd/pfast/inmod/part1/part;
REMOTE  bynetcop16  root /home2/tpcd/pfast/inmod/part/part;
REMOTE  bynetcop16  root /home2/tpcd/pfast/inmod/part1/part;
REMOTE  bynetcop17  root /home2/tpcd/pfast/inmod/part/part;
REMOTE  bynetcop17  root /home2/tpcd/pfast/inmod/part1/part;
REMOTE  bynetcop18  root /home2/tpcd/pfast/inmod/part/part;
REMOTE  bynetcop18  root /home2/tpcd/pfast/inmod/part1/part;
REMOTE  bynetcop19  root /home2/tpcd/pfast/inmod/part/part;
REMOTE  bynetcop19  root /home2/tpcd/pfast/inmod/part1/part;
REMOTE  bynetcop20  root /home2/tpcd/pfast/inmod/part/part;
REMOTE  bynetcop20  root /home2/tpcd/pfast/inmod/part1/part;
REMOTE  bynetcop21  root /home2/tpcd/pfast/inmod/part/part;
REMOTE  bynetcop21  root /home2/tpcd/pfast/inmod/part1/part;
REMOTE  bynetcop22  root /home2/tpcd/pfast/inmod/part/part;
REMOTE  bynetcop22  root /home2/tpcd/pfast/inmod/part1/part;
REMOTE  bynetcop23  root /home2/tpcd/pfast/inmod/part/part;
REMOTE  bynetcop23  root /home2/tpcd/pfast/inmod/part1/part;
REMOTE  bynetcop24  root /home2/tpcd/pfast/inmod/part/part;
REMOTE  bynetcop24  root /home2/tpcd/pfast/inmod/part1/part;
REMOTE  bynetcop25  root /home2/tpcd/pfast/inmod/part/part;
REMOTE  bynetcop25  root /home2/tpcd/pfast/inmod/part1/part;
REMOTE  bynetcop26  root /home2/tpcd/pfast/inmod/part/part;
REMOTE  bynetcop26  root /home2/tpcd/pfast/inmod/part1/part;
REMOTE  bynetcop27  root /home2/tpcd/pfast/inmod/part/part;
REMOTE  bynetcop27  root /home2/tpcd/pfast/inmod/part1/part;
REMOTE  bynetcop28  root /home2/tpcd/pfast/inmod/part/part;
REMOTE  bynetcop28  root /home2/tpcd/pfast/inmod/part1/part;
REMOTE  bynetcop29  root /home2/tpcd/pfast/inmod/part/part;
REMOTE  bynetcop29  root /home2/tpcd/pfast/inmod/part1/part;
REMOTE  bynetcop30  root /home2/tpcd/pfast/inmod/part/part;
REMOTE  bynetcop30  root /home2/tpcd/pfast/inmod/part1/part;
REMOTE  bynetcop31  root /home2/tpcd/pfast/inmod/part/part;
REMOTE  bynetcop31  root /home2/tpcd/pfast/inmod/part1/part;
REMOTE  bynetcop32  root /home2/tpcd/pfast/inmod/part/part;
REMOTE  bynetcop32  root /home2/tpcd/pfast/inmod/part1/part;
REMOTE  bynetcop33  root /home2/tpcd/pfast/inmod/part/part;
REMOTE  bynetcop33  root /home2/tpcd/pfast/inmod/part1/part;
REMOTE  bynetcop34  root /home2/tpcd/pfast/inmod/part/part;
REMOTE  bynetcop34  root /home2/tpcd/pfast/inmod/part1/part;
REMOTE  bynetcop35  root /home2/tpcd/pfast/inmod/part/part;
REMOTE  bynetcop35  root /home2/tpcd/pfast/inmod/part1/part;
REMOTE  bynetcop36  root /home2/tpcd/pfast/inmod/part/part;
REMOTE  bynetcop36  root /home2/tpcd/pfast/inmod/part1/part;
REMOTE  bynetcop37  root /home2/tpcd/pfast/inmod/part/part;
REMOTE  bynetcop37  root /home2/tpcd/pfast/inmod/part1/part;
REMOTE  bynetcop38  root /home2/tpcd/pfast/inmod/part/part;
REMOTE  bynetcop38  root /home2/tpcd/pfast/inmod/part1/part;
REMOTE  bynetcop39  root /home2/tpcd/pfast/inmod/part/part;
REMOTE  bynetcop39  root /home2/tpcd/pfast/inmod/part1/part;
REMOTE  bynetcop40  root /home2/tpcd/pfast/inmod/part/part;
REMOTE  bynetcop40  root /home2/tpcd/pfast/inmod/part1/part;
REMOTE  bynetcop41  root /home2/tpcd/pfast/inmod/part/part;
REMOTE  bynetcop41  root /home2/tpcd/pfast/inmod/part1/part;
REMOTE  bynetcop42  root /home2/tpcd/pfast/inmod/part/part;
REMOTE  bynetcop42  root /home2/tpcd/pfast/inmod/part1/part;
REMOTE  bynetcop43  root /home2/tpcd/pfast/inmod/part/part;
REMOTE  bynetcop43  root /home2/tpcd/pfast/inmod/part1/part;
REMOTE  bynetcop44  root /home2/tpcd/pfast/inmod/part/part;
REMOTE  bynetcop44  root /home2/tpcd/pfast/inmod/part1/part;
REMOTE  bynetcop45  root /home2/tpcd/pfast/inmod/part/part;
REMOTE  bynetcop45  root /home2/tpcd/pfast/inmod/part1/part;
```

```
REMOTE  bynetcop46  root /home2/tpcd/pfast/inmod/part/part;
REMOTE  bynetcop46  root /home2/tpcd/pfast/inmod/part1/part;
REMOTE  bynetcop47  root /home2/tpcd/pfast/inmod/part/part;
REMOTE  bynetcop47  root /home2/tpcd/pfast/inmod/part1/part;
REMOTE  bynetcop48  root /home2/tpcd/pfast/inmod/part/part;
REMOTE  bynetcop48  root /home2/tpcd/pfast/inmod/part1/part;
REMOTE  bynetcop49  root /home2/tpcd/pfast/inmod/part/part;
REMOTE  bynetcop49  root /home2/tpcd/pfast/inmod/part1/part;
REMOTE  bynetcop50  root /home2/tpcd/pfast/inmod/part/part;
REMOTE  bynetcop50  root /home2/tpcd/pfast/inmod/part1/part;
REMOTE  bynetcop51  root /home2/tpcd/pfast/inmod/part/part;
REMOTE  bynetcop51  root /home2/tpcd/pfast/inmod/part1/part;
REMOTE  bynetcop52  root /home2/tpcd/pfast/inmod/part/part;
REMOTE  bynetcop52  root /home2/tpcd/pfast/inmod/part1/part;
REMOTE  bynetcop53  root /home2/tpcd/pfast/inmod/part/part;
REMOTE  bynetcop53  root /home2/tpcd/pfast/inmod/part1/part;
REMOTE  bynetcop54  root /home2/tpcd/pfast/inmod/part/part;
REMOTE  bynetcop54  root /home2/tpcd/pfast/inmod/part1/part;
REMOTE  bynetcop55  root /home2/tpcd/pfast/inmod/part/part;
REMOTE  bynetcop55  root /home2/tpcd/pfast/inmod/part1/part;
REMOTE  bynetcop56  root /home2/tpcd/pfast/inmod/part/part;
REMOTE  bynetcop56  root /home2/tpcd/pfast/inmod/part1/part;
REMOTE  bynetcop57  root /home2/tpcd/pfast/inmod/part/part;
REMOTE  bynetcop57  root /home2/tpcd/pfast/inmod/part1/part;
REMOTE  bynetcop58  root /home2/tpcd/pfast/inmod/part/part;
REMOTE  bynetcop58  root /home2/tpcd/pfast/inmod/part1/part;
REMOTE  bynetcop59  root /home2/tpcd/pfast/inmod/part/part;
REMOTE  bynetcop59  root /home2/tpcd/pfast/inmod/part1/part;
REMOTE  bynetcop60  root /home2/tpcd/pfast/inmod/part/part;
REMOTE  bynetcop60  root /home2/tpcd/pfast/inmod/part1/part;
REMOTE  bynetcop61  root /home2/tpcd/pfast/inmod/part/part;
REMOTE  bynetcop61  root /home2/tpcd/pfast/inmod/part1/part;
REMOTE  bynetcop62  root /home2/tpcd/pfast/inmod/part/part;
REMOTE  bynetcop62  root /home2/tpcd/pfast/inmod/part1/part;
REMOTE  bynetcop63  root /home2/tpcd/pfast/inmod/part/part;
REMOTE  bynetcop63  root /home2/tpcd/pfast/inmod/part1/part;
REMOTE  bynetcop64  root /home2/tpcd/pfast/inmod/part/part;
REMOTE  bynetcop64  root /home2/tpcd/pfast/inmod/part1/part;
LOGON local/tpcd3000g,tpcd3000g;

DROP TABLE PARTTBL;
DROP TABLE ERRPARTTBL1;
DROP TABLE ERRPARTTBL2;

CREATE MULTISET TABLE PARTTBL
  (
    P_PARTKEY      INTEGER not null
   ,P_NAME         VARCHAR(55) CASESPECIFIC not null
   ,P_MFGR         CHAR(25) CASESPECIFIC not null
   ,P_BRAND        CHAR(10) CASESPECIFIC not null
   ,P_TYPE         VARCHAR(25) CASESPECIFIC not null
   ,P_SIZE         INTEGER not null
   ,P_CONTAINER    CHAR(10) CASESPECIFIC not null
   ,P_RETAILPRICE  DECIMAL(15,2) not null
   ,P_COMMENT      VARCHAR(23) CASESPECIFIC not null
  )
UNIQUE PRIMARY INDEX( P_PARTKEY );

BEGIN LOADING PARTTBL
      ERRORFILES ERRPARTTBL1, ERRPARTTBL2
      checkpoint 60;

DEFINE
    F_P_PARTKEY      (INTEGER)
   ,F_P_NAME         (VARCHAR(55))
   ,F_P_MFGR         (CHAR(25))
   ,F_P_BRAND        (CHAR(10))
   ,F_P_TYPE         (VARCHAR(25))
   ,F_P_SIZE         (INTEGER)
   ,F_P_CONTAINER    (CHAR(10))
   ,F_P_RETAILPRICE  (DECIMAL(15,2))
   ,F_P_COMMENT      (VARCHAR(23))
INMOD=BLKEXIT;

SHOW;

INSERT INTO PARTTBL
  (
    P_PARTKEY
   ,P_NAME
   ,P_MFGR
   ,P_BRAND
   ,P_TYPE
   ,P_SIZE
   ,P_CONTAINER
   ,P_RETAILPRICE
   ,P_COMMENT
  )
VALUES
  (
   :F_P_PARTKEY,
   :F_P_NAME,
   :F_P_MFGR,
   :F_P_BRAND,
```

```
   :F_P_TYPE,
   :F_P_SIZE,
   :F_P_CONTAINER,
   :F_P_RETAILPRICE,
   :F_P_COMMENT
  );

END LOADING;

LOGOFF;

----------------------------------------
inmod.customer
----------------------------------------

SESSIONS 1280;

REMOTE  bynetcop1  root
/home2/tpcd/pfast/inmod/customer/customer;
REMOTE  bynetcop1  root
/home2/tpcd/pfast/inmod/customer1/customer;
REMOTE  bynetcop2  root
/home2/tpcd/pfast/inmod/customer/customer;
REMOTE  bynetcop2  root
/home2/tpcd/pfast/inmod/customer1/customer;
REMOTE  bynetcop3  root
/home2/tpcd/pfast/inmod/customer/customer;
REMOTE  bynetcop3  root
/home2/tpcd/pfast/inmod/customer1/customer;
REMOTE  bynetcop4  root
/home2/tpcd/pfast/inmod/customer/customer;
REMOTE  bynetcop4  root
/home2/tpcd/pfast/inmod/customer1/customer;
REMOTE  bynetcop5  root
/home2/tpcd/pfast/inmod/customer/customer;
REMOTE  bynetcop5  root
/home2/tpcd/pfast/inmod/customer1/customer;
REMOTE  bynetcop6  root
/home2/tpcd/pfast/inmod/customer/customer;
REMOTE  bynetcop6  root
/home2/tpcd/pfast/inmod/customer1/customer;
REMOTE  bynetcop7  root
/home2/tpcd/pfast/inmod/customer/customer;
REMOTE  bynetcop7  root
/home2/tpcd/pfast/inmod/customer1/customer;
REMOTE  bynetcop8  root
/home2/tpcd/pfast/inmod/customer/customer;
REMOTE  bynetcop8  root
/home2/tpcd/pfast/inmod/customer1/customer;
REMOTE  bynetcop9  root
/home2/tpcd/pfast/inmod/customer/customer;
REMOTE  bynetcop9  root
/home2/tpcd/pfast/inmod/customer1/customer;
REMOTE  bynetcop10  root
/home2/tpcd/pfast/inmod/customer/customer;
REMOTE  bynetcop10  root
/home2/tpcd/pfast/inmod/customer1/customer;
REMOTE  bynetcop11  root
/home2/tpcd/pfast/inmod/customer/customer;
REMOTE  bynetcop11  root
/home2/tpcd/pfast/inmod/customer1/customer;
REMOTE  bynetcop12  root
/home2/tpcd/pfast/inmod/customer/customer;
REMOTE  bynetcop12  root
/home2/tpcd/pfast/inmod/customer1/customer;
REMOTE  bynetcop13  root
/home2/tpcd/pfast/inmod/customer/customer;
REMOTE  bynetcop13  root
/home2/tpcd/pfast/inmod/customer1/customer;
REMOTE  bynetcop14  root
/home2/tpcd/pfast/inmod/customer/customer;
REMOTE  bynetcop14  root
/home2/tpcd/pfast/inmod/customer1/customer;
REMOTE  bynetcop15  root
/home2/tpcd/pfast/inmod/customer/customer;
REMOTE  bynetcop15  root
/home2/tpcd/pfast/inmod/customer1/customer;
REMOTE  bynetcop16  root
/home2/tpcd/pfast/inmod/customer/customer;
REMOTE  bynetcop16  root
/home2/tpcd/pfast/inmod/customer1/customer;
REMOTE  bynetcop17  root
/home2/tpcd/pfast/inmod/customer/customer;
REMOTE  bynetcop17  root
/home2/tpcd/pfast/inmod/customer1/customer;
REMOTE  bynetcop18  root
/home2/tpcd/pfast/inmod/customer/customer;
REMOTE  bynetcop18  root
/home2/tpcd/pfast/inmod/customer1/customer;
REMOTE  bynetcop19  root
/home2/tpcd/pfast/inmod/customer/customer;
REMOTE  bynetcop19  root
/home2/tpcd/pfast/inmod/customer1/customer;
```

```
REMOTE  bynetcop20  root
/home2/tpcd/pfast/inmod/customer/customer;
REMOTE  bynetcop20  root
/home2/tpcd/pfast/inmod/customer1/customer;
REMOTE  bynetcop21  root
/home2/tpcd/pfast/inmod/customer/customer;
REMOTE  bynetcop21  root
/home2/tpcd/pfast/inmod/customer1/customer;
REMOTE  bynetcop22  root
/home2/tpcd/pfast/inmod/customer/customer;
REMOTE  bynetcop22  root
/home2/tpcd/pfast/inmod/customer1/customer;
REMOTE  bynetcop23  root
/home2/tpcd/pfast/inmod/customer/customer;
REMOTE  bynetcop23  root
/home2/tpcd/pfast/inmod/customer1/customer;
REMOTE  bynetcop24  root
/home2/tpcd/pfast/inmod/customer/customer;
REMOTE  bynetcop24  root
/home2/tpcd/pfast/inmod/customer1/customer;
REMOTE  bynetcop25  root
/home2/tpcd/pfast/inmod/customer/customer;
REMOTE  bynetcop25  root
/home2/tpcd/pfast/inmod/customer1/customer;
REMOTE  bynetcop26  root
/home2/tpcd/pfast/inmod/customer/customer;
REMOTE  bynetcop26  root
/home2/tpcd/pfast/inmod/customer1/customer;
REMOTE  bynetcop27  root
/home2/tpcd/pfast/inmod/customer/customer;
REMOTE  bynetcop27  root
/home2/tpcd/pfast/inmod/customer1/customer;
REMOTE  bynetcop28  root
/home2/tpcd/pfast/inmod/customer/customer;
REMOTE  bynetcop28  root
/home2/tpcd/pfast/inmod/customer1/customer;
REMOTE  bynetcop29  root
/home2/tpcd/pfast/inmod/customer/customer;
REMOTE  bynetcop29  root
/home2/tpcd/pfast/inmod/customer1/customer;
REMOTE  bynetcop30  root
/home2/tpcd/pfast/inmod/customer/customer;
REMOTE  bynetcop30  root
/home2/tpcd/pfast/inmod/customer1/customer;
REMOTE  bynetcop31  root
/home2/tpcd/pfast/inmod/customer/customer;
REMOTE  bynetcop31  root
/home2/tpcd/pfast/inmod/customer1/customer;
REMOTE  bynetcop32  root
/home2/tpcd/pfast/inmod/customer/customer;
REMOTE  bynetcop32  root
/home2/tpcd/pfast/inmod/customer1/customer;
REMOTE  bynetcop33  root
/home2/tpcd/pfast/inmod/customer/customer;
REMOTE  bynetcop33  root
/home2/tpcd/pfast/inmod/customer1/customer;
REMOTE  bynetcop34  root
/home2/tpcd/pfast/inmod/customer/customer;
REMOTE  bynetcop34  root
/home2/tpcd/pfast/inmod/customer1/customer;
REMOTE  bynetcop35  root
/home2/tpcd/pfast/inmod/customer/customer;
REMOTE  bynetcop35  root
/home2/tpcd/pfast/inmod/customer1/customer;
REMOTE  bynetcop36  root
/home2/tpcd/pfast/inmod/customer/customer;
REMOTE  bynetcop36  root
/home2/tpcd/pfast/inmod/customer1/customer;
REMOTE  bynetcop37  root
/home2/tpcd/pfast/inmod/customer/customer;
REMOTE  bynetcop37  root
/home2/tpcd/pfast/inmod/customer1/customer;
REMOTE  bynetcop38  root
/home2/tpcd/pfast/inmod/customer/customer;
REMOTE  bynetcop38  root
/home2/tpcd/pfast/inmod/customer1/customer;
REMOTE  bynetcop39  root
/home2/tpcd/pfast/inmod/customer/customer;
REMOTE  bynetcop39  root
/home2/tpcd/pfast/inmod/customer1/customer;
REMOTE  bynetcop40  root
/home2/tpcd/pfast/inmod/customer/customer;
REMOTE  bynetcop40  root
/home2/tpcd/pfast/inmod/customer1/customer;
REMOTE  bynetcop41  root
/home2/tpcd/pfast/inmod/customer/customer;
REMOTE  bynetcop41  root
/home2/tpcd/pfast/inmod/customer1/customer;
REMOTE  bynetcop42  root
/home2/tpcd/pfast/inmod/customer/customer;
REMOTE  bynetcop42  root
/home2/tpcd/pfast/inmod/customer1/customer;
```

```
REMOTE  bynetcop43  root
/home2/tpcd/pfast/inmod/customer/customer;
REMOTE  bynetcop43  root
/home2/tpcd/pfast/inmod/customer1/customer;
REMOTE  bynetcop44  root
/home2/tpcd/pfast/inmod/customer/customer;
REMOTE  bynetcop44  root
/home2/tpcd/pfast/inmod/customer1/customer;
REMOTE  bynetcop45  root
/home2/tpcd/pfast/inmod/customer/customer;
REMOTE  bynetcop45  root
/home2/tpcd/pfast/inmod/customer1/customer;
REMOTE  bynetcop46  root
/home2/tpcd/pfast/inmod/customer/customer;
REMOTE  bynetcop46  root
/home2/tpcd/pfast/inmod/customer1/customer;
REMOTE  bynetcop47  root
/home2/tpcd/pfast/inmod/customer/customer;
REMOTE  bynetcop47  root
/home2/tpcd/pfast/inmod/customer1/customer;
REMOTE  bynetcop48  root
/home2/tpcd/pfast/inmod/customer/customer;
REMOTE  bynetcop48  root
/home2/tpcd/pfast/inmod/customer1/customer;
REMOTE  bynetcop49  root
/home2/tpcd/pfast/inmod/customer/customer;
REMOTE  bynetcop49  root
/home2/tpcd/pfast/inmod/customer1/customer;
REMOTE  bynetcop50  root
/home2/tpcd/pfast/inmod/customer/customer;
REMOTE  bynetcop50  root
/home2/tpcd/pfast/inmod/customer1/customer;
REMOTE  bynetcop51  root
/home2/tpcd/pfast/inmod/customer/customer;
REMOTE  bynetcop51  root
/home2/tpcd/pfast/inmod/customer1/customer;
REMOTE  bynetcop52  root
/home2/tpcd/pfast/inmod/customer/customer;
REMOTE  bynetcop52  root
/home2/tpcd/pfast/inmod/customer1/customer;
REMOTE  bynetcop53  root
/home2/tpcd/pfast/inmod/customer/customer;
REMOTE  bynetcop53  root
/home2/tpcd/pfast/inmod/customer1/customer;
REMOTE  bynetcop54  root
/home2/tpcd/pfast/inmod/customer/customer;
REMOTE  bynetcop54  root
/home2/tpcd/pfast/inmod/customer1/customer;
REMOTE  bynetcop55  root
/home2/tpcd/pfast/inmod/customer/customer;
REMOTE  bynetcop55  root
/home2/tpcd/pfast/inmod/customer1/customer;
REMOTE  bynetcop56  root
/home2/tpcd/pfast/inmod/customer/customer;
REMOTE  bynetcop56  root
/home2/tpcd/pfast/inmod/customer1/customer;
REMOTE  bynetcop57  root
/home2/tpcd/pfast/inmod/customer/customer;
REMOTE  bynetcop57  root
/home2/tpcd/pfast/inmod/customer1/customer;
REMOTE  bynetcop58  root
/home2/tpcd/pfast/inmod/customer/customer;
REMOTE  bynetcop58  root
/home2/tpcd/pfast/inmod/customer1/customer;
REMOTE  bynetcop59  root
/home2/tpcd/pfast/inmod/customer/customer;
REMOTE  bynetcop59  root
/home2/tpcd/pfast/inmod/customer1/customer;
REMOTE  bynetcop60  root
/home2/tpcd/pfast/inmod/customer/customer;
REMOTE  bynetcop60  root
/home2/tpcd/pfast/inmod/customer1/customer;
REMOTE  bynetcop61  root
/home2/tpcd/pfast/inmod/customer/customer;
REMOTE  bynetcop61  root
/home2/tpcd/pfast/inmod/customer1/customer;
REMOTE  bynetcop62  root
/home2/tpcd/pfast/inmod/customer/customer;
REMOTE  bynetcop62  root
/home2/tpcd/pfast/inmod/customer1/customer;
REMOTE  bynetcop63  root
/home2/tpcd/pfast/inmod/customer/customer;
REMOTE  bynetcop63  root
/home2/tpcd/pfast/inmod/customer1/customer;
REMOTE  bynetcop64  root
/home2/tpcd/pfast/inmod/customer/customer;
REMOTE  bynetcop64  root
/home2/tpcd/pfast/inmod/customer1/customer;
LOGON local/tpcd3000g,tpcd3000g;

DROP TABLE CUSTOMER;
DROP TABLE ERRCUSTOMER1;
DROP TABLE ERRCUSTOMER2;
```

```
CREATE MULTISET TABLE CUSTOMER
  (
    C_CUSTKEY     INTEGER not null
   ,C_NAME        VARCHAR(25) CASESPECIFIC not null
   ,C_ADDRESS     VARCHAR(40) CASESPECIFIC not null
   ,C_NATIONKEY   INTEGER not null
   ,C_PHONE       CHAR(15) CASESPECIFIC not null
   ,C_ACCTBAL     DECIMAL(15,2) not null
   ,C_MKTSEGMENT  CHAR(10) CASESPECIFIC not null
   ,C_COMMENT     VARCHAR(117) CASESPECIFIC not null
  )
UNIQUE PRIMARY INDEX( C_CUSTKEY );

BEGIN LOADING CUSTOMER
      ERRORFILES ERRCUSTOMER1, ERRCUSTOMER2
       checkpoint 60;

DEFINE
   F_C_CUSTKEY     (INTEGER)
  ,F_C_NAME        (VARCHAR(25))
  ,F_C_ADDRESS     (VARCHAR(40))
  ,F_C_NATIONKEY   (INTEGER)
  ,F_C_PHONE       (CHAR(15))
  ,F_C_ACCTBAL     (DECIMAL(15,2))
  ,F_C_MKTSEGMENT  (CHAR(10))
  ,F_C_COMMENT     (VARCHAR(117))
INMOD=BLKEXIT;

SHOW;

INSERT INTO CUSTOMER
  (
    C_CUSTKEY
   ,C_NAME
   ,C_ADDRESS
   ,C_NATIONKEY
   ,C_PHONE
   ,C_ACCTBAL
   ,C_MKTSEGMENT
   ,C_COMMENT
  )
VALUES
  (
   :F_C_CUSTKEY,
   :F_C_NAME,
   :F_C_ADDRESS,
   :F_C_NATIONKEY,
   :F_C_PHONE,
   :F_C_ACCTBAL,
   :F_C_MKTSEGMENT,
   :F_C_COMMENT
  );

END LOADING;

LOGOFF;
```

```
----------------------------------------
inmod.supplier
----------------------------------------

SESSIONS 1280;

REMOTE  bynetcop1  root
/home2/tpcd/pfast/inmod/supplier/supplier;
REMOTE  bynetcop1  root
/home2/tpcd/pfast/inmod/supplier1/supplier;
REMOTE  bynetcop2  root
/home2/tpcd/pfast/inmod/supplier/supplier;
REMOTE  bynetcop2  root
/home2/tpcd/pfast/inmod/supplier1/supplier;
REMOTE  bynetcop3  root
/home2/tpcd/pfast/inmod/supplier/supplier;
REMOTE  bynetcop3  root
/home2/tpcd/pfast/inmod/supplier1/supplier;
REMOTE  bynetcop4  root
/home2/tpcd/pfast/inmod/supplier/supplier;
REMOTE  bynetcop4  root
/home2/tpcd/pfast/inmod/supplier1/supplier;
REMOTE  bynetcop5  root
/home2/tpcd/pfast/inmod/supplier/supplier;
REMOTE  bynetcop5  root
/home2/tpcd/pfast/inmod/supplier1/supplier;
REMOTE  bynetcop6  root
/home2/tpcd/pfast/inmod/supplier/supplier;
REMOTE  bynetcop6  root
/home2/tpcd/pfast/inmod/supplier1/supplier;
REMOTE  bynetcop7  root
/home2/tpcd/pfast/inmod/supplier/supplier;
REMOTE  bynetcop7  root
/home2/tpcd/pfast/inmod/supplier1/supplier;
REMOTE  bynetcop8  root
/home2/tpcd/pfast/inmod/supplier/supplier;
```

```
REMOTE  bynetcop8  root
/home2/tpcd/pfast/inmod/supplier1/supplier;
REMOTE  bynetcop9  root
/home2/tpcd/pfast/inmod/supplier/supplier;
REMOTE  bynetcop9  root
/home2/tpcd/pfast/inmod/supplier1/supplier;
REMOTE  bynetcop10  root
/home2/tpcd/pfast/inmod/supplier/supplier;
REMOTE  bynetcop10  root
/home2/tpcd/pfast/inmod/supplier1/supplier;
REMOTE  bynetcop11  root
/home2/tpcd/pfast/inmod/supplier/supplier;
REMOTE  bynetcop11  root
/home2/tpcd/pfast/inmod/supplier1/supplier;
REMOTE  bynetcop12  root
/home2/tpcd/pfast/inmod/supplier/supplier;
REMOTE  bynetcop12  root
/home2/tpcd/pfast/inmod/supplier1/supplier;
REMOTE  bynetcop13  root
/home2/tpcd/pfast/inmod/supplier/supplier;
REMOTE  bynetcop13  root
/home2/tpcd/pfast/inmod/supplier1/supplier;
REMOTE  bynetcop14  root
/home2/tpcd/pfast/inmod/supplier/supplier;
REMOTE  bynetcop14  root
/home2/tpcd/pfast/inmod/supplier1/supplier;
REMOTE  bynetcop15  root
/home2/tpcd/pfast/inmod/supplier/supplier;
REMOTE  bynetcop15  root
/home2/tpcd/pfast/inmod/supplier1/supplier;
REMOTE  bynetcop16  root
/home2/tpcd/pfast/inmod/supplier/supplier;
REMOTE  bynetcop16  root
/home2/tpcd/pfast/inmod/supplier1/supplier;
REMOTE  bynetcop17  root
/home2/tpcd/pfast/inmod/supplier/supplier;
REMOTE  bynetcop17  root
/home2/tpcd/pfast/inmod/supplier1/supplier;
REMOTE  bynetcop18  root
/home2/tpcd/pfast/inmod/supplier/supplier;
REMOTE  bynetcop18  root
/home2/tpcd/pfast/inmod/supplier1/supplier;
REMOTE  bynetcop19  root
/home2/tpcd/pfast/inmod/supplier/supplier;
REMOTE  bynetcop19  root
/home2/tpcd/pfast/inmod/supplier1/supplier;
REMOTE  bynetcop20  root
/home2/tpcd/pfast/inmod/supplier/supplier;
REMOTE  bynetcop20  root
/home2/tpcd/pfast/inmod/supplier1/supplier;
REMOTE  bynetcop21  root
/home2/tpcd/pfast/inmod/supplier/supplier;
REMOTE  bynetcop21  root
/home2/tpcd/pfast/inmod/supplier1/supplier;
REMOTE  bynetcop22  root
/home2/tpcd/pfast/inmod/supplier/supplier;
REMOTE  bynetcop22  root
/home2/tpcd/pfast/inmod/supplier1/supplier;
REMOTE  bynetcop23  root
/home2/tpcd/pfast/inmod/supplier/supplier;
REMOTE  bynetcop23  root
/home2/tpcd/pfast/inmod/supplier1/supplier;
REMOTE  bynetcop24  root
/home2/tpcd/pfast/inmod/supplier/supplier;
REMOTE  bynetcop24  root
/home2/tpcd/pfast/inmod/supplier1/supplier;
REMOTE  bynetcop25  root
/home2/tpcd/pfast/inmod/supplier/supplier;
REMOTE  bynetcop25  root
/home2/tpcd/pfast/inmod/supplier1/supplier;
REMOTE  bynetcop26  root
/home2/tpcd/pfast/inmod/supplier/supplier;
REMOTE  bynetcop26  root
/home2/tpcd/pfast/inmod/supplier1/supplier;
REMOTE  bynetcop27  root
/home2/tpcd/pfast/inmod/supplier/supplier;
REMOTE  bynetcop27  root
/home2/tpcd/pfast/inmod/supplier1/supplier;
REMOTE  bynetcop28  root
/home2/tpcd/pfast/inmod/supplier/supplier;
REMOTE  bynetcop28  root
/home2/tpcd/pfast/inmod/supplier1/supplier;
REMOTE  bynetcop29  root
/home2/tpcd/pfast/inmod/supplier/supplier;
REMOTE  bynetcop29  root
/home2/tpcd/pfast/inmod/supplier1/supplier;
REMOTE  bynetcop30  root
/home2/tpcd/pfast/inmod/supplier/supplier;
REMOTE  bynetcop30  root
/home2/tpcd/pfast/inmod/supplier1/supplier;
REMOTE  bynetcop31  root
/home2/tpcd/pfast/inmod/supplier/supplier;
```

```
REMOTE  bynetcop31  root
/home2/tpcd/pfast/inmod/supplier1/supplier;
REMOTE  bynetcop32  root
/home2/tpcd/pfast/inmod/supplier/supplier;
REMOTE  bynetcop32  root
/home2/tpcd/pfast/inmod/supplier1/supplier;
REMOTE  bynetcop33  root
/home2/tpcd/pfast/inmod/supplier/supplier;
REMOTE  bynetcop33  root
/home2/tpcd/pfast/inmod/supplier1/supplier;
REMOTE  bynetcop34  root
/home2/tpcd/pfast/inmod/supplier/supplier;
REMOTE  bynetcop34  root
/home2/tpcd/pfast/inmod/supplier1/supplier;
REMOTE  bynetcop35  root
/home2/tpcd/pfast/inmod/supplier/supplier;
REMOTE  bynetcop35  root
/home2/tpcd/pfast/inmod/supplier1/supplier;
REMOTE  bynetcop36  root
/home2/tpcd/pfast/inmod/supplier/supplier;
REMOTE  bynetcop36  root
/home2/tpcd/pfast/inmod/supplier1/supplier;
REMOTE  bynetcop37  root
/home2/tpcd/pfast/inmod/supplier/supplier;
REMOTE  bynetcop37  root
/home2/tpcd/pfast/inmod/supplier1/supplier;
REMOTE  bynetcop38  root
/home2/tpcd/pfast/inmod/supplier/supplier;
REMOTE  bynetcop38  root
/home2/tpcd/pfast/inmod/supplier1/supplier;
REMOTE  bynetcop39  root
/home2/tpcd/pfast/inmod/supplier/supplier;
REMOTE  bynetcop39  root
/home2/tpcd/pfast/inmod/supplier1/supplier;
REMOTE  bynetcop40  root
/home2/tpcd/pfast/inmod/supplier/supplier;
REMOTE  bynetcop40  root
/home2/tpcd/pfast/inmod/supplier1/supplier;
REMOTE  bynetcop41  root
/home2/tpcd/pfast/inmod/supplier/supplier;
REMOTE  bynetcop41  root
/home2/tpcd/pfast/inmod/supplier1/supplier;
REMOTE  bynetcop42  root
/home2/tpcd/pfast/inmod/supplier/supplier;
REMOTE  bynetcop42  root
/home2/tpcd/pfast/inmod/supplier1/supplier;
REMOTE  bynetcop43  root
/home2/tpcd/pfast/inmod/supplier/supplier;
REMOTE  bynetcop43  root
/home2/tpcd/pfast/inmod/supplier1/supplier;
REMOTE  bynetcop44  root
/home2/tpcd/pfast/inmod/supplier/supplier;
REMOTE  bynetcop44  root
/home2/tpcd/pfast/inmod/supplier1/supplier;
REMOTE  bynetcop45  root
/home2/tpcd/pfast/inmod/supplier/supplier;
REMOTE  bynetcop45  root
/home2/tpcd/pfast/inmod/supplier1/supplier;
REMOTE  bynetcop46  root
/home2/tpcd/pfast/inmod/supplier/supplier;
REMOTE  bynetcop46  root
/home2/tpcd/pfast/inmod/supplier1/supplier;
REMOTE  bynetcop47  root
/home2/tpcd/pfast/inmod/supplier/supplier;
REMOTE  bynetcop47  root
/home2/tpcd/pfast/inmod/supplier1/supplier;
REMOTE  bynetcop48  root
/home2/tpcd/pfast/inmod/supplier/supplier;
REMOTE  bynetcop48  root
/home2/tpcd/pfast/inmod/supplier1/supplier;
REMOTE  bynetcop49  root
/home2/tpcd/pfast/inmod/supplier/supplier;
REMOTE  bynetcop49  root
/home2/tpcd/pfast/inmod/supplier1/supplier;
REMOTE  bynetcop50  root
/home2/tpcd/pfast/inmod/supplier/supplier;
REMOTE  bynetcop50  root
/home2/tpcd/pfast/inmod/supplier1/supplier;
REMOTE  bynetcop51  root
/home2/tpcd/pfast/inmod/supplier/supplier;
REMOTE  bynetcop51  root
/home2/tpcd/pfast/inmod/supplier1/supplier;
REMOTE  bynetcop52  root
/home2/tpcd/pfast/inmod/supplier/supplier;
REMOTE  bynetcop52  root
/home2/tpcd/pfast/inmod/supplier1/supplier;
REMOTE  bynetcop53  root
/home2/tpcd/pfast/inmod/supplier/supplier;
REMOTE  bynetcop53  root
/home2/tpcd/pfast/inmod/supplier1/supplier;
REMOTE  bynetcop54  root
/home2/tpcd/pfast/inmod/supplier/supplier;
```

```
REMOTE  bynetcop54  root
/home2/tpcd/pfast/inmod/supplier1/supplier;
REMOTE  bynetcop55  root
/home2/tpcd/pfast/inmod/supplier/supplier;
REMOTE  bynetcop55  root
/home2/tpcd/pfast/inmod/supplier1/supplier;
REMOTE  bynetcop56  root
/home2/tpcd/pfast/inmod/supplier/supplier;
REMOTE  bynetcop56  root
/home2/tpcd/pfast/inmod/supplier1/supplier;
REMOTE  bynetcop57  root
/home2/tpcd/pfast/inmod/supplier/supplier;
REMOTE  bynetcop57  root
/home2/tpcd/pfast/inmod/supplier1/supplier;
REMOTE  bynetcop58  root
/home2/tpcd/pfast/inmod/supplier/supplier;
REMOTE  bynetcop58  root
/home2/tpcd/pfast/inmod/supplier1/supplier;
REMOTE  bynetcop59  root
/home2/tpcd/pfast/inmod/supplier/supplier;
REMOTE  bynetcop59  root
/home2/tpcd/pfast/inmod/supplier1/supplier;
REMOTE  bynetcop60  root
/home2/tpcd/pfast/inmod/supplier/supplier;
REMOTE  bynetcop60  root
/home2/tpcd/pfast/inmod/supplier1/supplier;
REMOTE  bynetcop61  root
/home2/tpcd/pfast/inmod/supplier/supplier;
REMOTE  bynetcop61  root
/home2/tpcd/pfast/inmod/supplier1/supplier;
REMOTE  bynetcop62  root
/home2/tpcd/pfast/inmod/supplier/supplier;
REMOTE  bynetcop62  root
/home2/tpcd/pfast/inmod/supplier1/supplier;
REMOTE  bynetcop63  root
/home2/tpcd/pfast/inmod/supplier/supplier;
REMOTE  bynetcop63  root
/home2/tpcd/pfast/inmod/supplier1/supplier;
REMOTE  bynetcop64  root
/home2/tpcd/pfast/inmod/supplier/supplier;
REMOTE  bynetcop64  root
/home2/tpcd/pfast/inmod/supplier1/supplier;
LOGON local/tpcd3000g,tpcd3000g;

DROP TABLE SUPPLIER;
DROP TABLE ERRSUPPLIER1;
DROP TABLE ERRSUPPLIER2;
```

```
CREATE MULTISET TABLE SUPPLIER
  (
    S_SUPPKEY    INTEGER not null
   ,S_NAME       CHAR(25) CASESPECIFIC not null
   ,S_ADDRESS    VARCHAR(40) CASESPECIFIC not null
   ,S_NATIONKEY  INTEGER not null
   ,S_PHONE      CHAR(15) CASESPECIFIC not null
   ,S_ACCTBAL    DECIMAL(15,2) not null
   ,S_COMMENT    VARCHAR(101) CASESPECIFIC not null
  )
UNIQUE PRIMARY INDEX( S_SUPPKEY );

BEGIN LOADING SUPPLIER
      ERRORFILES ERRSUPPLIER1, ERRSUPPLIER2
       checkpoint 60;

DEFINE
   F_S_SUPPKEY    (INTEGER)
  ,F_S_NAME       (CHAR(25))
  ,F_S_ADDRESS    (VARCHAR(40))
  ,F_S_NATIONKEY  (INTEGER)
  ,F_S_PHONE      (CHAR(15))
  ,F_S_ACCTBAL    (DECIMAL(15,2))
  ,F_S_COMMENT    (VARCHAR(101))
INMOD=BLKEXIT;

SHOW;

INSERT INTO SUPPLIER
  (
    S_SUPPKEY
   ,S_NAME
   ,S_ADDRESS
   ,S_NATIONKEY
   ,S_PHONE
   ,S_ACCTBAL
   ,S_COMMENT
  )
VALUES
  (
   :F_S_SUPPKEY,
   :F_S_NAME,
   :F_S_ADDRESS,
   :F_S_NATIONKEY,
   :F_S_PHONE,
   :F_S_ACCTBAL,
```

```
   :F_S_COMMENT
  );

END LOADING;

LOGOFF;

----------------------------------------
inmod.nation
----------------------------------------

SESSIONS 1;

REMOTE  bynetcop1  root /home2/tpcd/pfast/inmod/nation/nation;

LOGON local/tpcd3000g,tpcd3000g;
DROP TABLE NATION;
DROP TABLE ERRNATIONTMP1;
DROP TABLE ERRNATIONTMP2;

CREATE MULTISET TABLE NATION
  (
   N_NATIONKEY INTEGER NOT NULL
  ,N_NAME CHAR(25) CASESPECIFIC NOT NULL
  ,N_REGIONKEY INTEGER NOT NULL
  ,N_COMMENT VARCHAR(152) CASESPECIFIC NOT NULL
  )
UNIQUE PRIMARY INDEX ( N_NATIONKEY );

BEGIN LOADING NATION
      ERRORFILES ERRNATIONTMP1, ERRNATIONTMP2
      checkpoint 60;

DEFINE
   F_N_NATIONKEY (INTEGER)
  ,F_N_NAME (CHAR(25))
  ,F_N_REGIONKEY (INTEGER)
  ,F_N_COMMENT (VARCHAR(152))
INMOD=BLKEXIT;

SHOW;

INSERT INTO NATION
 (
   N_NATIONKEY
  ,N_NAME
  ,N_REGIONKEY
  ,N_COMMENT
 )
VALUES
(
  :F_N_NATIONKEY
 ,:F_N_NAME
 ,:F_N_REGIONKEY
 ,:F_N_COMMENT
);

END LOADING;

.LOGOFF;

----------------------------------------
inmod.region
----------------------------------------

SESSIONS 1;

REMOTE  bynetcop1  root /home2/tpcd/pfast/inmod/region/region;

LOGON local/tpcd3000g,tpcd3000g;
DROP TABLE REGION;
DROP TABLE ERRREGIONTMP1;
DROP TABLE ERRREGIONTMP2;

CREATE MULTISET TABLE REGION
  (
   R_REGIONKEY INTEGER NOT NULL
  ,R_NAME CHAR(25) CASESPECIFIC NOT NULL
  ,R_COMMENT VARCHAR(152) CASESPECIFIC NOT NULL
  )
UNIQUE PRIMARY INDEX ( R_REGIONKEY );

BEGIN LOADING REGION
      ERRORFILES ERRREGIONTMP1, ERRREGIONTMP2
      checkpoint 60;

DEFINE
   F_R_REGIONKEY (INTEGER)
  ,F_R_NAME (CHAR(25))
  ,F_R_COMMENT (VARCHAR(152))
INMOD=BLKEXIT;

SHOW;
```

```
INSERT INTO REGION
 (
   R_REGIONKEY
  ,R_NAME
  ,R_COMMENT
 )
VALUES
(
  :F_R_REGIONKEY
 ,:F_R_NAME
 ,:F_R_COMMENT
);

END LOADING;

.LOGOFF;
```

Appendix F. Driver and Implementation Specific Layer Detail

Driver program

The driver program "tpcddriver" was written to simplify running the benchmark. It incorporates all of the QGEN program, plus those parts of the DBGEN program related to generating update sets. This driver is capable of running the entire benchmark, including both the power test and the throughput tests. It uses standard Teradata call-level interface (CLIv2) to send requests to the Teradata system. Because CLIv2 operates at a very low level, an implementation specific layer was added between the driver and CLIv2 to hide some of the complexities of CLIv2 from the main body of the tpcddriver.

The file tpcddriver.c is the main program for the driver. Vsub.c is the same as the standard varsub.c from the standard QGEN code, with modifications to make the substitutions in a buffer instead of writing them to disk. The files build.c, bm_utils.c, rnd.c, and bcd2.c are used unmodified from the standard DBGEN distribution. The include files sqltypes.h and sql.h are standard include files to define X/Open CLI style of interface. These can be found from either the ISO CLI spec (ISO/IEC 9075-3:1995) or from the Microsoft ODBC SDK.

tpcddriver.c

```
/* @(#)tpcddriver.c  2.1.2.2 */
/*
 * tpcddriver.c  This program is a master driver program that
runs
 * the entire TPC-D benchmark.  It first runs the power tests,
then
 * it runs the throughput tests.  It includes the queries and the
 * update functions UF1 and UF2.
 * This program incorporates all of QGEN.  It also has some of
 * DBGEN incorporated so it can generate update data on the fly.
 */
#define DECLARER
#define NO_FUNC (int (*) ()) NULL /* to clean up tdefs */
#define NO_LFUNC (long (*) ()) NULL             /* to clean up
tdefs */
#define MAXSESS 500
#define MAXKIDS 999
#define EVERYTHING        0x10000
#define LOG0(f, m) \
       if (f & 0x01) { fprintf(fdetail, m); fflush(fdetail); }
       \
       if (f & 0x02) { fprintf(stdout, m); fflush(fdetail); } \
       if (f & 0x04) fprintf(stderr, m)
#define LOG1(f, m, a1) \
       if (f & 0x01) { fprintf(fdetail, m, a1); fflush(fdetail);
}      \
       if (f & 0x02) { fprintf(stdout, m, a1); fflush(fdetail); }
       \
       if (f & 0x04) fprintf(stderr, m, a1)
#define LOG2(f, m, a1, a2) \
       if (f & 0x01) { fprintf(fdetail, m, a1, a2);
fflush(fdetail); }   \
       if (f & 0x02) { fprintf(stdout, m, a1, a2);
fflush(fdetail); }   \
       if (f & 0x04) fprintf(stderr, m, a1, a2)
#define LOG3(f, m, a1, a2, a3) \
       if (f & 0x01) { fprintf(fdetail, m, a1, a2, a3);
fflush(fdetail); }   \
       if (f & 0x02) { fprintf(stdout, m, a1, a2, a3);
fflush(fdetail); }   \
       if (f & 0x04) fprintf(stderr, m, a1, a2, a3)

#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#include <time.h>
#include <sys/timeb.h>
#include <limits.h>
#include <math.h>
#include <sys/types.h>
#include <sys/timeb.h>
#include <signal.h>
#include <errno.h>
```

```
#if (defined(_POSIX_)||!defined(WIN32))
#include <unistd.h>
#include <sys/wait.h>
#define INLINE _Inline
#else
#include <process.h>
#define INLINE _inline
#ifndef timeb
#define timeb _timeb
#endif
#ifndef itoa
#define itoa _itoa
#endif
#ifndef ftime
#define ftime _ftime
#endif
#ifndef sleep
#define sleep(x) Sleep(x*1000)
typedef unsigned long DWORD;
__declspec(dllimport) void __stdcall Sleep(DWORD dwMillseconds);
#endif

#endif
#include <ctype.h>
#include <time.h>
#include <assert.h>

#undef FAR
#define FAR

typedef void *HWND;
#include <sqltypes.h>
#include <sql.h>
#include <sqlext.h>
#include <coptypes.h>
#include <dbcarea.h>
#include <parcel.h>
#undef VERSION

/* includes from QGEN */
#include "config.h"
#include "dss.h"
#include "tpcd.h"
#include "permute.h"
/* These two from DBGEN */
#include "dsstypes.h"
#include "bcd2.h"

/*
 * prototypes for seed functions needed by set_state for insert
generation
 * added 13 Aug 99 jms
 */
sd_order (int child, long skip_count);
sd_line (int child, long skip_count);

SQLRETURN SQL_API SQLSetUsingParcel (

       SQLHSTMT hstmt,

       char *uptr,

       long ulen);

SQLRETURN SQL_API SQLWaitForAny (

       SQLHENV henv,

       SQLHSTMT * lphstmt,
                                                                    int
*stmtno);

#ifndef BOOL
typedef int BOOL;
#endif
#ifndef TRUE
#define TRUE 1
#endif
#ifndef FALSE
#define FALSE 0
#endif
long throughputstreams;
int ac1;
char **av1;
int pids[MAXKIDS];
extern seed_t Seed[];

SQLHENV henv;
SQLHDBC hdbcs[MAXSESS + 1];
SQLHSTMT hstmts[MAXSESS + 1];
BOOL hstmtbusy[MAXSESS + 1];
SQLHDBC hdbc;
SQLHSTMT hstmt;
```

```
#define LINE_SIZE 512

/*
 * Function Protoypes
 */

int prep_direct(char *);
int close_direct(void);
int ld_line(order_t * o, int mode);
int ld_order(order_t * o, int mode);
int ld_order_line(order_t * o, int mode);
int ld_deletes (DSS_HUGE * okey, int mode);

void vsub PROTO ((char *SQLRequest, int qnum, int vnum, int
flags));
int strip_comments PROTO ((char *line));
void usage PROTO ((void));
int process_options PROTO ((int cnt, char **args));
int setup PROTO ((void));
void qsub PROTO ((char *qtag, int flags));
void gen_updates (long start, long count, long upd_num);
int gen_deletes (long min, long cnt, long num, int special);



extern char *optarg;
extern int optind;
char **mk_ascdate (void);

char **asc_date;
int snum = -1;
int use_fastload_for_updates = 3;
char *prog;
char *p1 = NULL;
FILE *fdetail;
FILE *fsummary;


int xld_order (order_t * o, int mode);

tdef tdefs[] =
{
       {"part.tbl", "part table", 200000, NO_FUNC,
        {NO_FUNC, NO_FUNC}, NO_LFUNC, NO_FUNC, PSUPP, 0},
       {"partsupp.tbl", "partsupplier table", 200000, NO_FUNC,
        {NO_FUNC, NO_FUNC}, NO_LFUNC, NO_FUNC, NONE, 0},
       {"supplier.tbl", "suppliers table", 10000, NO_FUNC,
        {NO_FUNC, NO_FUNC}, NO_LFUNC, NO_FUNC, NONE, 0},
       {"customer.tbl", "customers table", 150000, NO_FUNC,
        {NO_FUNC, NO_FUNC}, NO_LFUNC, NO_FUNC, NONE, 0},
       {"orders.tbl", "order table", 150000, NO_FUNC,
        {NO_FUNC, NO_FUNC}, sd_order, NO_FUNC, LINE, NONE},
       {"lineitem.tbl", "lineitem table", 150000, NO_FUNC,
        {NO_FUNC, NO_FUNC}, sd_line, NO_FUNC, NONE, 0},
       {"orders.tbl", "order/lineitem tables", 150000, NO_FUNC,
        {NO_FUNC, NO_FUNC}, NO_LFUNC, NO_FUNC, LINE, 0},
       {"part.tbl", "part/partsupplier tables", 200000, NO_FUNC,
        {NO_FUNC, NO_FUNC}, NO_LFUNC, NO_FUNC, PSUPP, 0},
       {"nation.tbl", "nation table", NATIONS_MAX, NO_FUNC,
        {NO_FUNC, NO_FUNC}, NO_LFUNC, NO_FUNC, NONE, NONE},
       {"region.tbl", "region table", NATIONS_MAX, NO_FUNC,
        {NO_FUNC, NO_FUNC}, NO_LFUNC, NO_FUNC, NONE, NONE}
};

long SaveSeed[MAX_STREAM + 1];
long tempSeed;
long initSeeds[MAX_STREAM + 1];
long num_seeds = 0;
long rndm;
int rowcnt = 0;
long minrow = 0, upd_num = 0;
int setsPerReq = 1;
int maxSess = 56;
int specialtest = 0;
double flt_scale;
struct timeb StartTime;
double QueryTime[QUERIES_PER_SET + 1];
double UF1time;
double UF2time;
double Throughputtime;



char SQLRequest[32768];
char UsingBuffer[32768];
void mk_sparse(long i, DSS_HUGE *res, long seq);

/*
 * FUNCTION strip_comments(line)
 *
 * remove all comments from 'line'; recognizes both {} and --
comments
 */
```

```
int
strip_comments (char *line)
{
       static int in_comment = 0;
       char *cp1, *cp2;

       cp1 = line;

#ifdef WIN32
/* Disable warning about conditional expression is constant */
#pragma warning(disable:4127)
#endif
       while (1)                   /* traverse the entire string
*/
              {
#ifdef WIN32
#pragma warning(default:4127)
#endif
                     if (in_comment)
                            {
                            if ((cp2 = strchr (cp1, '}')) !=
NULL)  /* comment ends */
                                   {
                                   strcpy (cp1, cp2 + 1);
                                   in_comment = 0;
                                   continue;
                                   }
                            else
                                   {
                                   *cp1 = '\0';
                                   break;
                                   }
                            }
                     else /* not in_comment */
                            {
                            if ((cp2 = strchr (cp1, '-')) !=
NULL)
                                   {
                                   if (*(cp2 + 1) == '-')  /*
found a '--' comment */
                                          {
                                          *cp2 = '\0';
                                          break;
                                          }
                                   }
                            if ((cp2 = strchr (cp1, '{')) !=
NULL)  /* comment starts */
                                   {
                                   in_comment = 1;
                                   *cp2 = ' ';
                                   continue;
                                   }
                            else
                                   break;
                            }
                     }
       return (0);
}

/*
 * FUNCTION qsub(char *qtag, int flags)
 *
 * based on the settings of flags, and the template file
$QDIR/qtag.sql
 * make the following substitutions to turn a query template into
EQT
 *
 *  String      Converted to            Based on
 *  ======      ============            ===========
 *  first line  database <db_name>;      -n from command line
 *  second line set explain on;         -x from command line
 *   :<number>  parameter <number>
 *  :k          set number
 *  :o          output to outpath/qnum.snum
 *                                      -o from command line,
SET_OUTPUT
 *  :s          stream number
 *  :b          BEGIN WORK;             -a from command line,
START_TRAN
 *  :e          COMMIT WORK;            -a from command line,
END_TRAN
 *  :q          query number
 *  :n<number>                          sets rowcount to be
returned
 */
void
qsub (char *qtag, int flags)
{
       static char *line = NULL, *qpath = NULL;
       int qnum;
       int i;
       FILE *qfp;
       char *cptr, *mark, *qroot = NULL;
       char tempStr[128];
```

```
	qnum = atoi (qtag);
	if (line == NULL)
		{
			line = malloc (BUFSIZ);
			qpath = malloc (BUFSIZ);
			if (line == NULL || qpath == NULL)
				{
					fprintf (stderr, "Malloc
failed (qsub)\n");
					fflush (stderr);
					fclose (fdetail);
					fclose (fsummary);
					exit (2);
				}
		}

	qroot = env_config (QDIR_TAG, QDIR_DFLT);
	sprintf (qpath, "%s/%s.sql", qroot, qtag);
	qfp = fopen (qpath, "r");
	if (qfp == NULL)
		{
			fprintf (stderr, "open failed for query
template %s, errno=%d\n", qpath, errno);
			fflush (stderr);
			fclose (fdetail);
			fclose (fsummary);
			exit (1);
		}

	SQLRequest[0] = '\0';
	rowcnt = rowcnt_dflt[qnum];
	vsub (SQLRequest, qnum, 0, flags);/* set the variables */

	/*//if (flags & DFLT_NUM)
	   //    { strcat(SQLRequest, SET_ROWCOUNT);
strcat(SQLRequest, itoa(rowcnt,tempStr,10)); }
	 */
	while (fgets (line, BUFSIZ, qfp) != NULL)
		{
			if (line[strlen (line) - 1] == 0x0A)     /*
strip LF chars */
				{
					line[strlen (line) - 1] = ' ';
					strcat (line, "\r");
				}
			if (line[0] == '.')  /* BTEQ command? */
				strcpy (line, " \r");
			else if (line[0] == ' ' && line[1] == '.')
				strcpy (line, " \r");


			if (!(flags & COMMENT))
				strip_comments (line);

			mark = line;
			while ((cptr = strchr (mark, VTAG)) != NULL)
				{
					*cptr = '\0';
					cptr++;
					strcat (SQLRequest, mark);
					switch (*cptr)
						{
						case 'b':
						case 'B':
							if ((flags &
ANSI) == 0)
								{
	strcat (SQLRequest, START_TRAN);

	strcat (SQLRequest, "\r");
								}
							cptr++;
							break;
						case 'c':
						case 'C':
							/*if (flags &
DBASE)
							   //    {
strcat(SQLRequest, SET_DBASE); strcat(SQLRequest, db_name);   }
							    */
							cptr++;
							break;
						case 'e':
						case 'E':
							if ((flags &
ANSI) == 0)
								{
	strcat (SQLRequest, END_TRAN);

	strcat (SQLRequest, "\r");
```

```
                                        }
                                      cptr++;
                                      break;
                                case 'n':
                                case 'N':
                                      if (!(flags &
DFLT_NUM))
                                        {

      rowcnt = atoi (++cptr);

      while (isdigit (*cptr) || *cptr == ' ')

      cptr++;

      /*sprintf(tempStr, SET_ROWCOUNT, rowcnt);

//strcat(SQLRequest, tempStr); */
                                        }
                                      continue;
                                case 'o':
                                case 'O':
                                      if (flags &
OUTPUT)
                                        {
      /*fprintf(ofp,"%s '%s/%s.%d'", SET_OUTPUT, osuff,

qtag, (snum < 0)?0:snum);  */
                                        }
                                      cptr++;
                                      break;
                                case 'q':
                                case 'Q':
                                      strcat
(SQLRequest, qtag);
                                      cptr++;
                                      break;
                                case 's':
                                case 'S':
                                      sprintf (tempStr,
"%d", (snum < 0) ? 0 : snum);
                                      strcat
(SQLRequest, tempStr);
                                      cptr++;
                                      break;
                                case 'X':
                                case 'x':
                                      if (flags &
EXPLAIN)
                                        {

      strcat (SQLRequest, GEN_QUERY_PLAN);

      strcat (SQLRequest, "\r");
                                        }
                                      cptr++;
                                      break;
                                default:
                                      vsub (SQLRequest,
qnum, atoi (cptr), flags & DFLT);
                                      while (isdigit
(*++cptr));
                                      break;
                                }
                              mark = cptr;
                            }
                        strcat (SQLRequest, mark);
                  }
      fclose (qfp);
      for (i = strlen (SQLRequest) - 1; i > 0; i--)
            if (SQLRequest[i] == ' ' ||
                  SQLRequest[i] == '\r' ||
                  SQLRequest[i] == '\t')
                  SQLRequest[i] = '\0';
            else
                  break;
      if (SQLRequest[strlen (SQLRequest) - 1] == ';')
            SQLRequest[strlen (SQLRequest) - 1] = '\0';
      return;

}

void
usage (void)
{
      printf("TPC-H/R Benchmark Driver, matched to DBGEN/QGEN
(Version %d.%d.%d%c)\n",
                        VERSION,RELEASE,
                            MODIFICATION,PATCH);

      printf ("Portions Copyright %s %s\n", TPC, C_DATES);
      printf ("USAGE: %s <options> [ queries ]\n", prog);
      printf ("Options:\n");
```

```
       printf ("\t-c\t\t-- retain comments found in
template.\n");
       printf ("\t-d\t\t-- use default substitution values.\n");
       printf ("\t-e\t\t-- run everything: Power test and
throughput test.\n");
       printf ("\t-h\t\t-- print this usage summary.\n");
/*printf("\t-i <str>\t-- use file <str> for initialization.\n");
   //printf("\t-l <str>\t-- log parameters to <str>.\n"); */
       printf ("\t-m <n>\t\t-- number of sessions to use for
updates.\n");
       printf ("\t-M <n>\t\t-- number of transactions per multi-
statement request for updates.\n");
       printf ("\t-n <str>\t-- connect to Teradata using logon
<str>.\n");
       printf ("\t-N\t\t-- use default rowcounts and ignore :n
directive.\n");
       printf ("\t-o <str>\t-- set the output file base path to
<str>.\n");
       printf ("\t-p <n>\t\t-- use the query permutation for
stream <n>\n");
       printf ("\t-r <n,n,>\t\t-- seed the random number
generator with <n>\n");
       printf ("\t-R  \t\t-- seed the random number generator
with the current time of day\n");
       printf ("\t-s <n>\t\t-- base substitutions and updates on
an SF of <n>\n");
       printf ("\t-S <n>\t\t-- set number of streams for
throughput test to <n>\n");
       printf ("\t-U <s>\t\t-- generate <s> update sets.  Use 0
to avoid updates\n");
       printf ("\t-C <n>\t\t-- use seed file generated for <n>
load processes to generate updates\n");
       printf ("\t-v\t\t-- verbose.\n");
       printf ("\t-x\t\t-- enable EXPLAIN in each query.\n");
}

int
process_options (int cnt, char **args)
{
       int flag;
       int i;

       while ((flag = getopt (cnt, args,
"acC:dehi:M:m:n:Nl:o:p:P:r:s:S:t:U:vx")) != -1)
              switch (flag)
                     {
                     case 'a':                  /* special test
mode */
                            specialtest = 1;
                            flags |= VERBOSE;
                            break;
                     case 'c':                  /* retain
comments in EQT */
                            flags |= COMMENT;
                            break;
                     case 'C':
                            children = atoi (optarg);

                            break;
                     case 'd':                  /* use default
substitution values */
                            flags |= DFLT;
                            break;
                     case 'e':                  /* Run
everything, power test + multisession test. */
                            snum = 0;
                            flags |= EVERYTHING;
                            break;

                     case 'h':                  /* just generate
the usage summary */
                            usage ();
                            exit (0);
                            break;
                     case 'i':                  /* set stream
initialization file name */
                            ifile = malloc (strlen (optarg) + 1);
                            MALLOC_CHECK (ifile);
                            strcpy (ifile, optarg);
                            flags |= INIT;
                            break;
                     case 'l':                  /* log parameter
usages */
                            lfile = malloc (strlen (optarg) + 1);
                            MALLOC_CHECK (lfile);
                            strcpy (lfile, optarg);
                            flags |= LOG;
                            break;
                     case 'm':                  /* sessions to
use for updates. */
                            maxSess = atoi (optarg);
                            if (maxSess < 1 || maxSess > MAXSESS)
                                   {
```

```
                                        fprintf (stderr, " Max
sessions out of range, ignored\n");
                                        maxSess = 56;
                                }
                        break;

                case 'M':                       /* transactions
per multi-statement req. */
                        setsPerReq = atoi (optarg);
                        if (setsPerReq < 1 || setsPerReq > 9)
                        {
                                fprintf (stderr, " Sets per
Request out of range, ignored\n");
                                setsPerReq = 1;
                        }
                        break;

                case 'N':                       /* use default
rowcounts */
                        flags |= DFLT_NUM;
                        break;
                case 'n':                       /* set database
name */
                        db_name = malloc (strlen (optarg) +
1);
                        MALLOC_CHECK (db_name);
                        strcpy (db_name, optarg);
                        flags |= DBASE;
                        break;
                case 'o':                       /* set the output
path */
                        osuff = malloc (strlen (optarg) + 1);
                        MALLOC_CHECK (osuff);
                        strcpy (osuff, optarg);
                        flags |= OUTPUT;
                        break;
                case 'p':                       /* permutation
for a given stream */
                        snum = atoi (optarg);
                        break;
                case 'P':
                        use_fastload_for_updates = atoi
(optarg);
                        break;
                case 'r':                       /* set random
number seed for parameter gen */
                        flags |= SEED;
                                        num_seeds = sscanf (optarg,
"%ld,%ld,%ld,%ld,%ld,%ld,%ld,%ld,%ld,%ld,%ld,%ld",

                        &initSeeds[0], &initSeeds[1], &initSeeds[2],
&initSeeds[3], &initSeeds[4], &initSeeds[5],

                        &initSeeds[6], &initSeeds[7], &initSeeds[8],
&initSeeds[9], &initSeeds[10], &initSeeds[11]);
                                        rndm = initSeeds[0];
                                        if (num_seeds > 1)
                                                {
                                                        for (i = 0; i <
num_seeds; i++)
                                                                {
                                                                        //printf
(" -- Using %ld as seed for stream %d\n", initSeeds[i], i);
                                                                        if
(initSeeds[i] == 0)
                                                                                {

                        fprintf (stderr, " -- Seeds cannot be zero!\n");

                        exit (1);
                                                                                }
                                                                }
                                                }
                                        //else
                                        //     printf (" -- Using %ld as
seed\n", rndm);
                                        break;

                        case 's':                       /* scale of data
set to run against */
                                        flt_scale = (double) atof (optarg);
                                        if (flt_scale < 1.0)
                                                {
                                                        int i;

                                                        scale = 1;
                                                        for (i = PART; i < LINE;
i++)
                                                                {

                        tdefs[i].base = (long) (tdefs[i].base * flt_scale);
                                                                        if
(tdefs[i].base < 1)
```

```
	tdefs[i].base = 1;
                                        }
                                }
                        else
                                scale = (long) flt_scale;
                        if (scale < 1)
                                {
                                        fprintf (stderr,
                                                "WARNING: Scale
set to its lower bound (1)\n");
                                        scale = 1;
                                }
                        break;

                case 'S':
                        throughputstreams = atoi (optarg);
                        if (throughputstreams > MAX_STREAM)
                                {
                                        fprintf (stderr,
"Throughput streams reset to limit of %d\n",

MAX_STREAM);
                                        throughputstreams =
MAX_STREAM;
                                }
                        break;
                case 't':                       /* set
termination file name */
                        tfile = malloc (strlen (optarg) + 1);
                        MALLOC_CHECK (tfile);
                        strcpy (tfile, optarg);
                        flags |= TERMINATE;
                        break;
                case 'U':                       /* generate for
update stream */
                        updates = atoi (optarg);
                        break;
                case 'v':                       /* verbose */
                        flags |= VERBOSE;
                        break;
                case 'x':                       /* set explain in
the queries */
                        flags |= EXPLAIN;
                        break;
                default:
                                        printf ("unknown option '%s'
ignored\n", args[optind]);
                                        usage ();
                                        exit (1);
                                        break;
                                }
                if (children > MAXKIDS && step < 0)             /*
limitation of current seed file names */
                        {
                        printf ("Child process counts of > %d not
supported.\n", MAXKIDS);
                        exit (1);
                        }
/*              if (children > 1 && step >= 0)
                        pids = malloc (children * sizeof (pid_t)); */
        return (0);
}

int
setup (void)
{
        asc_date = mk_ascdate ();
        read_dist (env_config (DIST_TAG, DIST_DFLT), "p_cntr",
&p_cntr_set);
        read_dist (env_config (DIST_TAG, DIST_DFLT), "colors",
&colors);
        read_dist (env_config (DIST_TAG, DIST_DFLT), "p_types",
&p_types_set);
        read_dist (env_config (DIST_TAG, DIST_DFLT), "nations",
&nations);
        read_dist (env_config (DIST_TAG, DIST_DFLT), "nations2",
&nations2);
        read_dist (env_config (DIST_TAG, DIST_DFLT), "regions",
&regions);
        read_dist (env_config (DIST_TAG, DIST_DFLT), "o_oprio",
                                &o_priority_set);
        read_dist (env_config (DIST_TAG, DIST_DFLT), "instruct",
                                &l_instruct_set);
        read_dist (env_config (DIST_TAG, DIST_DFLT), "smode",
&l_smode_set);
        read_dist (env_config (DIST_TAG, DIST_DFLT), "category",
                                &l_category_set);
        read_dist (env_config (DIST_TAG, DIST_DFLT), "rflag",
&l_rflag_set);
        read_dist (env_config (DIST_TAG, DIST_DFLT), "msegmnt",
&c_mseg_set);
```

```
       /* load the distributions that contain text generation */
    read_dist (env_config (DIST_TAG, DIST_DFLT), "nouns",
&nouns);
    read_dist (env_config (DIST_TAG, DIST_DFLT), "verbs",
&verbs);
    read_dist (env_config (DIST_TAG, DIST_DFLT), "adjectives",
&adjectives);
    read_dist (env_config (DIST_TAG, DIST_DFLT), "adverbs",
&adverbs);
    read_dist (env_config (DIST_TAG, DIST_DFLT), "auxillaries",
&auxillaries);
    read_dist (env_config (DIST_TAG, DIST_DFLT), "terminators",
&terminators);
    read_dist (env_config (DIST_TAG, DIST_DFLT), "articles",
&articles);
    read_dist (env_config (DIST_TAG, DIST_DFLT), "prepositions",
&prepositions);
    read_dist (env_config (DIST_TAG, DIST_DFLT), "grammar",
&grammar);
    read_dist (env_config (DIST_TAG, DIST_DFLT), "np", &np);
    read_dist (env_config (DIST_TAG, DIST_DFLT), "vp", &vp);
    read_dist (env_config (DIST_TAG, DIST_DFLT), "q13a", &q13a);
    read_dist (env_config (DIST_TAG, DIST_DFLT), "q13b", &q13b);

       return (0);
}

BOOL canRetry(long ErrorCode)
{
       if (ErrorCode == 2825 || /* No record of transaction after
DBC restart */
             ErrorCode == 2826 || /* Request complete, but
output lost due to DBC Restart */
             ErrorCode == 2584 || /* Transaction aborted due to
Disk I/O error */
             ErrorCode == 2631 || /* Transaction aborted due to
deadlock */
             ErrorCode == 3120 || /* Request lost due to DBC
recovery */
             ErrorCode == 3679 || /* Transaction aborted due to
resource shortage */
             ErrorCode == 3897    /* Transaction aborted due to
DBC restart */ )
             return TRUE;
       else
             return FALSE;
}
```

```
/* First, some helper routines to copy data into the parcel we
are building */
static void
DR_Strt ()
{
       p1 = UsingBuffer;                 /* Skip 2 for the length
field */

}
static void
DR_End (int t)
{
       if (t);
       if ((p1 - UsingBuffer) > 20000)
             fprintf (stderr, " Using data too long!!!!!!!\n");
       if ((p1 - UsingBuffer) + strlen (SQLRequest) > 32000)
             fprintf (stderr, " Using data too long!!!!!!!\n");
       SQLSetUsingParcel (hstmt, UsingBuffer, (int) (p1 -
UsingBuffer));
}

INLINE
static void
DR_Int (long x)
{
       memcpy (p1, &x, 4);
       p1 += 4;
}
INLINE
static void DR_Huge(DSS_HUGE * data)   /* Used only for orderkey,
which gets > 32 bits at times */
{

#ifdef SUPPORT_64BITS
    if (scale > 300) {
        memcpy(p1,data,8);
        p1+=8;
    }
    else {
        memcpy(p1,data,4);
        p1+=4;
    }
#else
       double tempx;
       unsigned long templ;
       long temph;
```

```
	if (*(data+1) ==0)
		{
			memcpy(p1,*data,4);
			p1 += 4;
			memcpy(p1,*(data+1),4);
			p1 += 4;
		}
	else
		{
			/* Sigh, don't have an Int64 type, so need
to use double and convert to 2 longs */
			tempx = *(data+1)*10000000.0+*data;
			temph = (long)(tempx/4294967296.0);
			templ = (unsigned long)(tempx-
temph*4294967296.0);
			memcpy(p1,&templ,4);
			p1 += 4;
			memcpy(p1,&temph,4);
			p1 += 4;

		}
#endif
}
INLINE
static void
DR_VStr (char *x)
{
	short len;
	len = (short) strlen (x);
	memcpy (p1, &len, 2);
	p1 += 2;
	memcpy (p1, x, len);
	p1 += len;
}
INLINE
static void
DR_Str (char *x, size_t y)
{
	memset (p1, ' ', y);
	memcpy (p1, x, strlen (x));
	p1 += y;
}
INLINE
static void
DR_Money (long x)
{
	long temp = 0;
	memcpy (p1, &x, 4);
	p1 += 4;
	memcpy (p1, &temp, 4);
	p1 += 4;

}
INLINE
static void
DR_Char (char x)
{
	*p1 = x;
	p1++;
}
INLINE
static void
DR_Date (char *x)
{
	long tempdate;
	int y, m, d;
	y = atoi (x);
	m = atoi (x + 5);
	d = atoi (x + 8);
	if (y < 1800 || y > 2200 || m < 1 || m > 12 || d < 1 || d
> 31)
		{
			fprintf (stderr, " Help! I can't interpret
the date %s\n", x);
			exit (1);
		}
	tempdate = (y - 1900) * 10000 + m * 100 + d;
	memcpy (p1, &tempdate, 4);
	p1 += 4;

}

/*
   CREATE TABLE TPCD.ORDER  ( O_ORDERKEY       DECIMAL(15,0) NOT
NULL,
   O_CUSTKEY        INTEGER NOT NULL,
   O_ORDERSTATUS    CHAR(1) NOT NULL,
   O_TOTALPRICE     DECIMAL(15,2) NOT NULL,
   O_ORDERDATE      DATE NOT NULL,
   O_ORDERPRIORITY  CHAR(15) NOT NULL,  -- R
   O_CLERK          CHAR(15) NOT NULL,  -- R
   O_SHIPPRIORITY   INTEGER NOT NULL,
   O_COMMENT        VARCHAR(79) NOT NULL);
 */
```

```
int
xld_order (order_t * p, int mode)
{
       if (mode);



       DR_Huge (p->okey);
       DR_Int (p->custkey);
       DR_Char (p->orderstatus);
       DR_Money (p->totalprice);
       DR_Date (p->odate);
       DR_Str (p->opriority, O_OPRIO_LEN);
       DR_Str (p->clerk, O_CLRK_LEN);
       DR_Int (p->spriority);
       DR_VStr (p->comment);
       DR_End (ORDER);
       return (0);
}

/*
   CREATE TABLE TPCD.LINEITEM ( L_ORDERKEY    DECIMAL(15,0) NOT
NULL,
   L_PARTKEY     INTEGER NOT NULL,
   L_SUPPKEY     INTEGER NOT NULL,
   L_LINENUMBER  INTEGER NOT NULL,
   L_QUANTITY    DECIMAL(15,2) NOT NULL,
   L_EXTENDEDPRICE  DECIMAL(15,2) NOT NULL,
   L_DISCOUNT    DECIMAL(15,2) NOT NULL,
   L_TAX         DECIMAL(15,2) 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,  -- R
   L_SHIPMODE     CHAR(10) NOT NULL,  -- R
   L_COMMENT      VARCHAR(44) NOT NULL);
 */
xld_one_line (order_t * p, int i, int mode)
{
       //int i;
       if (mode);
       //for (i = 0; i < p->lines; i++)
       //     {
                     DR_Huge (p->l[i].okey);

                     DR_Int (p->l[i].partkey);
                     DR_Int (p->l[i].suppkey);
                     DR_Int (p->l[i].lcnt);
                     DR_Int (p->l[i].quantity);
                     DR_Money (p->l[i].eprice);
                     DR_Money (p->l[i].discount);
                     DR_Money (p->l[i].tax);
                     DR_Char (p->l[i].rflag[0]);
                     DR_Char (p->l[i].lstatus[0]);
                     DR_Date (p->l[i].sdate);
                     DR_Date (p->l[i].cdate);
                     DR_Date (p->l[i].rdate);
                     DR_Str (p->l[i].shipinstruct, L_INST_LEN);
                     DR_Str (p->l[i].shipmode, L_SMODE_LEN);
                     DR_VStr (p->l[i].comment);
                     DR_End (LINE);
       //     }
       return (0);
}

/*
int
xld_line (order_t * p,  int mode)
{
       int i;
       xld_order (p, mode);
       for (i = 0; i < p->lines; i++)
              xld_one_line (p, i, mode);
       return (0);
}

int
xld_order_line (order_t * p, int mode)
{
       xld_order (p, mode);
       xld_line (p,  mode);

       return (0);
} */


int
Fetch_and_Display_All_Rows (SQLHSTMT hstmt, int qnum)
{
```

```
	int rc;
	int rc2;
	char dValue[512];
	char ColTitle[60];
	short ColTitleLen;
	long actualLen;
	short icol;
	short maxcol;
	long totalRows;
	long columnDisplaySize[200];
	long columnSQLType[200];
	long currow;
	long temp;
	char SqlState[6];
	char ErrMsg[256];
	short ErrMsgLen;
	long ErrCode;


	if (SQLRowCount (hstmt, &totalRows) != SQL_SUCCESS)
		fprintf (stderr, " SQLRowCount problem\n");
	if (SQLNumResultCols (hstmt, &maxcol) != SQL_SUCCESS)
		fprintf (stderr, " SQLNumResultCols problem\n");
	if (maxcol == 0)
			{
			LOG0(3, "\n SQL statement complete.\n");
			}
	else
		{
			if (qnum > 0)
				{
				LOG2(3,
					"\n Query %d complete, %d rows
returned\n", qnum, totalRows);
				}
			else
				{
				LOG1(3,
					" Query complete, %d rows
returned\n", totalRows);
				}

			if (!(flags & EXPLAIN))
				if (rowcnt > 0 && rowcnt < totalRows)
					{
						LOG1(1, " only
displaying %d rows per TPC-D spec\n", rowcnt);
						totalRows = rowcnt;
					}
				LOG0(1, "\n\n");
			}
		currow = 0;
		actualLen = 0;
		if (totalRows != 0 && maxcol > 0)
			{
				for (icol = 1; icol <= maxcol; icol++)
					{
						ColTitle[0] = '\0';
						if (SQLColAttributes (hstmt,
icol, SQL_COLUMN_LABEL, ColTitle, 60, &ColTitleLen, &temp) !=
SQL_SUCCESS)
							{
								SQLError
((SQLHENV) 0, (SQLHDBC) 0, hstmt, (SQLCHAR *) SqlState, &ErrCode,
(SQLCHAR *) ErrMsg, 256, &ErrMsgLen);

								fprintf (stderr,
" ColAttributes call failed\n");
								fprintf (stderr,
" %s (%ld) %s\n", SqlState, ErrCode, ErrMsg);
							}
						if (SQLColAttributes (hstmt,
icol, SQL_COLUMN_DISPLAY_SIZE, NULL, 0, NULL,
&columnDisplaySize[icol]) != SQL_SUCCESS)
							{
								SQLError
((SQLHENV) 0, (SQLHDBC) 0, hstmt, (SQLCHAR *) SqlState, &ErrCode,
(SQLCHAR *) ErrMsg, 256, &ErrMsgLen);

								fprintf (stderr,
" ColAttributes call failed\n");
								fprintf (stderr,
" %s (%ld) %s\n", SqlState, ErrCode, ErrMsg);
							}
						if (SQLColAttributes (hstmt,
icol, SQL_COLUMN_TYPE, NULL, 0, NULL, &columnSQLType[icol]) !=
SQL_SUCCESS)
							{
								SQLError
((SQLHENV) 0, (SQLHDBC) 0, hstmt, (SQLCHAR *) SqlState, &ErrCode,
(SQLCHAR *) ErrMsg, 256, &ErrMsgLen);

								fprintf (stderr,
" ColAttributes call failed\n");
```

```
                                                fprintf (stderr,
" %s (%ld) %s\n", SqlState, ErrCode, ErrMsg);
                                        }
                                LOG1(1, "%c", '|');
                                actualLen = strlen (ColTitle);
                                if (columnDisplaySize[icol] <
actualLen)
                                        columnDisplaySize[icol]
= actualLen;


                                if (columnSQLType[icol] !=
SQL_CHAR && columnSQLType[icol] != SQL_VARCHAR)
                                        while
(columnDisplaySize[icol] > actualLen++ && actualLen < 81)
                                                {
                                                LOG1(1, "%c",
'_');
                                                }

                                LOG1(1, "%s", ColTitle);

                                if (columnSQLType[icol] ==
SQL_CHAR || columnSQLType[icol] == SQL_VARCHAR)
                                        while
(columnDisplaySize[icol] > actualLen++ && actualLen < 81)
                                                {
                                                LOG1(1, "%c",
'_');
                                                }
                        }
                LOG0(1, "|\n");
        }

        rc = SQL_SUCCESS;
        if (totalRows > 0)
                while (((rc = SQLFetch (hstmt)) == SQL_SUCCESS) &&
currow++ < totalRows)       /* records */
                {
                        icol = 0;
                        actualLen = 0;
                        rc2 = SQL_SUCCESS;
                        while (((int) icol++ <= (int) maxcol)
&&
                                   (rc2 = SQLGetData (hstmt,
icol, SQL_C_CHAR, dValue, 512, &actualLen) == SQL_SUCCESS))
                                {
                                                LOG1(1, "%c", '|');
                                                if (columnSQLType[icol]
!= SQL_CHAR && columnSQLType[icol] != SQL_VARCHAR)
                                                        while
(columnDisplaySize[icol] > actualLen++ && actualLen < 81)
                                                                {
                                                                LOG1(1,
"%c", ' ');
                                                                }

                                                LOG1(1, "%s", dValue);

                                                if (columnSQLType[icol]
== SQL_CHAR || columnSQLType[icol] == SQL_VARCHAR)
                                                        while
(columnDisplaySize[icol] > actualLen++ && actualLen < 81)
                                                                {
                                                                LOG1(1,
"%c", ' ');
                                                                }

                                        }
                                LOG0(1, "|\n");
                                if (rc2 == SQL_ERROR)
                                        {
                                                SQLError ((SQLHENV) 0,
(SQLHDBC) 0, hstmt, (SQLCHAR *) SqlState, &ErrCode, (SQLCHAR *)
ErrMsg, 256, &ErrMsgLen);

                                                fprintf (stderr, "
GetData call failed\n");
                                                fprintf (stderr, " %s
(%ld) %s\n", SqlState, ErrCode, ErrMsg);
                                        }
                        }
        LOG0(1, "\n");
        if (rc == SQL_ERROR)
                {
                        SQLError ((SQLHENV) 0, (SQLHDBC) 0, hstmt,
(SQLCHAR *) SqlState, &ErrCode, (SQLCHAR *) ErrMsg, 256,
&ErrMsgLen);

                        fprintf (stderr, " Fetch call failed\n");
                        fprintf (stderr, " %s (%ld) %s\n", SqlState,
ErrCode, ErrMsg);
                }
```

```
	if (rc == SQL_ERROR)
		return ((SQLRETURN) rc);

	return (SQLFreeStmt (hstmt, SQL_CLOSE));
}

DSS_HUGE * start;
DSS_HUGE * last;

long orderRowsDeleted = 0;
long lineitemRowsDeleted = 0;
long orderRowsToBeDeleted = 0;
long orderRowsInError = 0;
int OrdersInReq[MAXSESS + 1] = {0};

typedef struct DBC
	{

		Int32 SessionId;
		Int32 ReqId;
		short numResultCols;
		long RowCount;
		char *p;
		unsigned short Async;
		unsigned short busy;
		long NativeError;
		char ErrorMessage[512];
		struct CliDataInfoType DataInfo;
		struct DBCAREA dbcarea;

	}
DBC;

typedef struct STMT
	{

		DBC *lpdbc;
		long hstmt_num;
	}
STMT;



SQLRETURN
Get_Delete_Answer (int h, SQLRETURN rc)
{
	long totalRows;
	char SqlState[6];
	char ErrMsg[256];
	short ErrMsgLen;
	long ErrCode;
	long j;


	if (rc == SQL_ERROR)
		{
			SQLError ((SQLHENV) 0, (SQLHDBC) 0,
hstmts[h], (SQLCHAR *) SqlState, &ErrCode, (SQLCHAR *) ErrMsg,
256, &ErrMsgLen);

			if (canRetry(ErrCode))	/* Transaction
ABORTed due to DeadLock */
				{
					LOG0(3, " Deadlock during
delete\n");
					LOG3(3, " %s (%ld) %s\n",
SqlState, ErrCode, ErrMsg);
					SQLFreeStmt (hstmts[h],
SQL_CLOSE);
					LOG0(3, " Attempting to
resubmit\n");
					rc = SQLExecDirect(hstmts[h],
						(SQLCHAR FAR *)((STMT *)
hstmt)->lpdbc->dbcarea.req_ptr,
						(SQLINTEGER)   ((STMT *)
hstmt)->lpdbc->dbcarea.req_len);
					if (rc == SQL_ERROR)
						{
						LOG0(3, " Resubmit
failed to work\n");
						}
					else
						return
Get_Delete_Answer(h,rc);
				}

			orderRowsInError += OrdersInReq[h];
			hstmtbusy[h] = FALSE;
			DR_Strt ();

			LOG0(3, " Delete Request failed\n");
			LOG1(3, "%s\n", SQLRequest);
			LOG3(3, " %s (%ld) %s\n", SqlState, ErrCode,
ErrMsg);
```

```
                    SQLFreeStmt (hstmts[h], SQL_CLOSE);
                    fprintf (stderr, " Delete request failed,
Cannot continue!\n");
                    DR_Strt ();
                    return (-1);


             }
       else
             {
                    DR_Strt ();
                    if (flags & EXPLAIN)
                          {
                                hstmtbusy[h] = FALSE;
                                SQLSetStmtOption (hstmts[h],
SQL_ASYNC_ENABLE, SQL_ASYNC_ENABLE_OFF);
                                LOG1(1, "%s\n\n", SQLRequest);
                                Fetch_and_Display_All_Rows
(hstmts[h], -1);
                                return (-1);
                          }
                    else
                          {
                                long templong;


                                hstmtbusy[h] = FALSE;
                                SQLSetStmtOption (hstmts[h],
SQL_ASYNC_ENABLE, SQL_ASYNC_ENABLE_OFF);

                                for (j = 1; j <=
OrdersInReq[h]; j++)
                                      {
                                            SQLRowCount
(hstmts[h], &totalRows);

                                            orderRowsDeleted
+= totalRows;

                                            if (totalRows !=
1 && totalRows != 0)
                                                  {
                                                  LOG1(1, "
%d rows deleted from Order Table\n", totalRows);
                                                  }
                                            if (j !=
OrdersInReq[h])
                                                                                    if ((rc =
SQLMoreResults (hstmts[h])) != SQL_SUCCESS)
                                                                                          {

       fprintf (stderr, " Problem with SQLMoreResult in del \n");

       if (rc == SQL_NO_DATA_FOUND)

              fprintf (stderr, " No data found from
SQLMoreResults in Del\n");

       else

              {

                     SQLError ((SQLHENV) 0, (SQLHDBC) 0,
hstmts[h], (SQLCHAR *) SqlState, &ErrCode, (SQLCHAR *) ErrMsg,
256, &ErrMsgLen);

                     fprintf (stderr, " %s (%ld) %s\n", SqlState,
ErrCode, ErrMsg);


                     LOG0(5, " Something is wrong in the delete
response\n");

              }


       break;
                                                                                          }
                                                                              }
                                                                        //fprintf(stdout,"  %d rows
deleted from Order Table\n",totalRows);
                                                                        totalRows = 0;
                                                                        while ((rc = SQLMoreResults
(hstmts[h])) == SQL_SUCCESS)
                                                                              {
                                                                                    templong = 0;
                                                                                    SQLRowCount
(hstmts[h], &templong);
                                                                                    if (templong < 0
|| templong > 10)
                                                                                          {
                                                                                          LOG1(1, "
%d rows deleted from LineItem table\n", templong);
```

```
                                                }

                                                totalRows +=
templong;
                                        }
                                if (rc == SQL_ERROR)

                                        {
                                                fprintf (stderr,
" Problem with SQLMoreResult del2\n");
                                                SQLError
((SQLHENV) 0, (SQLHDBC) 0, hstmts[h], (SQLCHAR *) SqlState,
&ErrCode, (SQLCHAR *) ErrMsg, 256, &ErrMsgLen);
                                                fprintf (stderr,
" %s (%ld) %s\n", SqlState, ErrCode, ErrMsg);
                                        }
                                lineitemRowsDeleted +=
totalRows;
                        }


                }

        return 0;

}

int LinesPerOrder[MAXSESS + 1][20];
long orderRowsAdded = 0;
long lineitemRowsAdded = 0;
long orderRowsToBeAdded = 0;
long lineitemRowsToBeAdded = 0;
long duplicates = 0;
order_t o[MAXSESS + 1][20];


SQLRETURN
Get_Insert_Answer (int h, SQLRETURN rc)
{

        long totalRows;
        char SqlState[6];
        char ErrMsg[256];
        short ErrMsgLen;
        long ErrCode;
        int j;

        if (rc == SQL_ERROR)
                {
                        hstmtbusy[h] = FALSE;
                        SQLError ((SQLHENV) 0, (SQLHDBC) 0,
hstmts[h], (SQLCHAR *) SqlState, &ErrCode, (SQLCHAR *) ErrMsg,
256, &ErrMsgLen);
                        if (ErrCode == 2801) /* Duplicate unique
primary index */
                                {
                                        DR_Strt ();
                                        duplicates += OrdersInReq[h];
                                        LOG1(3, " Duplicate on
orderkey %d\n", *(o[h][0].okey));
                                        LOG3(3, " %s (%ld) %s\n",
SqlState, ErrCode, ErrMsg);
                                        SQLFreeStmt (hstmts[h],
SQL_CLOSE);
                                }
                        else if (canRetry(ErrCode)) /* Transaction
ABORTed due to DeadLock */
                                {
                                        LOG1(3, " Deadlock on orderkey
%d\n", *(o[h][0].okey));
                                        LOG3(3, " %s (%ld) %s\n",
SqlState, ErrCode, ErrMsg);
                                        SQLFreeStmt (hstmts[h],
SQL_CLOSE);
                                        LOG0(3, " Attempting to
resubmit\n");
                                        rc = SQLExecDirect(hstmts[h],
                                                (SQLCHAR FAR *)((STMT *)
hstmt)->lpdbc->dbcarea.req_ptr,
                                                (SQLINTEGER)   ((STMT *)
hstmt)->lpdbc->dbcarea.req_len);
                                        if (rc == SQL_ERROR)
                                                {
                                                LOG0(3, " Resubmit
failed to work\n");
                                                }
                                        else
                                                return
Get_Insert_Answer(h,rc);
                                }
                        else
                                {
                                        DR_Strt ();
```

```
                                orderRowsInError +=
OrdersInReq[h];
                                LOG0(5, " Insert Request
failed\n");
                                LOG1(5, "%s\n", SQLRequest);
                                LOG3(5, " %s (%ld) %s\n",
SqlState, ErrCode, ErrMsg);
                                SQLFreeStmt (hstmts[h],
SQL_CLOSE);
                                fprintf (stderr, " Insert
request failed, Cannot continue!\n");
                                DR_Strt ();
                                OrdersInReq[h] = 0;
                                return (-1);
                        }
                OrdersInReq[h] = 0;
        }
      else
        {
                DR_Strt ();
                if (flags & EXPLAIN)
                        {
                                hstmtbusy[h] = FALSE;
                                SQLSetStmtOption (hstmts[h],
SQL_ASYNC_ENABLE, SQL_ASYNC_ENABLE_OFF);
                                OrdersInReq[h] = 0;
                                LOG1(1, "%s\n\n", SQLRequest);
                                Fetch_and_Display_All_Rows
(hstmts[h], -1);
                                return (-1);
                        }
                else
                        {
                                long templong;
                                int k;

                                hstmtbusy[h] = FALSE;
                                SQLSetStmtOption (hstmts[h],
SQL_ASYNC_ENABLE, SQL_ASYNC_ENABLE_OFF);

                                for (j = 0; j <
OrdersInReq[h]; j++)
                                        {
                                                SQLRowCount
(hstmts[h], &totalRows);
                                                orderRowsAdded +=
totalRows;
                                                if (totalRows !=
1)
                                                        {
                                                        LOG1(1, "
%d rows inserted into Order Table in this request! \n",
totalRows);
                                                        }
                                                totalRows = 0;
                                                for (k = 0; k <
LinesPerOrder[h][j]; k++)
                                                        {
                                                                if
(SQLMoreResults (hstmts[h]) != SQL_SUCCESS)

        {

                fprintf (stderr, " Problem with SQLMoreResult for
insert \n");

                SQLError ((SQLHENV) 0, (SQLHDBC) 0, hstmts[h],
(SQLCHAR *) SqlState, &ErrCode, (SQLCHAR *) ErrMsg, 256,
&ErrMsgLen);

                fprintf (stderr, " %s (%ld) %s\n", SqlState,
ErrCode, ErrMsg);

        }

        templong = 0;
                                                                if
(SQLRowCount (hstmts[h], &templong) != SQL_SUCCESS)

        fprintf (stderr, " Problem with SQLRowCount\n");
                                                                if
(templong != 1)

        {

        LOG1(1, "  %d rows inserted into Lineitem Table in this
insert! \n", totalRows);

        }


        totalRows += templong;
```

```
                                                        }

                                                lineitemRowsAdded
+= totalRows;
                                                if (totalRows !=
LinesPerOrder[h][j])
                                                        {
                                                        LOG2(1, "
%d rows inserted into LineItem table in this request, should have
been %d\n", totalRows, LinesPerOrder[h][j]);
                                                        }


                                                rc =
SQLMoreResults (hstmts[h]);
                                                if (rc ==
SQL_ERROR || rc == SQL_SUCCESS_WITH_INFO)
                                                        {

        fprintf (stderr, " Problem with SQLMoreResult ins2\n");

        SQLError ((SQLHENV) 0, (SQLHDBC) 0, hstmts[h], (SQLCHAR *)
SqlState, &ErrCode, (SQLCHAR *) ErrMsg, 256, &ErrMsgLen);

        fprintf (stderr, " %s (%ld) %s\n", SqlState, ErrCode,
ErrMsg);
                                                        }
                                                else if (rc ==
SQL_NO_DATA_FOUND && j < (OrdersInReq[h] - 1))
                                                        {

        fprintf (stderr, " Problem with SQLMoreResults ins3\n");
                                                        }
                                        }
                                OrdersInReq[h] = 0;

                        }
                }
        return 0;
}



void
Wait_For_Free_Hstmt (int *h, int inserts)
{
        int i;
        SQLRETURN rc;
        SQLHSTMT newhstmt;

        for (i = 1; i <= maxSess; i++)
                if (!hstmtbusy[i])
                        {
                                //fprintf(stderr,"Wait_for_Free
returned %d because it wasnt busy\n",i);
                                *h = i;
                                return;
                        }
        rc = SQLWaitForAny (henv, &newhstmt, &i);
        if (rc == SQL_ERROR && (i < 0 || newhstmt ==
SQL_NULL_HSTMT))
                {
                LOG0(5, "Unexpected error: SQLWaitForAny returned
SQL_ERROR in Wait_for_free\n");

                return;

                }

        if (rc == SQL_NO_DATA_FOUND)
                {
                        fprintf (stderr, "Bug:  SQLWaitForAny
returned complete.\n");
                        *h = 1;
                        return;
                }
        if (hstmts[i] != newhstmt)
                fprintf (stderr, "SQLWaitForAny returned
garbage\n");

        //fprintf(stderr,"SQLWaitForAny returned %d\n",i);
        if (inserts)

                Get_Insert_Answer (i, rc);
        else
                Get_Delete_Answer (i, rc);
        hstmtbusy[i] = FALSE;
        *h = i;
        return;
/*
   for (;;)
   {
   for (i=0;i<maxSess;i++)
   {
   if (Submit_Req(i)!=SQL_STILL_EXECUTING)
```

```
   {
   *h = i;
   return;
   }
   }
   }
 */
}

SQLRETURN
Submit_Req (int h, int inserts)
{

       SQLRETURN rc;




       if (!hstmtbusy[h])
              {
                     SQLSetStmtOption (hstmts[h],
SQL_ASYNC_ENABLE, SQL_ASYNC_ENABLE_ON);
                     hstmtbusy[h] = TRUE;
              }

       rc = SQLExecDirect (hstmts[h], (SQLCHAR *) SQLRequest,
SQL_NTS);
       if (rc == SQL_STILL_EXECUTING)
              {
                     //fprintf(stderr," Submit_req returns
SQL_STILL_EXECUTING on %d\n",h);
                     hstmtbusy[h] = TRUE;
                     return (rc);
              }
       //fprintf(stderr," Submit_req did not have to wait for
%d\n",h);

       SQLSetStmtOption (hstmts[h], SQL_ASYNC_ENABLE,
SQL_ASYNC_ENABLE_OFF);
       hstmtbusy[h] = FALSE;
       if (inserts)
              Get_Insert_Answer (h, rc);
       else
              Get_Delete_Answer (h, rc);

}
```

```
/* From print.c */
/*
 * NOTE: this routine does NOT use the BCD2_* routines. As a
result,
 * it WILL fail if the keys being deleted exceed 32 bits. Since
this
 * would require ~660 update iterations, this seems an acceptable
 * oversight
 */
int
gen_deletes (long min, long cnt, long num, int special)
{

       static int last_num = 0;
       static FILE *dfp = NULL;
       int child = -1;
       DSS_HUGE * sk;
       struct timeb EndTime;
       struct timeb difTime;
       char tempStr[40];
       int rc;
       DSS_HUGE * i;
    DSS_HUGE * temp;

       long o;
       int h;
    long ii;

       BOOL anybusy;

       orderRowsDeleted = 0;
       orderRowsInError = 0;
       lineitemRowsDeleted = 0;
       orderRowsToBeDeleted = 0;

       if (special == 0)
              {
              LOG0(1, "\n Running update function UF2
(deletes)\n");
              }
       else
              {
              LOG0(1, "\n Running special cleanup deletes\n");
              }
       if (flags & VERBOSE)
```

```
              {
                     if (special == 0)
                           fprintf (stdout, " Running update
function UF2 (deletes)\n");
                     else
                           fprintf (stdout, " Doing special
cleanup deletes\n");
                     //fprintf(stderr," Running update function
UF2 (deletes)\n");
              }
       ftime (&StartTime);
    INIT_HUGE(sk);
    INIT_HUGE(i);
    INIT_HUGE(last);
    INIT_HUGE(start);
    INIT_HUGE(temp);

       if (last_num != num)
              {
                     /* Do first time init here */
                     last_num = num;



              }
       gen_rng = 1;

       mk_sparse(min, start, special + num / (10000 / refresh));



    HUGE_SUB(start,1,last);

       h = 1;

       DR_Strt ();
       for (child = min; cnt > 0; child++, cnt--)
              {

            mk_sparse(child, sk, special + num / (10000 /
refresh));

                     if (gen_rng == 1 && (*sk) - *last == 1 &&
cnt > 1)
                           {
                    HUGE_SET(sk,last);

                                 continue;
                                                                  }
                                                           else
                                                                  {
                                                                         if (cnt <= 1 && (*sk) - *last
                                                           == 1)
                                                                                HUGE_SET(sk,last);

                                                                         SQLRequest[0] = '\0';
                                                                         if (flags & EXPLAIN)
                                                                                strcat (SQLRequest,
                                                           "EXPLAIN ");
                                                                         //strcat(SQLRequest,"DELETE
                                                           FROM ORDERTBL WHERE O_ORDERKEY IN (");
                                                                         OrdersInReq[h] = 0;
                                                                         DR_Strt ();
                                                                         strcat (SQLRequest, "USING
                                                           (");
                                                                         o = 0;
                                                                         for (HUGE_SET(start,i); (*i)
                                                           <= (*last); (*i)++)
                                                                                {
                                                                                       DR_Huge (i);
                                                                                       o++;
                                                                                       strcat
                                                           (SQLRequest, "O");
                                                                                       sprintf (tempStr,
                                                           "%ld", o);
                                                                                       strcat
                                                           (SQLRequest, tempStr);
                                                                                       strcat
                                                           (SQLRequest, " INT");
                                                                                       if (*i != *last)
                                                                                              strcat
                                                           (SQLRequest, ",");
                                                                                }
                                                                         if (cnt <= 1 && (*sk) > *last)
                                                                                {
                                                                                       strcat
                                                           (SQLRequest, ",");
                                                                                       DR_Huge (sk);
                                                                                       o++;
                                                                                       strcat
                                                           (SQLRequest, "O");
                                                                                       sprintf (tempStr,
                                                           "%ld", o);
                                                                                       strcat
                                                           (SQLRequest, tempStr);
```

```
                                        strcat
(SQLRequest, " INT");
                                }
                        strcat (SQLRequest, ") ");

                        o = 0;
                        for (HUGE_SET(start,i); (*i)
<= *last; (*i)++)
                                {
                                        o++;

        orderRowsToBeDeleted++;
                                        OrdersInReq[h]++;
                                        strcat
(SQLRequest, "DELETE FROM ORDERTBL WHERE O_ORDERKEY =:O");
                                        sprintf (tempStr,
"%ld", o);
                                        strcat
(SQLRequest, tempStr);
                                        //if (i!=last)
strcat(SQLRequest,",");
                                        strcat
(SQLRequest, ";");
                                }
                        if (cnt <= 1 && (*sk) > *last)
                                {
                                        o++;

        orderRowsToBeDeleted++;
                                        OrdersInReq[h]++;
                                        strcat
(SQLRequest, "DELETE FROM ORDERTBL WHERE O_ORDERKEY =:O");
                                        sprintf (tempStr,
"%ld", o);
                                        strcat
(SQLRequest, tempStr);
                                        //if (i!=last)
strcat(SQLRequest,",");
                                        strcat
(SQLRequest, ";");
                                }
                        //strcat(SQLRequest,");");

                        o = 0;
                        for (HUGE_SET(start,i); (*i)
<= *last; (*i)++)
                                {
                                        o++;
                                        strcat
(SQLRequest, "DELETE FROM LINEITEM WHERE L_ORDERKEY =:O");
                                        sprintf (tempStr,
"%ld", o);
                                        strcat
(SQLRequest, tempStr);
                                        strcat
(SQLRequest, ";");
                                }
                        if (cnt <= 1 && (*sk) > *last)
                                {
                                        o++;
                                        strcat
(SQLRequest, "DELETE FROM LINEITEM WHERE L_ORDERKEY =:O");
                                        sprintf (tempStr,
"%ld", o);
                                        strcat
(SQLRequest, tempStr);
                                        strcat
(SQLRequest, ";");
                                }


                        LOG1(1, "SQL
COMMAND:\n\t%s\n", SQLRequest);
                        DR_End (LINE);

                        Submit_Req (h, FALSE);
                        Wait_For_Free_Hstmt (&h,
FALSE);
                        hstmt = hstmts[h];
                        DR_Strt ();
                        //fprintf(stderr," Next req
goes on hstmt %d\n",h);



                        HUGE_SET(sk,start);
                HUGE_SET(sk,last);

                        }
                }

        //fprintf(stderr," All submitted, waiting\n");
        anybusy = TRUE;
        while (anybusy)
```

```
	{
		anybusy = FALSE;
		for (h = 1; h <= maxSess; h++)
			{
				if (hstmtbusy[h])
					{
						rc =
SQLWaitForAny (henv, &hstmt, (int *) &ii);
						if (rc ==
SQL_ERROR)
							{

	fprintf (stderr, "SQLWaitForAny returned SQL_ERROR\n");

	break;

							}
						if (rc ==
SQL_NO_DATA_FOUND)
							break;

						if (hstmts[ii] !=
hstmt)
							fprintf
(stderr, "SQLWaitForAny returned garbage\n");


	//fprintf(stderr,"SQLWaitForAny returned %d\n",ii);
						Get_Delete_Answer
(ii, (SQLRETURN) rc);
					}
				if (hstmtbusy[h])
					anybusy = TRUE;
			}
	}

	hstmt = hstmts[1];
	ftime (&EndTime);
	difTime.time = EndTime.time - StartTime.time;
	if (EndTime.millitm >= StartTime.millitm)
	{
		difTime.millitm = (unsigned short)
(EndTime.millitm - StartTime.millitm);
	}
	else
	{
		difTime.millitm = (unsigned short) ((1000 +
EndTime.millitm) - StartTime.millitm);
		difTime.time -= 1;
	};
	UF2time = difTime.time + difTime.millitm / 1000.0 + 0.005;

	StartTime.time = EndTime.time;
	StartTime.millitm = EndTime.millitm;

	if (orderRowsDeleted == 0 && special)
		UF2time = 0.0;
	else
		{
			LOG2(1,  " UF2 Time was %.2f seconds.  Ended
at %s\n\n", UF2time, ctime (&StartTime.time));


			LOG1(1,  " Total %d deleted from Order
table\n", orderRowsDeleted);
			if (orderRowsDeleted !=
orderRowsToBeDeleted)
				{
				LOG1(1,  " Should have been %d
deleted from Order table!!\n", orderRowsToBeDeleted);
				}
			LOG1(1,  " Total %d deleted from LineItem
table\n", lineitemRowsDeleted);
			if (orderRowsInError > 0)
				{
				LOG1(1,  " Total %d deletes failed
due to database errors\n", orderRowsInError);
				}

		}



	return (0);
}


int
gen_deletes_via_fastload (long min, long cnt, long num, int
special)
{

	static int last_num = 0;
```

```
       static FILE *dfp = NULL;
       int child = -1;

       char SqlState[6];
       char ErrMsg[256];
       short ErrMsgLen;
       long ErrCode;
       BOOL retry;


       struct timeb EndTime;
       struct timeb difTime;
       DSS_HUGE * sk;

       int h;


    INIT_HUGE(sk);
       orderRowsDeleted = 0;
       lineitemRowsDeleted = 0;
       orderRowsToBeDeleted = 0;

       prep_direct((db_name)?db_name:DBNAME);


       if (special == 0)
              {
              LOG0(1,  "\n Running update function UF2
(deletes)\n");
              }
       else
              {
              LOG0(1,  "\n Running special cleanup deletes\n");
              }
       if (flags & VERBOSE)
              {
                     if (special == 0)
                            fprintf (stdout, " Running update
function UF2 (deletes)\n");
                     else
                            fprintf (stdout, " Doing special
cleanup deletes\n");
                     //fprintf(stderr," Running update function
UF2 (deletes)\n");
              }
       ftime (&StartTime);
```

```
       /* In this version of UF2, we first use the Teradata
"fastload" utility
          to send the keys to be deleted to a temporary table on
the Teradata system.
          After all the rows have been sent, we use two DELETE
statements
          to delete the rows from the existing tables */

       if (last_num != num)
              {
                     /* Do first time init here */
                     last_num = num;
              }
       gen_rng = 1;
    INIT_HUGE(start);


       mk_sparse(min, start , special + num / (10000 / refresh));
       last = start - 1;
       h = 1;

       DR_Strt ();
       for (child = min; cnt > 0; child++, cnt--)
              {

            mk_sparse (child, sk, special + num / (10000 /
refresh));


                     ld_deletes (sk, upd_num);
                     orderRowsToBeDeleted++;

              }

       close_direct();



       hstmt = hstmts[1];


       /* By doing both DELETE statements in a single request to
the Teradata system,
          Teradata guarantees these are done as an atomic
transaction */

       retry = TRUE;
```

```
       while (retry)
       {
              retry = FALSE;
              if (SQLExecDirect (hstmt, (unsigned char *)
#ifdef DOL
      "DELETE FROM ORDERTBL WHERE O_ORDERKEY =
KEYS_TO_DELETE.ORDERKEY;DELETE FROM LINEITEM WHERE L_ORDERKEY =
KEYS_TO_DELETE.ORDERKEY",
#else
      "DELETE FROM LINEITEM WHERE L_ORDERKEY =
KEYS_TO_DELETE.ORDERKEY;DELETE FROM ORDERTBL WHERE O_ORDERKEY =
KEYS_TO_DELETE.ORDERKEY",
#endif
                     SQL_NTS) == SQL_ERROR)
                     {
                            LOG0(3,  " UF2 delete failed\n");
                            SQLError ((SQLHENV) 0, (SQLHDBC) 0,
hstmt, (SQLCHAR *) SqlState, &ErrCode, (SQLCHAR *) ErrMsg, 256,
&ErrMsgLen);
                            LOG2(3,  " %d: %s\n", ErrCode,
ErrMsg);
                            SQLFreeStmt (hstmt, SQL_CLOSE);
                            if (canRetry(ErrCode))     /*
Transaction ABORTed due to DeadLock or crash */
                                   {
                                          retry = TRUE;
                                          LOG0(5,  " Attempting to
resubmit UF2 delete\n");
                                   }
                     }
              else
                     {
#ifdef DOL
                            if (SQLRowCount (hstmt,
&orderRowsDeleted) != SQL_SUCCESS)
                                   fprintf (stderr, " SQLRowCount
problem\n");
#else
                            if (SQLRowCount (hstmt,
&lineitemRowsDeleted) != SQL_SUCCESS)
                                   fprintf (stderr, " SQLRowCount
problem\n");
#endif

                            if (SQLMoreResults (hstmt) !=
SQL_SUCCESS)
                                   fprintf (stderr, "
SQLMoreResults problem\n");
#ifdef DOL
                                   if (SQLRowCount (hstmt,
&lineitemRowsDeleted) != SQL_SUCCESS)
                                   fprintf (stderr, " SQLRowCount
problem\n");
#else
                                   if (SQLRowCount (hstmt,
&orderRowsDeleted) != SQL_SUCCESS)
                                   fprintf (stderr, " SQLRowCount
problem\n");
#endif
                     }
       }


       ftime (&EndTime);
       difTime.time = EndTime.time - StartTime.time;
       if (EndTime.millitm >= StartTime.millitm)
              {
                     difTime.millitm = (unsigned short)
(EndTime.millitm - StartTime.millitm);
              }
       else
              {
                     difTime.millitm = (unsigned short) ((1000 +
EndTime.millitm) - StartTime.millitm);
                     difTime.time -= 1;
              };
       UF2time = difTime.time + difTime.millitm / 1000.0 + 0.005;

       StartTime.time = EndTime.time;
       StartTime.millitm = EndTime.millitm;

       if (orderRowsDeleted == 0 && special)
              UF2time = 0.0;
       else
              {
                     LOG2(1,  " UF2 Time was %.2f seconds.  Ended
at %s\n\n", UF2time, ctime (&StartTime.time));


                     LOG1(1,  " Total %d deleted from Order
table\n", orderRowsDeleted);
                     if (orderRowsDeleted !=
orderRowsToBeDeleted)
```

```
                        {
                        LOG1(1,  " Should have been %d
deleted from Order table!!\n", orderRowsToBeDeleted);
                        }
                    LOG1(1,  " Total %d deleted from LineItem
table\n", lineitemRowsDeleted);

             }




      return (0);
}




int
Build_Multistatement_Insert (int h)
{
      char tstr2[6] = "?";
      char tstr1[3] = "?";
      char tstr3[4] = "?";
      int j;
      int k;

      /*if ((flags & VERBOSE)&&(specialtest))
             {
        LOG2(1,  Building multi insert, orders %d, lines[0]
=%d\n",OrdersInReq,LinesPerOrder[0]);
             }
       */
      SQLRequest[0] = '\0';
      if (flags & EXPLAIN)
             strcpy (SQLRequest, " EXPLAIN ");
      sprintf (tstr2, "%d", LinesPerOrder[h][1] + 1);
      strcat (SQLRequest, "/*");
      strcat (SQLRequest, tstr2);
      strcat (SQLRequest, "*/ ");
      strcat (SQLRequest, "USING ");

      if (OrdersInReq[h] > 10 || OrdersInReq[h] > setsPerReq ||
OrdersInReq[h] <= 0)
             {
                    fprintf (stderr, "OrdersInReq[h] = %d\n",
OrdersInReq[h]);
                    fclose (fdetail);
                    fclose (fsummary);
                    exit (1);
             }

      // First, build the using info for all the ORDER inserts
      for (k = 0; k < OrdersInReq[h]; k++)
      {
             tstr1[0] = (char) ('0' + k);
             tstr1[1] = '\0';
             if (k > 0)
                    strcat (SQLRequest, ",");
             strcat (SQLRequest, "OOK");
             strcat (SQLRequest, tstr1);
             if (scale > 300)
                    strcat (SQLRequest, "(DEC(15,0))");
             else
                    strcat (SQLRequest, "(INT)");
             strcat (SQLRequest, ",OCK");
             strcat (SQLRequest, tstr1);
             strcat (SQLRequest, "(INT)");
             strcat (SQLRequest, ",OOS");
             strcat (SQLRequest, tstr1);
             strcat (SQLRequest, "(CHAR(1))");
             strcat (SQLRequest, ",OTP");
             strcat (SQLRequest, tstr1);
             strcat (SQLRequest, "(DEC(15,2))");
             strcat (SQLRequest, ",OOD");
             strcat (SQLRequest, tstr1);
             strcat (SQLRequest, "(DATE)");
             strcat (SQLRequest, ",OOP");
             strcat (SQLRequest, tstr1);
             strcat (SQLRequest, "(CHAR(15))");
             strcat (SQLRequest, ",OC");
             strcat (SQLRequest, tstr1);
             strcat (SQLRequest, "(CHAR(15))");
             strcat (SQLRequest, ",OSP");
             strcat (SQLRequest, tstr1);
             strcat (SQLRequest, "(INT)");
             strcat (SQLRequest, ",OCM");
             strcat (SQLRequest, tstr1);
             strcat (SQLRequest, "(VARCHAR(79)) ");
             if (LinesPerOrder[h][k] > 20)
                    {
                           fprintf (stderr, "
LinesPerOrder[h][k] > 20, %d\n", LinesPerOrder[h][k]);
                           fclose (fdetail);
                           fclose (fsummary);
```

```
                        exit (1);
                }

        }

        // Now build all the using data for the lineitems.
        for (j = 0; j < 20; j++)
                for (k = 0; k < OrdersInReq[h]; k++)
                {
                        if (j < LinesPerOrder[h][k])
                                {
                                        tstr1[0] = (char) ('0' + k);
                                        tstr1[1] = '\0';
                                        tstr3[0] = (char) ('0' + j /
10);
                                        tstr3[1] = (char) ('0' + j %
10);
                                        tstr3[2] = '\0';
                                        strcpy (tstr2, tstr1);
                                        strcat (tstr2, tstr3);

                                        strcat (SQLRequest, ",LOK");
                                        strcat (SQLRequest, tstr2);
                                        if (scale > 300)

                                                strcat (SQLRequest,
"(DEC(15,0))");
                                        else
                                                strcat (SQLRequest,
"(INT)");

                                        strcat (SQLRequest, ",LPK");
                                        strcat (SQLRequest, tstr2);
                                        strcat (SQLRequest, "(INT)");

                                        strcat (SQLRequest, ",LSK");
                                        strcat (SQLRequest, tstr2);
                                        strcat (SQLRequest, "(INT)");
                                        strcat (SQLRequest, ",LLN");
                                        strcat (SQLRequest, tstr2);
                                        strcat (SQLRequest, "(INT)");
                                        strcat (SQLRequest, ",LQ");
                                        strcat (SQLRequest, tstr2);
                                        strcat (SQLRequest, "(INT)");
                                        strcat (SQLRequest, ",LEP");
                                        strcat (SQLRequest, tstr2);

                                                strcat (SQLRequest,
"(DEC(15,2))");
                                                strcat (SQLRequest,
"(DEC(15,2))");
                                                strcat (SQLRequest,
"(DEC(15,2))");
                                                strcat (SQLRequest,
"(CHAR(1))");
                                                strcat (SQLRequest,
"(CHAR(1))");
                                                strcat (SQLRequest,
"(CHAR(25))");
                                                strcat (SQLRequest,
"(CHAR(10))");
                                                strcat (SQLRequest,
"(VARCHAR(44)) ");
                                                strcat (SQLRequest, ",LDSC");
                                                strcat (SQLRequest, tstr2);
                                                strcat (SQLRequest, ",LTAX");
                                                strcat (SQLRequest, tstr2);
                                                strcat (SQLRequest, ",LRTNF");
                                                strcat (SQLRequest, tstr2);
                                                strcat (SQLRequest, ",LLS");
                                                strcat (SQLRequest, tstr2);
                                                strcat (SQLRequest, ",LSHD");
                                                strcat (SQLRequest, tstr2);
                                                strcat (SQLRequest, ",LCMTD");
                                                strcat (SQLRequest, tstr2);
                                                strcat (SQLRequest, ",LRCD");
                                                strcat (SQLRequest, tstr2);
                                                strcat (SQLRequest, ",LSHI");
                                                strcat (SQLRequest, tstr2);
                                                strcat (SQLRequest, ",LSHM");
                                                strcat (SQLRequest, tstr2);
                                                strcat (SQLRequest, ",LCM");
                                                strcat (SQLRequest, tstr2);

                                }
                        }

                // Next, build the inserts for all the ORDER inserts.
                for (k = 0; k < OrdersInReq[h]; k++)
                        {
                                tstr1[0] = (char) ('0' + k);
```

```
                tstr1[1] = '\0';
                strcat (SQLRequest, " INSERT INTO ORDERTBL
VALUES(");
                strcat (SQLRequest, ":OOK");
                strcat (SQLRequest, tstr1);
                strcat (SQLRequest, ",:OCK");
                strcat (SQLRequest, tstr1);
                strcat (SQLRequest, ",:OOS");
                strcat (SQLRequest, tstr1);
                strcat (SQLRequest, ",:OTP");
                strcat (SQLRequest, tstr1);
                strcat (SQLRequest, ",:OOD");
                strcat (SQLRequest, tstr1);
                strcat (SQLRequest, ",:OOP");
                strcat (SQLRequest, tstr1);
                strcat (SQLRequest, ",:OC");
                strcat (SQLRequest, tstr1);
                strcat (SQLRequest, ",:OSP");
                strcat (SQLRequest, tstr1);
                strcat (SQLRequest, ",:OCM");
                strcat (SQLRequest, tstr1);
                strcat (SQLRequest, ");");
        }
      for (j = 0; j < 20; j++)
        for (k = 0; k < OrdersInReq[h]; k++)
        {
                if (j < LinesPerOrder[h][k])
                        {
                                tstr1[0] = (char) ('0' + k);
                                tstr1[1] = '\0';
                                tstr3[0] = (char) ('0' + j /
10);
                                tstr3[1] = (char) ('0' + j %
10);
                                tstr3[2] = '\0';
                                strcpy (tstr2, tstr1);
                                strcat (tstr2, tstr3);

                                strcat (SQLRequest, " INSERT
INTO LINEITEM VALUES(");
                                strcat (SQLRequest, ":LOK");
                                strcat (SQLRequest, tstr2);
                                strcat (SQLRequest, ",:LPK");
                                strcat (SQLRequest, tstr2);
                                strcat (SQLRequest, ",:LSK");
                                strcat (SQLRequest, tstr2);
                                strcat (SQLRequest, ",:LLN");
                                strcat (SQLRequest, tstr2);
                                strcat (SQLRequest, ",:LQ");
                                strcat (SQLRequest, tstr2);
                                strcat (SQLRequest, ",:LEP");
                                strcat (SQLRequest, tstr2);
                                strcat (SQLRequest, ",:LDSC");
                                strcat (SQLRequest, tstr2);
                                strcat (SQLRequest, ",:LTAX");
                                strcat (SQLRequest, tstr2);
                                strcat (SQLRequest,
",:LRTNF");
                                strcat (SQLRequest, tstr2);
                                strcat (SQLRequest, ",:LLS");
                                strcat (SQLRequest, tstr2);
                                strcat (SQLRequest, ",:LSHD");
                                strcat (SQLRequest, tstr2);
                                strcat (SQLRequest,
",:LCMTD");
                                strcat (SQLRequest, tstr2);
                                strcat (SQLRequest, ",:LRCD");
                                strcat (SQLRequest, tstr2);
                                strcat (SQLRequest, ",:LSHI");
                                strcat (SQLRequest, tstr2);
                                strcat (SQLRequest, ",:LSHM");
                                strcat (SQLRequest, tstr2);
                                strcat (SQLRequest, ",:LCM");
                                strcat (SQLRequest, tstr2);
                                strcat (SQLRequest, ");");
                        }
                }
        return (0);
}

/*
 * generate a particular table
 */
void
gen_updates (long start, long count, long upd_num)
{
        long i;

        int h;
```

```
      static int completed = 0;

      struct timeb EndTime;
      struct timeb difTime;
      int rc;
      long maxReqLen = 0;
      long maxUsingLen = 0;

      BOOL anybusy;
    DSS_HUGE * sk;
    int j;
    int k;


      orderRowsAdded = 0;
      orderRowsInError = 0;
      lineitemRowsAdded = 0;
      orderRowsToBeAdded = 0;
      lineitemRowsToBeAdded = 0;
      duplicates = 0;



      LOG0(1,  "\n Running update function UF1 (inserts)\n");
      if (flags & VERBOSE)
            {
                  fprintf (stdout, " Running update function
UF1 (inserts)\n");
                  //fprintf(stderr," Running update function
UF1 (inserts)\n");
            }
      ftime (&StartTime);



      INIT_HUGE(sk);

      for (i = 1; i <= maxSess; i++)
            {
                  hstmtbusy[i] = FALSE;
                  OrdersInReq[i] = 0;
                  LinesPerOrder[i][0] = 0;
                  LinesPerOrder[i][1] = 0;
           for (k=0;k<20;k++)
           {
                  INIT_HUGE(o[i][k].okey);
                  for (j=0; j < O_LCNT_MAX; j++)
                           INIT_HUGE(o[i][k].l[j].okey);
                  }
                    }

      h = 1;
      hstmt = hstmts[1];




      DR_Strt ();
      for (i = start; count; count--, i++)
            {
                  LIFENOISE (1000, i);


                  mk_sparse (i, sk, 1 + upd_num / (10000 /
refresh));


                  mk_order (sk, &o[h][OrdersInReq[h]]);

                  LinesPerOrder[h][OrdersInReq[h]] =
o[h][OrdersInReq[h]].lines;
                  orderRowsToBeAdded++;
                  lineitemRowsToBeAdded +=
o[h][OrdersInReq[h]].lines;

                  OrdersInReq[h]++;
                  LinesPerOrder[h][OrdersInReq[h]] = 0;


                  if ((OrdersInReq[h] >= setsPerReq) || (count
<= 1))
                        {
                              int k;
                              int j;
                              Build_Multistatement_Insert
(h);
                              for (k = 0; k <
OrdersInReq[h]; k++)
                                    xld_order (&o[h][k],
upd_num);
```

```
                                for (j = 0; j < 20; j++)
                                       for (k = 0; k <
OrdersInReq[h]; k++)
                                              if (j <
LinesPerOrder[h][k])
       xld_one_line (&o[h][k], j, upd_num);
                                if (strlen (SQLRequest) >
(size_t) maxReqLen)
                                       maxReqLen = strlen
(SQLRequest);
                                if (((int) (p1 - UsingBuffer))
> maxUsingLen)
                                       maxUsingLen = (int) (p1
- UsingBuffer);


                                Submit_Req (h, TRUE);
                                Wait_For_Free_Hstmt (&h,
TRUE);
                                hstmt = hstmts[h];
                                DR_Strt ();
                                OrdersInReq[h] = 0;
                                //fprintf(stderr," Next req
goes on hstmt %d\n",h);
                         }
             }

       //fprintf(stderr," All submitted, waiting\n");
       anybusy = TRUE;
       while (anybusy)
              {
                     anybusy = FALSE;
                     for (h = 1; h <= maxSess; h++)
                            {
                                   if (hstmtbusy[h])
                                          {
                                                 rc =
SQLWaitForAny (henv, &hstmt, (int *) &i);
                                                 if (rc ==
SQL_ERROR)
                                                        {

       fprintf (stderr, "SQLWaitForAny returned SQL_ERROR\n");

       break;
                                                        }
                                                 if (rc ==
SQL_NO_DATA_FOUND)
                                                        break;

                                                 if (hstmts[i] !=
hstmt)
                                                        fprintf
(stderr, "SQLWaitForAny returned garbage\n");


       //fprintf(stderr,"SQLWaitForAny returned %d\n",i);
                                                 Get_Insert_Answer
(i, (SQLRETURN) rc);
                                          }

                                   if (hstmtbusy[h])
                                          anybusy = TRUE;
                            }
              }

       hstmt = hstmts[1];

       ftime (&EndTime);
       difTime.time = EndTime.time - StartTime.time;
       if (EndTime.millitm >= StartTime.millitm)
              {
                     difTime.millitm = (unsigned short)
(EndTime.millitm - StartTime.millitm);
              }
       else
              {
                     difTime.millitm = (unsigned short) ((1000 +
EndTime.millitm) - StartTime.millitm);
                     difTime.time -= 1;
              };
       UF1time = difTime.time + difTime.millitm / 1000.0 + 0.005;

       StartTime.time = EndTime.time;
       StartTime.millitm = EndTime.millitm;

       LOG2(1,  " UF1 Insert Time was %.2f seconds.  Ended at
%s\n\n", UF1time, ctime (&StartTime.time));

#ifdef _DEBUG
       if (flags & VERBOSE)
```

```
            fprintf (stdout, " Insert stmt max len %d, using
len %d\n", maxReqLen, maxUsingLen);
#endif

       LOG1(1,  " Total %d inserted into Order table\n",
orderRowsAdded);
       if (orderRowsAdded != orderRowsToBeAdded)
              {
              LOG1(1,  " Should have been %d inserted into Order
table!!\n", orderRowsToBeAdded);
              }
       LOG1(1,  " Total %d inserted into LineItem table\n",
lineitemRowsAdded);
       if (lineitemRowsAdded != lineitemRowsToBeAdded)
              {
              LOG1(1,  " Should have been %d inserted into
LineItem table\n", lineitemRowsToBeAdded);
              }

       if ((flags & VERBOSE) || (duplicates > 0))
              {
              LOG1(1,  " Total %d inserts ignored due to
duplicate unique primary index\n", duplicates);
              }

       if (orderRowsInError > 0)
              {
              LOG1(1,  " Total %d inserts failed due to database
errors\n", orderRowsInError);
              }
}

/*
 * generate a particular table
 */
void
gen_updates_via_fastload (long start, long count, long upd_num)
{
       long i;


       static int completed = 0;
       order_t o;

       char SqlState[6];
       char ErrMsg[256];
       short ErrMsgLen;
       long ErrCode;
       BOOL retry;

       struct timeb EndTime;
       struct timeb difTime;
    DSS_HUGE *sk;


       orderRowsAdded = 0;
       lineitemRowsAdded = 0;
       orderRowsToBeAdded = 0;
       lineitemRowsToBeAdded = 0;


       prep_direct((db_name)?db_name:DBNAME);


       LOG0(0,  "\n Running update function UF1 (inserts)\n");
       if (flags & VERBOSE)
              {
                     fprintf (stdout, " Running update function
UF1 (inserts)\n");
                     //fprintf(stderr," Running update function
UF1 (inserts)\n");
              }
       ftime (&StartTime);

       /* In this version of UF1, we first use the Teradata
"fastload" utility
          to send the rows to be inserted to temporary tables on
the Teradata system.
          After all the rows have been sent, we use INSERT/SELECT
statements
          to merge the new rows with the existing tables */



       INIT_HUGE(o.okey);
       INIT_HUGE(sk);
       for (i=0; i < O_LCNT_MAX; i++)
              INIT_HUGE(o.l[i].okey);

    for (i = start; count; count--, i++)
              {
                     LIFENOISE (1000, i);
```

```
                    mk_sparse (i, sk, 1 + upd_num / (10000 /
refresh));



                    mk_order (sk, &o);

                    orderRowsToBeAdded++;
                    lineitemRowsToBeAdded += o.lines;


                    ld_order_line (&o, upd_num);



             }


    close_direct();

       hstmt = hstmts[1];

       /* By doing both INSERT/SELECT statements in a single
request to the Teradata system,
          Teradata guarantees these are done as an atomic
transaction */

       retry = TRUE;
       while (retry)
       {
              retry = FALSE;
              if (SQLExecDirect (hstmt, (unsigned char *)
#ifdef IOL
        "INSERT INTO ORDERTBL SELECT * FROM
ORDERTBL_UPDATES;INSERT INTO LINEITEM SELECT * FROM
LINEITEM_UPDATES",
#else
       "INSERT INTO LINEITEM SELECT * FROM
LINEITEM_UPDATES;INSERT INTO ORDERTBL SELECT * FROM
ORDERTBL_UPDATES",
#endif
                           SQL_NTS) == SQL_ERROR)
                    {
                           LOG0(3,  " UF1 Insert/select
failed\n");
                           SQLError ((SQLHENV) 0, (SQLHDBC) 0,
hstmt, (SQLCHAR *) SqlState, &ErrCode, (SQLCHAR *) ErrMsg, 256,
&ErrMsgLen);
                           LOG2(3,  " %d: %s\n", ErrCode,
ErrMsg);
                           SQLFreeStmt (hstmt, SQL_CLOSE);
                           if (canRetry(ErrCode))     /*
Transaction ABORTed due to DeadLock or crash */
                                  {
                                         retry = TRUE;
                                         LOG0(3,  " Attempting to
resubmit UF1 Insert/select\n");
                                  }
                    }
             else
                    {
#ifdef IOL
                           if (SQLRowCount (hstmt,
&orderRowsAdded) != SQL_SUCCESS)
                                  fprintf (stderr, " SQLRowCount
problem\n");
#else
                                if (SQLRowCount (hstmt,
&lineitemRowsAdded) != SQL_SUCCESS)
                                       fprintf (stderr, "
SQLRowCount problem\n");
#endif

                           if (SQLMoreResults (hstmt) !=
SQL_SUCCESS)
                                  fprintf (stderr, "
SQLMoreResults problem\n");

#ifdef IOL
                           if (SQLRowCount (hstmt,
&lineitemRowsAdded) != SQL_SUCCESS)
                                  fprintf (stderr, " SQLRowCount
problem\n");
#else
                                if (SQLRowCount (hstmt,
&orderRowsAdded) != SQL_SUCCESS)
                                       fprintf (stderr, "
SQLRowCount problem\n");
#endif

                    }
      }
```

```
	ftime (&EndTime);
	difTime.time = EndTime.time - StartTime.time;
	if (EndTime.millitm >= StartTime.millitm)
		{
			difTime.millitm = (unsigned short)
(EndTime.millitm - StartTime.millitm);
		}
	else
		{
			difTime.millitm = (unsigned short) ((1000 +
EndTime.millitm) - StartTime.millitm);
			difTime.time -= 1;
		};
	UF1time = difTime.time + difTime.millitm / 1000.0 + 0.005;

	StartTime.time = EndTime.time;
	StartTime.millitm = EndTime.millitm;

	LOG2(1,  " UF1 Insert Time was %.2f seconds.  Ended at
%s\n\n", UF1time, ctime (&StartTime.time));

	LOG1(1, " Total %d inserted into Order table\n",
orderRowsAdded);
	if (orderRowsAdded != orderRowsToBeAdded)
		{
		LOG1(1, " Should have been %d inserted into Order
table!!\n", orderRowsToBeAdded);
		}
	LOG1(1, " Total %d inserted into LineItem table\n",
lineitemRowsAdded);
	if (lineitemRowsAdded != lineitemRowsToBeAdded)
		{
		LOG1(1, " Should have been %d inserted into
LineItem table\n", lineitemRowsToBeAdded);
		}


}


void
stop_proc (int signum)
{
	fflush (fdetail);
	fflush (fsummary);
	fflush (stdout);
	fprintf (stderr, " Program terminating abnormally!
signal=%d\n", signum);
	fflush (stderr);
	exit (1);
}


int
Connect_Sessions ()
{
	char SqlState[6];
	char ErrMsg[256];
	short ErrMsgLen;
	long ErrCode;

	int i;
	char szLogon[240];
	SQLCHAR szDSN[32];
	SQLCHAR szUID[32];
	SQLCHAR szPWD[32];
	char tempstr[100];

	char *place;
	char *place2;

	szDSN[0] = '\0';
	szUID[0] = '\0';
	szPWD[0] = '\0';
	szLogon[0] = '\0';

	strcpy (szLogon, db_name);


	if (strstr (szLogon, "/") != NULL)
		{

			place = strstr (szLogon, "/");
			place[0] = '\0';
			strcpy ((char *) szDSN, szLogon);
			place++;
			place2 = strstr (place, ",");
			place2[0] = '\0';
			strcpy ((char *) szUID, place);
			place2++;
			strcpy ((char *) szPWD, place2);
```

```
        }

    if (SQLAllocEnv (&henv) != SQL_SUCCESS)
        {
            fprintf (stderr, "Could not allocate
ENV\n");
            exit (1);
        }

    for (i = 1; i <= maxSess; i++)
        {
            if (SQLAllocConnect (henv, &hdbc) !=
SQL_SUCCESS)
                {
                    fprintf (stderr, "Could not
allocate DBC\n");
                    exit (1);
                }
            if (SQLConnect (hdbc, szDSN, SQL_NTS, szUID,
SQL_NTS, szPWD, SQL_NTS) != SQL_SUCCESS)
                {
                    if (i > 1)
                        fprintf (stderr, " When
trying to log on the %dth session, \n", i);
                    fprintf (stderr, "Could not
log on using '%s/%s,%s'\n", szDSN, szUID, szPWD);
                    SQLError ((SQLHENV) 0, hdbc,
(SQLHSTMT) 0, (SQLCHAR *) SqlState, &ErrCode, (SQLCHAR *) ErrMsg,
256, &ErrMsgLen);
                    fprintf (stderr, " %s (%ld)
%s\n", SqlState, ErrCode, ErrMsg);
                    if (i < 10)
                        exit (1);
                    fprintf (stderr, " Continuing
with %d sessions only\n", i - 1);
                    fflush (stderr);
                    maxSess = i - 1;
                    hdbc = hdbcs[1];
                    hstmt = hstmts[1];

                    return (0);


                }
            if (SQLAllocStmt (hdbc, &hstmt) !=
SQL_SUCCESS)
                {
                    fprintf (stderr, "Could not
allocate STMT\n");
                    exit (1);
                }
            hdbcs[i] = hdbc;
            hstmts[i] = hstmt;
            if (updates == 0)
                break;

        }
    hdbc = hdbcs[1];
    hstmt = hstmts[1];

    return (0);
}
int
Disconnect_Sessions ()
{
    int i;
    for (i = 1; i <= maxSess; i++)
        {
            SQLFreeStmt (hstmts[i], SQL_DROP);
            hstmt = NULL;
            if (SQLDisconnect (hdbcs[i]) == SQL_ERROR)
                fprintf (stderr, "Error when logging
off the sessions\n");
            if (updates == 0)
                break;
        }

    if (flags & VERBOSE)
        fprintf (stdout, "Sessions are now logged off from
Teradata\n");
    return (0);
}

int
Run_Query (const char *SQLReq, int qnum)
{
    static char SQLR[2048];
    char SqlState[6];
    char ErrMsg[256];
    short ErrMsgLen;
    long ErrCode;
    BOOL retry;

    struct timeb EndTime;
```

```
	struct timeb difTime;
	int i;
	char *SQ1;
	char *SQ2;
	const char *SQ;
	strcpy (SQLR, SQLReq);

	fprintf (fdetail, "\n Submitting SQL Request #%d:\n\n",
qnum);
	fprintf (stdout, " Submitting SQL Request #%d:\n", qnum);

	SQ2 = SQLR;

	while (SQ2 != NULL)
		{
			SQ1 = SQ2;
			for (i = strlen (SQ1) - 1; i > 0; i--)   /*
Trim trailing spaces */
				if (SQ1[i] == ' ' ||
					SQ1[i] == '\r' ||
					SQ1[i] == '\t')
					SQ1[i] = '\0';
				else
					break;
			if (SQ1[strlen (SQ1) - 1] == ';') /* Trim
trailing semicolon and spaces */
				{
					SQ1[strlen (SQ1) - 1] = '\0';
					for (i = strlen (SQ1) - 1; i >
0; i--)
						if (SQ1[i] == ' ' ||
							SQ1[i] == '\r' ||
							SQ1[i] == '\t')
							SQ1[i] = '\0';
						else
							break;
				}

			if (strstr (SQ1, "/*") != NULL)
				SQ2 = strstr (strstr (strstr (SQ1,
"/*"), "*/"), ";");  /* look past the comment strings! */
			else
				SQ2 = strstr (SQ1, ";");   /* If
semicolon, this is a multi-statement request */
			if (SQ2 != NULL)
				{
					*SQ2 = '\0';  /* Break out the
first SQL statement in SQ1 */
					SQ2++;        /* SQ2 points to
the next statement */
				}

			SQ = SQ1;
			while (SQ[0] != 0)
				{

					if (SQ[0] == '\r')
						fputc ('\n', fdetail);
					else
						fputc (SQ[0], fdetail);
					SQ++;
				}
			fprintf (fdetail, ";\n\n");

			retry = TRUE;
			while (retry)
			{
				retry = FALSE;
				if (SQLExecDirect (hstmt, (unsigned
char *) SQ1, SQL_NTS) == SQL_ERROR)
					{
						fprintf (fdetail, "
Query #%d failed\n", qnum);
						SQLError ((SQLHENV) 0,
(SQLHDBC) 0, hstmt, (SQLCHAR *) SqlState, &ErrCode, (SQLCHAR *)
ErrMsg, 256, &ErrMsgLen);
						fprintf (fdetail, " %d:
%s\n", ErrCode, ErrMsg);
						fprintf (stdout, " Query
#%d failed\n", qnum);
						fprintf (stdout, " %d:
%s\n", ErrCode, ErrMsg);
						SQLFreeStmt (hstmt,
SQL_CLOSE);
						if (canRetry(ErrCode))
	/* Transaction ABORTed due to DeadLock or crash */
							{
								retry =
TRUE;
								fprintf
(fdetail, " Attempting to resubmit Query #%d\n", qnum);
								fprintf
(stdout, " Attempting to resubmit Query #%d\n", qnum);
```

```
                                        }
                                    else
                                    if (ErrCode != 3803) /*
table already exists */
                                        {

        QueryTime[qnum] = 0.0;
                                                    return (-
1);
                                        }
                                }
                            else
                                {

        Fetch_and_Display_All_Rows (hstmt, qnum);
                                }
                    }
            }

        ftime (&EndTime);
        difTime.time = EndTime.time - StartTime.time;
        if (EndTime.millitm >= StartTime.millitm)
            {
                difTime.millitm = (unsigned short)
(EndTime.millitm - StartTime.millitm);
            }
        else
            {
                difTime.millitm = (unsigned short) ((1000 +
EndTime.millitm) - StartTime.millitm);
                difTime.time -= 1;
            };

        QueryTime[qnum] = difTime.time + difTime.millitm / 1000.0
+ 0.005;

        StartTime.time = EndTime.time;
        StartTime.millitm = EndTime.millitm;

        fprintf (fdetail, "Time was %.2f seconds.  Query ended at
%s\n\n", QueryTime[qnum], ctime (&StartTime.time));



        return (0);

}
```

```
int
Verify_Database ()
{
        long actualLen;
        long crowcount;
        double newSF;
        char SqlState[6];
        char ErrMsg[256];
        char InfoData[256];
        short ErrMsgLen;
        long ErrCode;
        long vAMPs;
        int isV2;

        isV2 = 0;
        if (SQLExecDirect (hstmt, (SQLCHAR *) "SELECT INFODATA
FROM DBC.DBCINFO WHERE INFOKEY='RELEASE'", SQL_NTS) != SQL_ERROR)
            {
                if (SQLFetch (hstmt) == SQL_SUCCESS)
                    if (SQLGetData (hstmt, 1, SQL_C_CHAR,
InfoData, 256, &actualLen) == SQL_SUCCESS)
                        {
                            fprintf (fdetail, " The
system under test is running Teradata release %s\n", InfoData);
                            fprintf (stdout, " The
system under test is running Teradata release %s\n", InfoData);
                            if (InfoData[0] == 'V'
&& InfoData[1] == '2')
                                isV2 = 1;
                        }
                SQLFreeStmt (hstmt, SQL_CLOSE);
            }

        vAMPs = 0;
        if (isV2)
            if (SQLExecDirect (hstmt, (SQLCHAR *) "SELECT
HASHAMP(HASHBUCKET(HASHROW(S_SUPPKEY))) FROM SUPPLIER GROUP BY 1
ORDER BY 1", SQL_NTS) != SQL_ERROR)
                {
                    if (SQLRowCount (hstmt, &vAMPs) !=
SQL_SUCCESS)
                        fprintf (stderr, " Problem in
SQLRowCount!\n");
                    if (vAMPs > 0)
                        {
```

```
                                        fprintf (fdetail, " The
system under test has %d virtual AMPs\n", vAMPs);
                                        fprintf (stdout, " The
system under test has %d virtual AMPs\n", vAMPs);
                                    }

                            SQLFreeStmt (hstmt, SQL_CLOSE);
                    }

       if (SQLExecDirect (hstmt, (SQLCHAR *) "SELECT COUNT(*)
FROM DBC.SESSIONINFO", SQL_NTS) != SQL_ERROR)
              {
                    if (SQLFetch (hstmt) == SQL_SUCCESS)
                           if (SQLGetData (hstmt, 1,
SQL_C_SLONG, &crowcount, 4, &actualLen) == SQL_SUCCESS)
                                    {
                                        if (crowcount > maxSess)
                                               {
                                                      fprintf
(fdetail, " There are %d other sessions logged on to the system
under test\n", crowcount - maxSess);
                                                      fprintf
(stdout, " There are %d other sessions logged on to the system
under test\n", crowcount - maxSess);
                                               }
                                    }
                    SQLFreeStmt (hstmt, SQL_CLOSE);
              }


       if (flags & VERBOSE)
              fprintf (stdout, "Submitting SQL Requests to verify
scale factor\n");
       if (SQLExecDirect (hstmt, (SQLCHAR *) "SELECT COUNT(*)
FROM CUSTOMER", SQL_NTS) != SQL_ERROR)
              {
                    if (SQLFetch (hstmt) == SQL_SUCCESS)
                           if (SQLGetData (hstmt, 1,
SQL_C_SLONG, &crowcount, 4, &actualLen) == SQL_SUCCESS)
                                    {
                                        SQLFreeStmt (hstmt,
SQL_CLOSE);
                                        newSF = ((double)
crowcount) / 150000.0;
                                        fprintf (stdout, "
Customer table exists with scale factor %g\n", newSF);
                                        if ((long) (newSF * 1000
+ 0.5) != (long) (flt_scale * 1000))
                                               fprintf (stdout,
" Scale factor does not match!\n");
                                    }
              }
       else
              {
                    fprintf (stderr, " Customer table does not
exist or cant be accessed\n");
                    SQLError ((SQLHENV) 0, (SQLHDBC) 0, hstmt,
(SQLCHAR *) SqlState, &ErrCode, (SQLCHAR *) ErrMsg, 256,
&ErrMsgLen);
                    fprintf (stderr, " %d: %s\n", ErrCode,
ErrMsg);
                    SQLFreeStmt (hstmt, SQL_CLOSE);
              }

       if (SQLExecDirect (hstmt, (SQLCHAR *) "SELECT COUNT(*)
FROM PARTTBL", SQL_NTS) != SQL_ERROR)
              {
                    if (SQLFetch (hstmt) == SQL_SUCCESS)
                           if (SQLGetData (hstmt, 1,
SQL_C_SLONG, &crowcount, 4, &actualLen) == SQL_SUCCESS)
                                    {
                                        SQLFreeStmt (hstmt,
SQL_CLOSE);
                                        newSF = ((double)
crowcount) / 200000.0;
                                        fprintf (stdout, " Part
table exists with scale factor %g\n", newSF);
                                        if ((long) (newSF * 1000
+ 0.5) != (long) (flt_scale * 1000))
                                               fprintf (stdout,
" Scale factor does not match!\n");
                                    }
              }
       else
              {
                    fprintf (stderr, " Part table does not
exist\n");
                    SQLError ((SQLHENV) 0, (SQLHDBC) 0, hstmt,
(SQLCHAR *) SqlState, &ErrCode, (SQLCHAR *) ErrMsg, 256,
&ErrMsgLen);
                    fprintf (stderr, " %d: %s\n", ErrCode,
ErrMsg);
                    SQLFreeStmt (hstmt, SQL_CLOSE);
```

```
            }


      if (SQLExecDirect (hstmt, (SQLCHAR *) "SELECT COUNT(*)
FROM ORDERTBL", SQL_NTS) != SQL_ERROR)
            {
                  if (SQLFetch (hstmt) == SQL_SUCCESS)
                        if (SQLGetData (hstmt, 1,
SQL_C_SLONG, &crowcount, 4, &actualLen) == SQL_SUCCESS)
                              {
                                    SQLFreeStmt (hstmt,
SQL_CLOSE);
                                    newSF = ((double)
crowcount) / 1500000.0;
                                    fprintf (stdout, " Order
table exists with scale factor %g\n", newSF);
                                    if ((long) (newSF * 1000
+ 0.5) != (long) (flt_scale * 1000))
                                          fprintf (stdout,
" Scale factor does not match!\n");
                              }
            }
      else
            {
                  fprintf (stderr, " Order table does not
exist\n");
                  SQLError ((SQLHENV) 0, (SQLHDBC) 0, hstmt,
(SQLCHAR *) SqlState, &ErrCode, (SQLCHAR *) ErrMsg, 256,
&ErrMsgLen);
                  fprintf (stderr, " %d: %s\n", ErrCode,
ErrMsg);
                  SQLFreeStmt (hstmt, SQL_CLOSE);
            }


      return (0);

}

int
Run_Query_Stream ()
{
      int i;
      ftime (&StartTime);
      fprintf (stdout, " Starting query run for stream %d on
%s\n", snum, ctime (&StartTime.time));
      fprintf (fdetail, "\n Starting query run for stream %d on
%s\n", snum, ctime (&StartTime.time));

      ftime (&StartTime);



      if (snum >= 0)
            if (optind < ac1)
                  for (i = optind; i < ac1; i++)
                        {
                              char qname[10];
                              sprintf (qname, "%d", SEQUENCE
(snum, atoi (av1[i])));
                              qsub (qname, flags);
                              Run_Query (SQLRequest,
SEQUENCE (snum, atoi (av1[i])));
                        }
            else
                  for (i = 1; i <= QUERIES_PER_SET; i++)
                        {
                              char qname[10];
                              sprintf (qname, "%d", SEQUENCE
(snum, i));
                              qsub (qname, flags);
                              Run_Query (SQLRequest,
SEQUENCE (snum, i));
                        }
      else if (optind < ac1)
            for (i = optind; i < ac1; i++)
                  {
                        qsub (av1[i], flags);
                        Run_Query (SQLRequest, atoi
(av1[i]));
                  }
      else
            for (i = 1; i <= QUERIES_PER_SET; i++)
                  {
                        char qname[10];
                        sprintf (qname, "%d", i);
                        qsub (qname, flags);
                        Run_Query (SQLRequest, i);
                  }

      ftime (&StartTime);
      fprintf (stdout, " Finished query run for stream %d on
%s\n", snum, ctime (&StartTime.time));
```

```
	fprintf (fdetail, " Finished query run for stream %d on
%s\n", snum, ctime (&StartTime.time));

	return (0);
}

void
Print_Stream_Summary ()
{
	int i;

	fprintf (fsummary, "\nQuery timing results:\n\n");
	for (i = 1; i <= QUERIES_PER_SET; i++)
		if (QueryTime[i] != 0.0)
			fprintf (fsummary, "Query #%d time was %.2f
seconds.\n", i, QueryTime[i]);
		else
			fprintf (fsummary, "Query #%d was not
run.\n", i);

	if (UF1time != 0.0)
		fprintf (fsummary, "UF1 (insert) time was %.2f
seconds.\n", UF1time);
	else
		fprintf (fsummary, "UF1 (insert) was not run.\n");

	if (UF2time != 0.0)
		fprintf (fsummary, "UF2 (delete) time was %.2f
seconds.\n", UF2time);
	else
		fprintf (fsummary, "UF2 (delete) was not run.\n");
}

void
Run_UF1_Inserts ()
{
	ftime (&StartTime);
	fprintf (stdout, " Starting UF1 insert run for set %d on
%s\n", upd_num, ctime (&StartTime.time));
	fprintf (fdetail, "\n Starting UF1 insert run for set %d
on %s\n", upd_num, ctime (&StartTime.time));

	rowcnt = tdefs[ORDER_LINE].base / 10000 * scale * refresh;

	if (rowcnt != 1500 * scale && flt_scale >= 1.0)
		fprintf (stderr, " Why is rowcnt = %d\n", rowcnt);

	minrow = rowcnt * upd_num + 1;
	if (flags & VERBOSE)
		fprintf (fdetail, " Inserting from %d for %d txns,
upd_num =%d\n", minrow, rowcnt, upd_num);

	if (use_fastload_for_updates & 1 == 1)
		gen_updates_via_fastload (minrow, rowcnt, upd_num +
1);
	else
		gen_updates (minrow, rowcnt, upd_num + 1);

	upd_num++;

}

void
Run_UF2_Deletes (int special)
{
	ftime (&StartTime);
	if (special == 0)
		{
			fprintf (stdout, " Starting UF2 delete run
for set %d on %s\n", upd_num - 1, ctime (&StartTime.time));
			fprintf (fdetail, "\n Starting UF2 delete
run for set %d on %s\n", upd_num - 1, ctime (&StartTime.time));
		}

	rowcnt = tdefs[ORDER_LINE].base / 10000 * scale * refresh;
	if (rowcnt != 1500 * scale && flt_scale >= 1.0)
		fprintf (stderr, " Why is rowcnt = %d\n", rowcnt);

	minrow = rowcnt * (upd_num - 1) + 1;
	if (flags & VERBOSE)
		fprintf (fdetail, " Deleting from %d for %d txns,
upd_num =%d\n", minrow, rowcnt, upd_num);

	if (use_fastload_for_updates & 2 == 2)
		gen_deletes_via_fastload (minrow, rowcnt, upd_num,
special);
	else
		gen_deletes (minrow, rowcnt, upd_num, special);


}


int
```

```
main (int ac, char **av)
{
       int i;
       int c;
       int status;
       FILE *ifp;
       char line[LINE_SIZE];
       double QppD;
       double QthD;
       double QphD;
       double sumoflogs;
       double maxtime;
       double mintime;
       struct timeb ThroughputStartTime;
       struct timeb ThroughputEndTime;
       struct timeb difTime;
       char tempstr[200];
       char tempstr2[20];
       char tempstr3[128];

       prog = av[0];
       rowcnt = 0;
       table = (1 << CUST) |
              (1 << SUPP) |
              (1 << NATION) |
              (1 << REGION) |
              (1 << PART_PSUPP) |
              (1 << ORDER_LINE);
       scale = 1;
       flt_scale = (double) 1.0;
       flags = 0;
       updates = 1;
       refresh = UPD_PCT;
       gen_sql = 0;
       gen_rng = 1;
       direct = 1;
       tdefs[ORDER].base *=
              ORDERS_PER_CUST;           /* have to do this after
init */
       tdefs[LINE].base *=
              ORDERS_PER_CUST;           /* have to do this after
init */
       tdefs[ORDER_LINE].base *=
              ORDERS_PER_CUST;           /* have to do this after
init */
       children = 1;
       throughputstreams = 3;
       upd_num = 0;
       QppD = 0.0;
       QthD = 0.0;
       QphD = 0.0;

       ac1 = ac;
       av1 = av;


       process_options (ac, av);
       if (flags & VERBOSE)
              printf ("TPC-H/R Benchmark Driver, (matched to
DBGEN/QGEN Version %d.%d.%d%c)\n",
             VERSION, RELEASE ,MODIFICATION,PATCH);
       fflush (stdout);

       if (use_fastload_for_updates == 3)
              maxSess = throughputstreams + 1;

       if ((flags & SEED) == 0)
              if (flags & EVERYTHING)
                     num_seeds = throughputstreams + 1;

       if (num_seeds > 1 && num_seeds < throughputstreams + 1 &&
(flags & EVERYTHING))
              {
                     fprintf (stderr, " You didn't supply enough
seed values \n");
                     exit (1);
              }
       if (num_seeds > 1 && !(flags & EVERYTHING))
              {
                     fprintf (stderr, " Supplying multiple seeds
only makes sense if you are also use -e \n");
                     exit (1);
              }

       setup ();
       /* have to do this after init */
       tdefs[NATION].base = nations.count;
       tdefs[REGION].base = regions.count;

       for (i = 0; i <= QUERIES_PER_SET; i++)
              SaveSeed[i] = Seed[i].value;

       if (!(flags & DFLT))        /* preturb the RNG */
           {
```

```
          if (!(flags & SEED))
                    {
                    for (i = MAX_STREAM; i >= 0; i--)
                                        {
                                              rndm = rndm =
(long)((unsigned)time(NULL) * DSS_PROC) + i;
                                              if (rndm < 0)
                                                     rndm +=
2147483647;
                                              if (rndm == 0)
                                                     rndm = 12345;
                                              initSeeds[i] = rndm;
                                        }
                  }
              if (num_seeds > 1 && (flags & EVERYTHING))
                                        {
                                              for (i = 0; i <
num_seeds; i++)
                                                     {
                                                           printf ("
-- Using %ld as seed for stream %d\n", initSeeds[i], i);
                                                           if
(initSeeds[i] == 0)
                                                                  {

       fprintf (stderr, " -- Seeds cannot be zero!\n");

       exit (1);
                                                                  }
                                                     }
                                        }
              else
                printf("-- using %ld as a seed to the RNG\n",
rndm);

              for (i=1; i <= QUERIES_PER_SET; i++)
                     {
                    Seed[i].value = rndm;
                    UnifInt(0L, 100L, i);
                    UnifInt(0L, 100L, i);
                    UnifInt(0L, 100L, i);
                    UnifInt(0L, 100L, i);
                    UnifInt(0L, 100L, i);
                  }


              }
```

```
    else
        printf("-- using default substitutions\n");



       if (!(flags & DBASE))
              {
                     fprintf (stderr, " You must use the -n
option to enter the Teradata logon to use\n");

                     exit (1);
              }


       if (!(flags & OUTPUT))
              {
                     osuff = malloc (strlen (".") + 1);
                     MALLOC_CHECK (osuff);
                     strcpy (osuff, ".");
              }


       if (snum >= 0)
              sprintf (tempstr,
"%s/tpcd_stream_%d_detailed_output.txt", osuff, snum);
       else
              sprintf (tempstr, "%s/tpcd_detailed_output.txt",
osuff);
       fdetail = fopen (tempstr, "w");
       if (snum >= 0)
              sprintf (tempstr,
"%s/tpcd_stream_%d_summary_output.txt", osuff, snum);
       else
              sprintf (tempstr, "%s/tpcd_summary_output.txt",
osuff);
       fsummary = fopen (tempstr, "w");

       if (fdetail == NULL || fsummary == NULL)
              {
                     fprintf (stderr, " **** Fatal error, cannot
open output files. errno=%d\n", errno);
                     if (flags & OUTPUT)
                            fprintf (stderr, " **** Probably
directory %s does not exist or is not writable\n", osuff);
                     exit (1);
              }
```

```
	signal (SIGABRT, stop_proc);
	signal (SIGTERM, stop_proc);
	signal (SIGINT, stop_proc);
#ifdef _WIN32
	signal (SIGBREAK, stop_proc);
#else
	signal (SIGTSTP, stop_proc);
#endif


	fprintf (fdetail, "\n TPC-D Benchmark Execution, detailed
results\n");
	fprintf (fsummary, "\n TPC-D Benchmark Execution, summary
results\n");

	fprintf (fdetail, "\n Using Teradata logon '%s'\n",
db_name);
	fprintf (fsummary, "\n Using Teradata logon '%s'\n",
db_name);

	fprintf (fsummary, " Using %ld as seed \n", rndm);
	fprintf (fdetail, " Using %ld as seed \n", rndm);

	fprintf (fsummary, " Scale factor is %g\n", flt_scale);
	fprintf (fdetail, " Scale factor is %g\n", flt_scale);

	/* Log on all sessions needed */
	Connect_Sessions ();

	/* Test to see the size of the tables */
	if (specialtest == 0 && snum <= 0)
		Verify_Database ();

	for (i = 0; i <= QUERIES_PER_SET; i++)
		{
			QueryTime[i] = 0.0;
		}
	UF1time = 0.0;
	UF2time = 0.0;
	/* Run Power test warm-up, optional */
	/* run update function UF1 once on same query stream! */
	if (updates > 0)
		{

			/* Save Query Seeds */
			for (i = 0; i <= QUERIES_PER_SET; i++)
				{
					tempSeed = SaveSeed[i];
					SaveSeed[i] = Seed[i].value;
					Seed[i].value = tempSeed;
				}

			if (specialtest)
				{
					upd_num = 0;
					system ("prfld");
					system ("prfstat");

					for (i = 1; i < 5; i++)
						{
							setsPerReq = i;
							fprintf (fdetail,
" Testing with setsPerReq = %d \n", setsPerReq);

							upd_num = 1;
							Run_UF2_Deletes
(1);
							fflush (stdout);
							fflush (stderr);
							fflush (fdetail);
							fflush
(fsummary);

							sprintf (tempstr,
"prfsnap InsertText%dtxns.log", setsPerReq);
							system (tempstr);
							upd_num = 0;
							Run_UF1_Inserts
();
							system (tempstr);
							fflush (stdout);
							fflush (stderr);
							fflush (fdetail);
							fflush
(fsummary);

						}
					fflush (stdout);
					fflush (stderr);
					fclose (fsummary);
					fclose (fdetail);

					exit (1);
				}
```

```
                if ((flags & DFLT) || snum < 0 || flt_scale
< 1.0)
                        {
                                /* Temp:  Pre-delete to clean
up everything from previous failed runs */
                                /* normally, this should
delete zero rows */
                                upd_num = updates;
                                Run_UF2_Deletes (1);
                                UF2time = 0.0;
                        }
                upd_num = updates - 1;
                fflush (fdetail);
                fflush (fsummary);

/*
 * run set_state to advance the RNG to the start point for insert
generation
 * this will avoid duplicated rows between the inserts and the
original data
 */
                set_state (ORDER, scale, 1, 2, (long *)&i);
                Run_UF1_Inserts ();


                /* Restore Query Seeds, Save Insert seeds */
                for (i = 0; i <= QUERIES_PER_SET; i++)
                        {
                                tempSeed = SaveSeed[i];
                                SaveSeed[i] = Seed[i].value;
                                Seed[i].value = tempSeed;
                        }
        }

        fflush (fdetail);
        fflush (fsummary);

        if (flags & INIT)               /* init stream with
ifile */
        {
                ifp = fopen (ifile, "r");
                if (ifp == NULL)
                        {
                                fprintf (stderr, "Failed to
open file '%s'\n", ifile);
                                exit (1);
                        }
                while (fgets (line, LINE_SIZE, ifp) != NULL)
                        fprintf (stdout, "%s", line);
        }


        /* Run Power test, stream=0! */

        Run_Query_Stream ();

        /* Restore Insert seeds */
        for (i = 0; i <= QUERIES_PER_SET; i++)
                {
                        tempSeed = SaveSeed[i];
                        SaveSeed[i] = Seed[i].value;
                        Seed[i].value = tempSeed;
                }

        fflush (fdetail);
        fflush (fsummary);

        /* Run update function UF2 once on the same query stream!
*/

        if (updates > 0)
                if (snum < 0 || (flags & DFLT))
                        Run_UF2_Deletes (1);
                else
                        Run_UF2_Deletes (0);

        fprintf (stdout, " Stream %d finished on %s\n", snum,
ctime (&StartTime.time));
        fprintf (fdetail, "\n Stream %d finished on %s\n", snum,
ctime (&StartTime.time));

        Print_Stream_Summary ();

        fflush (fdetail);
        fflush (fsummary);

        if (snum > 0)
                if (flags & EVERYTHING)
                        {
                                Disconnect_Sessions ();

                                fclose (fsummary);
                                fclose (fdetail);
```

```
                        return (0);
                }

        maxtime = 0.0;
        mintime = 9e50;
        for (i = 1; i <= QUERIES_PER_SET; i++)
                {
                if (maxtime < QueryTime[i])
                        maxtime = QueryTime[i];
                if (mintime > QueryTime[i])
                        mintime = QueryTime[i];
                }
        if (maxtime > 0.0)
                if ((maxtime / mintime) > 1000.0)
                        {
                        fprintf (fsummary, " Ratio of max
query time to min query time over 1000, special processing in
effect\n");
                        fprintf (fdetail, " Ratio of max
query time to min query time over 1000, special processing in
effect\n");
                        for (i = 1; i < QUERIES_PER_SET; i++)
                                if (QueryTime[i] < maxtime /
1000.0)
                                        QueryTime[i] = maxtime /
1000.0;
                }

        if (maxtime > 0.0)
                {
                sumoflogs = 0.0;
                for (i = 1; i <= QUERIES_PER_SET; i++)
                        sumoflogs += log (QueryTime[i]);
                sumoflogs += log (UF1time) + log (UF2time);
                QppD = (3600.0 / exp (sumoflogs / 24.0)) *
flt_scale;

                fprintf (fsummary, "\n QppD@%.1fGB =
%.2f\n", flt_scale, QppD);
                fprintf (fdetail, "\n QppD@%.1fGB = %.2f\n",
flt_scale, QppD);
                }

        /* Power test complete!  */
```

```
        if (snum == 0)
                if (flags & EVERYTHING)
                        {
                                /*note: nothing is legal between
power test and throughput test */
                                /* Run throughput in parallel with a
single update stream */
                                /*note: stream 1 to s, where s=
#streams */

                                ftime (&StartTime);
                                ThroughputStartTime.time =
StartTime.time;
                                ThroughputStartTime.millitm =
StartTime.millitm;
                                fprintf (stdout, " Beginning
throughput test using %d query streams on %s\n",
throughputstreams, ctime (&StartTime.time));
                                fprintf (fdetail, "\n Beginning
throughput test using %d query streams on %s\n",
throughputstreams, ctime (&StartTime.time));

                                for (c = 0; c < throughputstreams;
c++)
                                        {
                                                sprintf (tempstr, "%d",
c + 1);
                                                sprintf (tempstr2, "%f",
flt_scale);
                                                if (c < num_seeds)
                                                        sprintf
(tempstr3, "%ld", initSeeds[c + 1]);
                                                else
                                                        sprintf
(tempstr3, "%ld", rndm);


#if (defined(WIN32)&&!defined(_POSIX_))
                                                pids[c] = _spawnl
(_P_NOWAIT, av[0], av[0], "-p", tempstr, "-s", tempstr2, "-U",
"0", "-r", tempstr3, "-n", db_name,

                "-o", osuff,

                "-v",

                (char *) NULL);
```

```
                                        fprintf (stdout, "
Spawned task, pid is %d\n", pids[c]);
                                        if (pids[c] == -1)
                                                {
                                                        fprintf
(stderr, "Child query stream not created %d\n", errno);
                                                        exit (-1);
                                                }
#else
                                        pids[c] = SPAWN ();
                                        if (pids[c] == -1)
                                                {
                                                        fprintf
(stderr, "Child query stream not created");
                                                        exit (-1);
                                                }
                                        else if (pids[c] == 0)
       /* CHILD */
                                                {
                                                        execl
(av[0], av[0], "-p", tempstr, "-s", tempstr2, "-U", "0", "-r",
tempstr3, "-n", db_name,

"-o", osuff,

(char *) NULL);
                                                        fprintf
(stderr, " Could not execl to start the new task %d\n", errno);

                                                        exit (1);
                                                }
                                        else
#endif
                                        if (flags & VERBOSE) /*
PARENT */
                                                fprintf (stdout,
".");
                                }

                        if (flags & VERBOSE)
                                fprintf (stdout,
"waiting...");

                        fflush (stderr);
                        fflush (fdetail);
                        fflush (fsummary);
                                        c = throughputstreams;
                                        while (c)
                                                {
#if (defined(WIN32)&&!defined(_POSIX_))
                                                i = _cwait (&status,
pids[c - 1], _WAIT_CHILD);
                                                if (i == -1 &&
throughputstreams)
                                                        {
                                                                if (errno
== ECHILD)

        fprintf (stderr, "Could not wait on pid %d\n", pids[c -
1]);
                                                                else if
(errno == EINTR)

        fprintf (stderr, "Process %d stopped abnormally\n", pids[c
- 1]);
                                                                else if
(errno == EINVAL)

        fprintf (stderr, "Program bug\n");
                                                        }
                                                else
                                                        {
                                                                fprintf
(stdout, "Process %d: STOPPED\n", pids[c - 1]);
                                                        }
#else
                                                i = wait (&status);
                                                if (i == -1 &&
throughputstreams)
                                                        {
                                                                fprintf
(stderr, "We lost one\n");
                                                                exit (-2);
                                                        }
                                                if (status & 0xFF)
                                                        {
                                                                if (status
& 0xFF == 0117)

        printf ("Process %d: STOPPED\n", i);
                                                                else

        printf ("Process %d: rcvd signal %d\n",
```

```
            i, status & 0x7F);
                                                }
#endif
                                        c--;
                                }

                        ftime (&StartTime);
                        fprintf (stdout, " Throughput query
streams ended on %s, starting updates\n", ctime
(&StartTime.time));
                        fprintf (fdetail, "\n  Throughput
query streams ended on %s, starting updates\n", ctime
(&StartTime.time));

                        if (updates > 0)
                                {
                                for (c = 0; c <
throughputstreams; c++)
                                        {
                                                Run_UF1_Inserts
();
                                                if (snum < 0 ||
(flags & DFLT))

       Run_UF2_Deletes (1);
                                                else

       Run_UF2_Deletes (0);
                                        }
                                }

                        ftime (&ThroughputEndTime);

                        difTime.time = ThroughputEndTime.time
- ThroughputStartTime.time;
                        if (ThroughputEndTime.millitm >=
ThroughputStartTime.millitm)
                                {
                                        difTime.millitm =
(unsigned short) (ThroughputEndTime.millitm -
ThroughputStartTime.millitm);
                                }
                        else
                                {
                                                difTime.millitm =
(unsigned short) ((1000 + ThroughputEndTime.millitm) -
ThroughputStartTime.millitm);
                                                difTime.time -= 1;
                                };
                                Throughputtime = difTime.time +
difTime.millitm / 1000.0 + 0.005;

                                fprintf (stdout, " Throughput test
ended on %s\n", ctime (&ThroughputEndTime.time));
                                fprintf (fdetail, "\n  Throughput
test ended on %s\n", ctime (&ThroughputEndTime.time));

                                fprintf (fdetail, "\n  Throughput
test took %.2f seconds\n", Throughputtime);

                                if (updates > 0)
                                        {
                                                QthD =
((throughputstreams * 22.0 * 3600.0) / Throughputtime) *
flt_scale;

                                                fprintf (fsummary, "\n
QthD@%.1fGB = %.2f\n", flt_scale, QthD);
                                                fprintf (fdetail, "\n
QthD@%.1fGB = %.2f\n", flt_scale, QthD);

                                                QphD = sqrt (QppD *
QthD);

                                                fprintf (fsummary, "\n
QphD@%.1fGB = %.2f\n", flt_scale, QphD);
                                                fprintf (fdetail, "\n
QphD@%.1fGB = %.2f\n", flt_scale, QphD);
                                        }


                        }



       if (flags & TERMINATE)           /* terminate stream with
tfile */
```

```
            {
                  ifp = fopen (tfile, "r");
                  if (ifp == NULL)
                        {
                              fprintf (stderr, "Failed to
open terminate file '%s'\n",
                                                tfile);
                              exit (1);
                        }
                  while (fgets (line, LINE_SIZE, ifp) != NULL)
                        fprintf (stdout, "%s", line);
            }

      fflush (fdetail);
      fflush (fsummary);

      Disconnect_Sessions ();

      fclose (fsummary);
      fclose (fdetail);

      return (0);
}
```

Implementation specific layer

To simplify the source to the tpcddriver, the details of calling Teradata CLIv2 was hidden in this layer of code designed to look similar to ISO CLI or ODBC CLI.

Tdatsql.h

```
/*
 * tdatsql.h This file just includes the standard ODBC or ISO CLI
 * header files (see ISO/IEC 9075-3:1995, or the Microsoft ODBC
SDK
 *
 */

#undef FAR
#define FAR

typedef void * HWND;
#include <sqltypes.h>
#include <sql.h>


/* Two Teradata-specific functions, because this made my life
   easier than using the standard ISO CLI or ODBC function */


SQLRETURN SQL_API  SQLSetUsingParcel(
       SQLHSTMT  hstmt,
    char * uptr,
    long ulen);

SQLRETURN SQL_API  SQLWaitForAny(
       SQLHENV   henv,
       SQLHSTMT  * lphstmt,
    int * stmtno);
```

tsqlt.h

```
/*
 * tsqlt.h
 * Teradata SQL Type codes are different from ODBC SQL Type
codes,
 * so we need to translate them.  This translates from Teradata
form
 * to ODBC form.   The Teradata form also contains the Nullable
information,
 * so we extract that at the same time.
 */

void TranslateSQLType( SWORD * SqlType, SWORD * Nullable, SWORD
OldSqlType );


/* This translates the other way, from ODBC SQL Type to Teradata
SQL Type.     */
#ifdef __cplusplus
extern "C"
#endif
SWORD UnTranslateSQLType( SWORD SqlType );
```

tsqlt.c

```
/*
 * TSQLT.C
 * Teradata SQL Type codes are different from ODBC SQL Type
codes,
 * so we need to translate them.  This translates from Teradata
form
 * to ODBC form.   The Teradata form also contains the Nullable
information,
 * so we extract that at the same time.
 */
#include "tdatsql.h"
```

```
void TranslateSQLType( SWORD * SqlType, SWORD * Nullable, SWORD
OldSqlType )
    {
    switch ( OldSqlType )
        {
 case 384:                      // IBM Date
 case 385:
 case 570:                      // DBC date (old style)?
 case 571:
 case 572:
 case 573:
 case 752:                      // DBC date
 case 753:
            *SqlType = SQL_DATE;
            break;

          case 388:
          case 389:
            *SqlType = SQL_TIME;
            break;

          case 392:
          case 393:
            *SqlType = SQL_TIMESTAMP;
            break;

          case 448:
          case 449:
            *SqlType = SQL_VARCHAR;
            break;

          case 452:
          case 453:
            *SqlType = SQL_CHAR;
            break;

          case 456:
          case 457:
            *SqlType = SQL_LONGVARCHAR;
            break;

          case 460:
          case 461:
            *SqlType = SQL_VARCHAR;     // with zero byte at end.
            break;

case 468:              // GRAPHIC
case 469:
  *SqlType = SQL_CHAR;// ?
  break;

case 464:              // VARGRAPHIC
case 465:
case 472:              // LONG VARGRAPHIC
case 473:
  *SqlType = SQL_VARCHAR;     // ?
  break;

case 480:
case 481:
  *SqlType = SQL_FLOAT;
  break;

case 484:
case 485:
  *SqlType = SQL_DECIMAL;
  break;

case 496:
case 497:
  *SqlType = SQL_INTEGER;
  break;

case 500:
case 501:
  *SqlType = SQL_SMALLINT;
  break;

case 576:
case 577:
case 756:
case 757:
  *SqlType = SQL_TINYINT;
  break;

case 588:
case 589:
case 692:
case 693:
  *SqlType = SQL_BINARY;
  break;

case 582:
```

```
          case 583:
          case 688:
          case 689:
          case 594:
          case 595:
          case 696:
          case 697:
            *SqlType = SQL_VARBINARY;
            break;

          default:
               ;
            }
    if ( ( OldSqlType & 1 ) == 1 )
        *Nullable = SQL_NULLABLE;
    else
        *Nullable = SQL_NO_NULLS;
    }

// This translates the other way, from ODBC SQL Type to Teradata
SQL Type.
// SDK 2.0 introduced signed/unsigned LONG, SHORT & TINYINT.
Signed types map
// to the same SqlType as SDK 1.0, but for unsigned they have to
map to a larger
// type. This was added to fix GCA list #1011, where parameter
passing
// (binding) of signed/unsigned  types was not working.
SWORD UnTranslateSQLType( SWORD SqlType )
    {
    switch ( SqlType )
        {
 case SQL_DATE:
 case SQL_TIMESTAMP:
            return 753;         // DBC Date
            break;

          case SQL_VARCHAR:
            return 449;
            break;

          case SQL_CHAR:
            return 453;
            break;

          case SQL_LONGVARCHAR:
            return 457;
            break;

          case SQL_REAL:
              return 481;   // Teradata does not have single prec
real.

          case SQL_FLOAT:
          case SQL_DOUBLE:
          case SQL_TIME:
            return 481;

          case SQL_DECIMAL:
          // Rudy Ezquerro. GCA list #1011, [un]signed types not
bound properly
          // SQL_C_ULONG = SQL_INTEGER + SQL_UNSIGENED_OFFSET
          // Best match for ULONG is DECIMAL(10,0) ==> 8 bytes
          case SQL_C_ULONG:
            return 485;

          case SQL_INTEGER:
          // SQL_C_SLONG = SQL_INTEGER + SQL_SIGNED_OFFSET
          // SQL_C_USHORT = SQL_SMALLINT + SQL_UNSIGED_OFFSET
          case SQL_C_SLONG:
          case SQL_C_USHORT:
            return 497;

          case SQL_SMALLINT:
          // SQL_C_SSHORT = SQL_SMALLINT + SQL_SIGNED_OFFSET
          // SQL_C_UTINYINT = SQL_TINYINT + SQL_UNSIGNED_OFFSET
          case SQL_C_SSHORT:
          case SQL_C_UTINYINT:
            return 501;

          case SQL_TINYINT:
          case SQL_BIT:
          // SQL_C_STINYINT = SQL_TINYINT + SQL_SIGNED_OFFSET
          case SQL_C_STINYINT:
            return 757;

          case SQL_BINARY:
            return 693;

          case SQL_VARBINARY:
            return 689;

          default:
            return SqlType;
```

```
            }
        }
```

tdatsql.c

```
/*
 * tdatsql.c  This is an interface layer that gives a very
primitive
 * ODBC style (or ISO CLI style) call level interface look on top
of
 * Teradata's standard CLIv2.  This allows the tpcddriver.c to be
 * a bit more readable and cleaner, and we hide the CLIv2 stuff
in
 * hear.  Only enough of ODBC/ISO CLI is implemented to run just
 * what we need for TPC-D, although this code could be used for
other
 * things.
 * The idea is that someday, when we have either an ANSI X/Open
 * or ISO CLI on Unix, or an ODBC on Unix, we can just rip out
this
 * code and throw it away, and use the ISO or ODBC cli.
 */

#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#include <time.h>
#include <limits.h>
#include <math.h>
#include <sys/types.h>
#include <sys/timeb.h>
#if (defined(_POSIX_)||!defined(WIN32))
#include <unistd.h>
#define INLINE _Inline
#ifndef snprintf
#define snprintf(w,x,y,z) sprintf(w,y,z)
#endif
#else
#include <process.h>
/*#include <signal.h> */
#include <errno.h>
/*
   #pragma warning(disable:4201)
   #pragma warning(disable:4214)
   #pragma warning(disable:4514)
   #define WIN32_LEAN_AND_MEAN
   #define NOATOM
   #define NOGDICAPMASKS
   #define NOMETAFILE
   #define NOMINMAX
   #define NOMSG
   #define NOOPENFILE
   #define NORASTEROPS
   #define NOSCROLL
   #define NOSOUND
   #define NOSYSMETRICS
   #define NOTEXTMETRIC
   #define NOWH
   #define NOCOMM
   #define NOKANJI
   #define NOMCX
   #include <windows.h>
   #pragma warning(default:4201)
   #pragma warning(default:4214)
 */
#define INLINE _inline
#ifndef itoa
#define itoa _itoa
#endif
#ifndef snprintf
#define snprintf _snprintf
#endif
#endif
#include <ctype.h>
#include <time.h>
#include <assert.h>
#include "tdatsql.h"
#include "tsqlt.h"

#include <coptypes.h>
#include <dbcarea.h>
#include <coperr.h>
#include <dbcerr.h>
#include <parcel.h>

#ifndef __min
#define __min(a,b)  (((a) < (b)) ? (a) : (b))
#endif

#define MALLOC_CHECK(var) \
    if ((var) == NULL) \
        { \
```

```
        fprintf(stderr, "Malloc failed at %s:%d\n",  \
            __FILE__, __LINE__); \
        exit(1);\
        }
#define DBCINTN    496
#define DBCINTI    497
#define DBCSINTN   500
#define DBCSINTI   501
#define DBCDECN    484
#define DBCDECI    485
#define DBCFLOATN  480
#define DBCFLOATI  481
#define DBCVCHARN  448
#define DBCVCHARI  449
#define DBCCHARN   452
#define DBCCHARI   453
#define DBCLCHARN  456
#define DBCLCHARI  457
#define DBCDATEN   752
#define DBCDATEI   753
#define DBCBINTN   756
#define DBCBINTI   757
#define DBCVBYTEN  688
#define DBCVBYTEI  689
#define DBCBYTEN   692
#define DBCBYTEI   693
#define DBCLBYTEN  696
#define DBCLBYTEI  697

#define LINE_SIZE 512



char *CLICTXT = NULL;

long hstmt_next_num = 1;

/*
   INLINE
   void DR_VStr(char * x)
   {
   short len;
   len=(short)strlen(x);
   memcpy(p1,&len,2);
   p1 += 2;
   memcpy(p1,x,len);
   p1 += len;
   }
   INLINE
   void DR_Str(char * x,size_t y)
   {
   memset(p1,' ',y);
   memcpy(p1,x,strlen(x));
   p1+=y;
   }
   INLINE
   void DR_Money(long x)
   {
   long temp = 0;
   memcpy(p1,&x,4);
   p1 += 4;
   memcpy(p1,&temp,4);
   p1 += 4;

   }
   INLINE
   void DR_Char(char x)
   {
   *p1 = x; p1++;
   }
   INLINE
   void DR_Date(char * x)
   {
   long tempdate;
   int y,m,d;
   y=atoi(x);
   m=atoi(x+5);
   d=atoi(x+8);
   if (y<1800 || y>2200 || m<1 || m>12 || d<1 || d>31)
   {
   fprintf(stderr," Help! I can't interpret the date %s\n",x);
   exit(1);
   }
   tempdate=(y-1900)*10000+m*100+d;
   memcpy(p1,&tempdate,4);
   p1 += 4;

   }
 */

typedef struct DBC
      {

            Int32 SessionId;
```

```
            Int32 ReqId;
            short numResultCols;
            long RowCount;
            char *p;
            unsigned short Async;
            unsigned short busy;
            long NativeError;
            char ErrorMessage[512];
            struct CliDataInfoType DataInfo;
            struct DBCAREA dbcarea;

      }
DBC;

typedef struct STMT
      {

            DBC *lpdbc;
            long hstmt_num;
      }
STMT;



SQLRETURN SQL_API
SQLAllocConnect (
                                 SQLHENV henv,
                                 SQLHDBC FAR * phdbc)
{
      Int32 ReturnCode;
      struct DBC *lpdbc;
      lpdbc = malloc (sizeof (struct DBC));
      lpdbc->SessionId = 0;
      lpdbc->ReqId = 0;
      lpdbc->numResultCols = 0;
      lpdbc->RowCount = 0;
      lpdbc->p = NULL;
      lpdbc->Async = 0;
      lpdbc->busy = 0;
      lpdbc->NativeError = (-999);
      lpdbc->ErrorMessage[0] = '\0';
      memset (&lpdbc->DataInfo, 0, sizeof (lpdbc->DataInfo));
      memset (&lpdbc->dbcarea, 0, sizeof (lpdbc->dbcarea));


      strncpy (lpdbc->dbcarea.eyecatcher, "DBCAREA", 8);
      lpdbc->dbcarea.total_len = sizeof (struct DBCAREA);
      DBCHINI (&ReturnCode, CLICTXT, &lpdbc->dbcarea);
      if (ReturnCode != 0)
            {
                  fprintf (stderr, " The DBCHINI return code
was %ld\n", ReturnCode);
                  strncpy (lpdbc->ErrorMessage, lpdbc-
>dbcarea.msg_text, lpdbc->dbcarea.msg_len);
                  lpdbc->ErrorMessage[lpdbc->dbcarea.msg_len]
= '\0';
                  lpdbc->NativeError = ReturnCode;
                  return (SQL_ERROR);
            }

      assert (lpdbc->dbcarea.total_len == sizeof (struct
DBCAREA));
      strncpy (lpdbc->dbcarea.eyecatcher, "DBCAREA", 8);

      lpdbc->dbcarea.req_buf_len = 32700;
      lpdbc->dbcarea.resp_buf_len = 32700;
      lpdbc->dbcarea.max_num_sess = 100;
      lpdbc->dbcarea.resp_mode = 'I';
      lpdbc->dbcarea.keep_resp = 'N';
      lpdbc->dbcarea.use_presence_bits = 'N';
      lpdbc->dbcarea.wait_for_resp = 'Y';
      lpdbc->dbcarea.loc_mode = 'Y';
      lpdbc->dbcarea.var_len_req = 'N';
      lpdbc->dbcarea.var_len_fetch = 'N';
      lpdbc->dbcarea.save_resp_buf = 'N';
      lpdbc->dbcarea.two_resp_bufs = 'N';
      lpdbc->dbcarea.req_proc_opt = 'E';
      lpdbc->dbcarea.change_opts = 'Y';
      lpdbc->dbcarea.wait_for_resp = 'Y';
      lpdbc->dbcarea.ret_time = 'Y';
      lpdbc->dbcarea.parcel_mode = 'Y';
      lpdbc->dbcarea.tell_about_crash = 'Y';   /* Set crash
options */
      lpdbc->dbcarea.wait_across_crash = 'N';         /* Set
crash options */
      lpdbc->dbcarea.msg_security = 'N';
      *phdbc = (SQLHDBC) lpdbc;
      return (SQL_SUCCESS);
}

SQLRETURN SQL_API
SQLAllocEnv (
                              SQLHENV FAR * phenv)
```

```
{
	return (SQL_SUCCESS);
}

SQLRETURN SQL_API
SQLAllocStmt (
				SQLHDBC hdbc,
				SQLHSTMT FAR * phstmt)
{
	struct STMT *lpstmt;
	lpstmt = malloc (sizeof (struct STMT));
	lpstmt->lpdbc = (DBC *) hdbc;
	lpstmt->hstmt_num = hstmt_next_num++;
	*phstmt = (SQLHSTMT) lpstmt;
	return (SQL_SUCCESS);
}

SQLRETURN SQL_API
SQLSetStmtOption (
				SQLHSTMT hstmt,
				SQLUSMALLINT fOption,
				SQLUINTEGER vParam)
{
	if (fOption == SQL_ASYNC_ENABLE)
		((STMT *) hstmt)->lpdbc->Async = (USHORT) vParam;

	if (((STMT *) hstmt)->lpdbc->Async != SQL_ASYNC_ENABLE_ON)
		((STMT *) hstmt)->lpdbc->dbcarea.wait_for_resp =
'Y';
	return (SQL_SUCCESS);
}


SQLRETURN SQL_API
SQLColAttributes (
				SQLHSTMT hstmt,
				SQLUSMALLINT icol,
				SQLUSMALLINT fDescType,
				SQLPOINTER rgbDesc,
				SQLSMALLINT cbDescMax,
				SQLSMALLINT FAR * pcbDesc,
				SQLINTEGER FAR * pfDesc)
{
	SWORD SType;
	SWORD Nullable;
	char temp[20];
	sprintf (temp, "%hd", icol);
	if (icol > 0)
		{
			TranslateSQLType (&SType, &Nullable, ((STMT
*) hstmt)->lpdbc->DataInfo.InfoVar[icol - 1].SQLType);
		}
	switch (fDescType)
		{
		case SQL_COLUMN_LABEL:
		case SQL_COLUMN_NAME:
			{
				strcpy (rgbDesc, "Col");
				strcat (rgbDesc, temp);
				*pcbDesc = (SQLSMALLINT) strlen
((char *) rgbDesc);
				return (SQL_SUCCESS);
			}
		case SQL_COLUMN_TYPE:
			*pfDesc = (long) SType;
			break;

		case SQL_COLUMN_LENGTH:
			*pfDesc = ((STMT *) hstmt)->lpdbc-
>DataInfo.InfoVar[icol - 1].SQLLen;
			switch (SType)
				{
				case SQL_BIT:
				case SQL_TINYINT:
					*pfDesc = 1;
					break;
				case SQL_SMALLINT:
					*pfDesc = 2;
					break;
				case SQL_INTEGER:
					*pfDesc = 4;
					break;
				case SQL_BIGINT:
					*pfDesc = 20;
					break;
				case SQL_REAL:
					*pfDesc = 4;
					break;
				case SQL_FLOAT:
				case SQL_DOUBLE:
					*pfDesc = 8;
					break;
				case SQL_DATE:
				case SQL_TIME:
```

```
                                *pfDesc = 6;
                                break;
                        case SQL_TIMESTAMP:
                                *pfDesc = 16;
                                break;
                        case SQL_NUMERIC:
                        case SQL_DECIMAL:
                                *pfDesc = ((STMT *) hstmt)-
>lpdbc->DataInfo.InfoVar[icol - 1].SQLLen + 2;
                                break;
                        default:
                                *pfDesc = ((STMT *) hstmt)-
>lpdbc->DataInfo.InfoVar[icol - 1].SQLLen;
                        }

                break;
        case SQL_COLUMN_PRECISION:
                switch (SType)
                        {
                        case SQL_BIT:
                                *pfDesc = 1;
                                break;
                        case SQL_TINYINT:
                                *pfDesc = 3;
                                break;
                        case SQL_SMALLINT:
                                *pfDesc = 5;
                                break;
                        case SQL_INTEGER:
                                *pfDesc = 10;
                                break;
                        case SQL_BIGINT:
                                *pfDesc = 19;
                                break;
                        case SQL_REAL:
                                *pfDesc = 7;
                                break;
                        case SQL_FLOAT:
                        case SQL_DOUBLE:
                                *pfDesc = 15;
                                break;
                        case SQL_DATE:
                                *pfDesc = 10;
                                break;
                        case SQL_TIME:
                                *pfDesc = 8;
                                break;
                        case SQL_TIMESTAMP:
                                *pfDesc = 23;
                                break;
                        case SQL_DECIMAL:
                                *pfDesc = ((STMT *) hstmt)-
>lpdbc->DataInfo.InfoVar[icol - 1].SQLLen / 256;
                                break;
                        default:
                                *pfDesc = ((STMT *) hstmt)-
>lpdbc->DataInfo.InfoVar[icol - 1].SQLLen;
                        }
                break;
        case SQL_COLUMN_SCALE:
                *pfDesc = 0;
                if (SType == SQL_DECIMAL)
                        *pfDesc = ((STMT *) hstmt)->lpdbc-
>DataInfo.InfoVar[icol - 1].SQLLen & 0x00FF;
                break;
        case SQL_COLUMN_DISPLAY_SIZE:
                switch (SType)
                        {
                        case SQL_BIT:
                                *pfDesc = 1;
                                break;
                        case SQL_TINYINT:
                                *pfDesc = 4;
                                break;
                        case SQL_SMALLINT:
                                *pfDesc = 6;
                                break;
                        case SQL_INTEGER:
                                *pfDesc = 11;
                                break;
                        case SQL_BIGINT:
                                *pfDesc = 20;
                                break;
                        case SQL_REAL:
                                *pfDesc = 13;
                                break;
                        case SQL_FLOAT:
                        case SQL_DOUBLE:
                                *pfDesc = 22;
                                break;
                        case SQL_DATE:
                                *pfDesc = 10;
                                break;
                        case SQL_TIME:
```

```
                              *pfDesc = 8;
                              break;
                        case SQL_TIMESTAMP:
                              *pfDesc = 23;
                              break;
                        case SQL_BINARY:
                        case SQL_VARBINARY:
                        case SQL_LONGVARBINARY:
                              *pfDesc = ((STMT *) hstmt)-
>lpdbc->DataInfo.InfoVar[icol - 1].SQLLen * 2;
                        case SQL_NUMERIC:
                        case SQL_DECIMAL:
                              *pfDesc = ((STMT *) hstmt)-
>lpdbc->DataInfo.InfoVar[icol - 1].SQLLen / 256 + 2;
                              break;

                        default:
                              *pfDesc = *pfDesc = ((STMT *)
hstmt)->lpdbc->DataInfo.InfoVar[icol - 1].SQLLen;
                        }

                  break;

            case SQL_COLUMN_NULLABLE:
                  *pfDesc = Nullable;
                  break;

            default:
                  return (SQL_ERROR);
            }

      return (SQL_SUCCESS);

}

SQLRETURN SQL_API
SQLRowCount (
                        SQLHSTMT hstmt,
                        SQLINTEGER FAR * pcrow)
{
      *pcrow = ((STMT *) hstmt)->lpdbc->RowCount;
      return (SQL_SUCCESS);
}
SQLRETURN SQL_API
SQLNumResultCols (
                              SQLHSTMT hstmt,
                              SQLSMALLINT FAR * pccol)
{
      *pccol = (short) ((STMT *) hstmt)->lpdbc->numResultCols;
      return (SQL_SUCCESS);
}
SQLRETURN SQL_API
SQLError (
                  SQLHENV henv,
                  SQLHDBC hdbc,
                  SQLHSTMT hstmt,
                  SQLCHAR FAR * szSqlState,
                  SQLINTEGER FAR * pfNativeError,
                  SQLCHAR FAR * szErrorMsg,
                  SQLSMALLINT cbErrorMsgMax,
                  SQLSMALLINT FAR * pcbErrorMsg)
{

      DBC *lpdbc;
      if (hstmt != 0)
            lpdbc = ((STMT *) hstmt)->lpdbc;
      else
            lpdbc = (DBC *) hdbc;
      *pfNativeError = lpdbc->NativeError;
      if (lpdbc->NativeError == 0)
            strcpy ((char *) szSqlState, "00000");
      else
            strcpy ((char *) szSqlState, "S1000");
      strcpy ((char *) szErrorMsg, lpdbc->ErrorMessage);
      *pcbErrorMsg = (SQLSMALLINT) strlen (lpdbc->ErrorMessage);
      if (lpdbc->NativeError == 0)
            return (SQL_NO_DATA_FOUND);
      else
            return (SQL_SUCCESS);
}

SQLRETURN SQL_API
SQLFreeStmt (
                        SQLHSTMT hstmt,
                        SQLUSMALLINT fOption)
{
      Int32 ReturnCode;
      ((STMT *) hstmt)->lpdbc->dbcarea.i_sess_id = ((STMT *)
hstmt)->lpdbc->SessionId;
      ((STMT *) hstmt)->lpdbc->dbcarea.i_req_id = ((STMT *)
hstmt)->lpdbc->ReqId;
      ((STMT *) hstmt)->lpdbc->dbcarea.func = DBFERQ;
      DBCHCL (&ReturnCode, CLICTXT, &((STMT *) hstmt)->lpdbc-
>dbcarea);
```

```
       ((STMT *) hstmt)->lpdbc->dbcarea.using_data_len = 0;
       ((STMT *) hstmt)->lpdbc->dbcarea.using_data_ptr = NULL;

       if (ReturnCode != 0)
              {
                     if (ReturnCode != 305)     /* Session not
found */
                            {
                                   fprintf (stderr, " The ERQ
return code was %ld\n", ReturnCode);
                                   strncpy (((STMT *) hstmt)-
>lpdbc->ErrorMessage, ((STMT *) hstmt)->lpdbc->dbcarea.msg_text,
((STMT *) hstmt)->lpdbc->dbcarea.msg_len);
                                   ((STMT *) hstmt)->lpdbc-
>ErrorMessage[((STMT *) hstmt)->lpdbc->dbcarea.msg_len] = '\0';
                                   ((STMT *) hstmt)->lpdbc-
>NativeError = ReturnCode;
                                   return (SQL_ERROR);
                            }
              }
       return (SQL_SUCCESS);
}



SQLRETURN SQL_API
SQLGetData (
                     SQLHSTMT hstmt,
                     SQLUSMALLINT icol,
                     SQLSMALLINT fCType,
                     SQLPOINTER rgbValue,
                     SQLINTEGER cbValueMax,
                     SQLINTEGER FAR * pcbValue)
{

       SWORD SType;
       SWORD Nullable;
       char *p2;
       static char tempStr[512];
       double tempFloat;
       unsigned long tempUInt;
       long tempInteger;
       short tempSmallint;

       ((STMT *) hstmt)->lpdbc->NativeError = 0;


       if ((int) icol > (int) ((STMT *) hstmt)->lpdbc-
>numResultCols)
              return (SQL_NO_DATA_FOUND);
       assert (((STMT *) hstmt)->lpdbc->numResultCols > 0);
       assert (icol > 0 && (int) icol <= (int) ((STMT *) hstmt)-
>lpdbc->numResultCols);
       assert (((STMT *) hstmt)->lpdbc->dbcarea.fet_ret_data_len
> 0);
       if (icol == 1)
              {
                     ((STMT *) hstmt)->lpdbc->p = ((struct
CliRecordType *) ((STMT *) hstmt)->lpdbc->dbcarea.fet_data_ptr)-
>Body;
                     assert (((STMT *) hstmt)->lpdbc->p != NULL);

                     ((STMT *) hstmt)->lpdbc->p += ((((STMT *)
hstmt)->lpdbc->numResultCols + 7) / 8);  /* Skip Indicator bytes
*/
              }
       p2 = ((struct CliRecordType *) ((STMT *) hstmt)->lpdbc-
>dbcarea.fet_data_ptr)->Body +
              ((STMT *) hstmt)->lpdbc->dbcarea.fet_ret_data_len;

       if (icol > 0)
              {
                     TranslateSQLType (&SType, &Nullable, ((STMT
*) hstmt)->lpdbc->DataInfo.InfoVar[icol - 1].SQLType);
              }
       assert (((STMT *) hstmt)->lpdbc->p != NULL);
       assert (p2 != NULL);
       assert (0 == strcmp (((STMT *) hstmt)->lpdbc-
>dbcarea.eyecatcher, "DBCAREA"));
       assert (((STMT *) hstmt)->lpdbc->dbcarea.total_len ==
sizeof (struct DBCAREA));

       if (((STMT *) hstmt)->lpdbc->p >= p2)
              return (SQL_NO_DATA_FOUND);

       if (fCType == SQL_C_DEFAULT &&
              (SType == SQL_CHAR || SType == SQL_VARCHAR))
              fCType = SQL_C_CHAR;

       if (fCType == SQL_C_DEFAULT &&
```

```
            (SType == SQL_INTEGER))
            fCType = SQL_C_SLONG;

      assert (fCType == SQL_C_CHAR || fCType == SQL_C_LONG ||
fCType == SQL_C_SLONG);

      if (pcbValue != NULL)
            *pcbValue = 0;

      switch (((STMT *) hstmt)->lpdbc->DataInfo.InfoVar[icol -
1].SQLType & 0xFFFE)
            {
            case 496:                        /* integer */
                  memcpy (&tempInteger, ((STMT *) hstmt)-
>lpdbc->p, 4);
                  ((STMT *) hstmt)->lpdbc->p += 4;
                  break;
            case 500:                        /* smallint */
                  memcpy (&tempSmallint, ((STMT *) hstmt)-
>lpdbc->p, 4);
                  tempInteger = tempSmallint;
                  ((STMT *) hstmt)->lpdbc->p += 2;
                  break;
            case 484:                        /* decimal */


                  if (((STMT *) hstmt)->lpdbc-
>DataInfo.InfoVar[icol - 1].SQLLen / 256 > 9)
                        {

                              memcpy (&tempUInt, ((STMT *)
hstmt)->lpdbc->p, 4);
                              tempFloat = tempUInt;

                              memcpy (&tempInteger, ((STMT
*) hstmt)->lpdbc->p + 4, 4);
                              tempFloat += tempInteger *
4294967296.0;

                              ((STMT *) hstmt)->lpdbc->p +=
8;
                        }
                  else
                        {
                              if (((STMT *) hstmt)->lpdbc-
>DataInfo.InfoVar[icol - 1].SQLLen / 256 > 4)
                                    {
                                                memcpy
(&tempInteger, ((STMT *) hstmt)->lpdbc->p, 4);
                                                tempFloat =
tempInteger;
                                                ((STMT *) hstmt)-
>lpdbc->p += 4;
                                    }
                              else
                                    {
                                                if (((STMT *)
hstmt)->lpdbc->DataInfo.InfoVar[icol - 1].SQLLen / 256 > 2)
                                                {

      memcpy (&tempSmallint, ((STMT *) hstmt)->lpdbc->p, 2);

      tempInteger = tempSmallint;

      tempFloat = tempSmallint;

      ((STMT *) hstmt)->lpdbc->p += 2;
                                                }
                                                else
                                                {

      tempFloat = *((STMT *) hstmt)->lpdbc->p;

      ((STMT *) hstmt)->lpdbc->p += 1;
                                                }
                                    }
                        }

                  switch (((STMT *) hstmt)->lpdbc-
>DataInfo.InfoVar[icol - 1].SQLLen & 0x00FF)
                        {
                        case 15:
                              tempFloat /=
1000000000000000.0;
                              break;
                        case 14:
                              tempFloat /=
100000000000000.0;
                              break;
                        case 13:
                              tempFloat /= 10000000000000.0;
                              break;
                        case 12:
                              tempFloat /= 1000000000000.0;
```

```
                        break;
                    case 11:
                        tempFloat /= 100000000000.0;
                        break;
                    case 10:
                        tempFloat /= 10000000000.0;
                        break;
                    case 9:
                        tempFloat /= 1000000000.0;
                        break;
                    case 8:
                        tempFloat /= 100000000.0;
                        break;
                    case 7:
                        tempFloat /= 10000000.0;
                        break;
                    case 6:
                        tempFloat /= 1000000.0;
                        break;
                    case 5:
                        tempFloat /= 100000.0;
                        break;
                    case 4:
                        tempFloat /= 10000.0;
                        break;
                    case 3:
                        tempFloat /= 1000.0;
                        break;
                    case 2:
                        tempFloat /= 100.0;
                        break;
                    case 1:
                        tempFloat /= 10.0;
                        break;
                    default:;

                    }

                break;
            case 480:                       /* float */
                memcpy (&tempFloat, ((STMT *) hstmt)->lpdbc-
>p, 8);
                ((STMT *) hstmt)->lpdbc->p += 8;
                break;
            case 452:
                tempSmallint = ((STMT *) hstmt)->lpdbc-
>DataInfo.InfoVar[icol - 1].SQLLen;
                        memcpy (tempStr, (char *) ((STMT *) hstmt)-
>lpdbc->p, __min (tempSmallint, 511));
                        tempStr[__min (tempSmallint, 511)] = '\0';
                        ((STMT *) hstmt)->lpdbc->p += tempSmallint;
                        break;
                    case 448:
                        memcpy (&tempSmallint, ((STMT *) hstmt)-
>lpdbc->p, 2);
                        memcpy (tempStr, (char *) (((STMT *) hstmt)-
>lpdbc->p + 2), __min (tempSmallint, 511));
                        tempStr[__min (tempSmallint, 511)] = '\0';
                        ((STMT *) hstmt)->lpdbc->p += tempSmallint +
2;
                        break;
                    case 752:
                        memcpy (&tempInteger, ((STMT *) hstmt)-
>lpdbc->p, 4);
                        tempInteger += 19000000;
                        ((STMT *) hstmt)->lpdbc->p += 4;
                        break;
                    case 756:
                        tempSmallint = (short) *(char *) ((STMT *)
hstmt)->lpdbc->p;
                        tempInteger = tempSmallint;
                        ((STMT *) hstmt)->lpdbc->p += 1;
                        break;
                    default:
                        *pcbValue = snprintf (rgbValue, cbValueMax,
"%S", "????");
                        ((STMT *) hstmt)->lpdbc->p += ((STMT *)
hstmt)->lpdbc->DataInfo.InfoVar[icol - 1].SQLLen;
                        break;
                    }

            if (fCType == SQL_C_CHAR)
                    {
                        ((char *) rgbValue)[0] = '\0';
                        switch (((STMT *) hstmt)->lpdbc-
>DataInfo.InfoVar[icol - 1].SQLType & 0xFFFE)
                            {
                            case 496:           /* integer */
                                *pcbValue = snprintf
(rgbValue, cbValueMax, "%10ld", tempInteger);
                                break;
                            case 500:           /* smallint */
                                *pcbValue = snprintf
(rgbValue, cbValueMax, "%6hd", tempSmallint);
```

```
                                break;
                        case 484:           /* decimal */
#ifdef WIN32
                                *pcbValue = snprintf
(rgbValue, cbValueMax, "%15.*f", ((STMT *) hstmt)->lpdbc-
>DataInfo.InfoVar[icol - 1].SQLLen & 0x00FF, tempFloat);
#else
                                *pcbValue = sprintf (rgbValue,
"%15.*f", ((STMT *) hstmt)->lpdbc->DataInfo.InfoVar[icol -
1].SQLLen & 0x00FF, tempFloat);
#endif
                                break;
                        case 480:           /* float */
                                *pcbValue = snprintf
(rgbValue, cbValueMax, "%15g", tempFloat);
                                break;
                        case 452:
                        case 448:
                                *pcbValue = snprintf
(rgbValue, cbValueMax, "%s", tempStr);
                                break;
                        case 752:
#ifdef WIN32
                                *pcbValue = snprintf
(rgbValue, cbValueMax, "%04ld-%02d-%02d", tempInteger / 10000,
(tempInteger / 100) % 100, tempInteger % 100);
#else
                                *pcbValue = sprintf (rgbValue,
"%04ld-%02d-%02d", tempInteger / 10000, (tempInteger / 100) %
100, tempInteger % 100);
#endif
                                break;
                        case 756:
                                *pcbValue = snprintf
(rgbValue, cbValueMax, "%4hd", tempSmallint);
                                break;
                        default:
                                *pcbValue = snprintf
(rgbValue, cbValueMax, "%s", "????");
                                break;
                        }
                if (*pcbValue < 0)
                        {
                                fprintf (stderr, " sprintf
failed!\n");
                        }
                *pcbValue = strlen (rgbValue);
                }
        else if (fCType == SQL_C_LONG || fCType == SQL_C_SLONG)
                {
                        if (pcbValue != NULL)
                                *pcbValue = 4;
                        switch (((STMT *) hstmt)->lpdbc-
>DataInfo.InfoVar[icol - 1].SQLType & 0xFFFE)
                                {
                                case 496:
                                case 500:
                                case 752:
                                case 756:           /* integer,
smallint, byteint, date */
                                        memcpy (rgbValue,
&tempInteger, 4);
                                        break;
                                case 484:
                                case 480:           /* decimal, float
*/
                                        tempInteger = (long)
tempFloat;
                                        memcpy (rgbValue,
&tempInteger, 4);
                                        break;

                                default:
                                        tempInteger = 0;
                                        memcpy (rgbValue,
&tempInteger, 4);
                                        break;
                                }
                        }

        return (SQL_SUCCESS);

}


SQLRETURN SQL_API
SQLFetch (
                        SQLHSTMT hstmt)
{
        Int32 ReturnCode;
        long ActivityCount;
```

```
       struct CliSuccessType *successPtr;
       struct CliFailureType *failurePtr;
       struct CliDataInfoType *datainfoPtr;

       ((STMT *) hstmt)->lpdbc->p = NULL;

       ((STMT *) hstmt)->lpdbc->dbcarea.i_sess_id = ((STMT *)
hstmt)->lpdbc->SessionId;
       ((STMT *) hstmt)->lpdbc->dbcarea.i_req_id = ((STMT *)
hstmt)->lpdbc->ReqId;
       ((STMT *) hstmt)->lpdbc->dbcarea.change_opts = 'y';



       assert (((STMT *) hstmt)->lpdbc->SessionId > 0);
       assert (((STMT *) hstmt)->lpdbc->ReqId > 0);

       assert (0 == strcmp (((STMT *) hstmt)->lpdbc-
>dbcarea.eyecatcher, "DBCAREA"));
       assert (((STMT *) hstmt)->lpdbc->dbcarea.total_len ==
sizeof (struct DBCAREA));

       ((STMT *) hstmt)->lpdbc->dbcarea.func = DBFFET;
       DBCHCL (&ReturnCode, CLICTXT, &((STMT *) hstmt)->lpdbc-
>dbcarea);
       if (((STMT *) hstmt)->lpdbc->Async && ReturnCode == 305)
              {
                     fprintf (stderr, " Fetch still executing?
The FETCH return code was %ld\n", ReturnCode);
                     return (SQL_STILL_EXECUTING);
              }
       if (ReturnCode != 0)
              {
                     fprintf (stderr, " The FETCH return code was
%ld\n", ReturnCode);
                     strncpy (((STMT *) hstmt)->lpdbc-
>ErrorMessage, ((STMT *) hstmt)->lpdbc->dbcarea.msg_text, ((STMT
*) hstmt)->lpdbc->dbcarea.msg_len);
                     ((STMT *) hstmt)->lpdbc->ErrorMessage[((STMT
*) hstmt)->lpdbc->dbcarea.msg_len] = '\0';
                     ((STMT *) hstmt)->lpdbc->NativeError =
ReturnCode;
                     return (SQL_ERROR);
              }
       assert (((STMT *) hstmt)->lpdbc->dbcarea.i_sess_id ==
((STMT *) hstmt)->lpdbc->SessionId);
       assert (((STMT *) hstmt)->lpdbc->dbcarea.i_req_id ==
((STMT *) hstmt)->lpdbc->ReqId);


       switch (((STMT *) hstmt)->lpdbc-
>dbcarea.fet_parcel_flavor)
              {
              case PclSUCCESS:
                     successPtr = (struct CliSuccessType *)
((STMT *) hstmt)->lpdbc->dbcarea.fet_data_ptr;
                     memcpy (&ActivityCount, successPtr-
>ActivityCount, 4);
                     ((STMT *) hstmt)->lpdbc->RowCount =
ActivityCount;
                     ((STMT *) hstmt)->lpdbc->numResultCols =
successPtr->FieldCount;
                     ((STMT *) hstmt)->lpdbc->busy = 0;
                     ((STMT *) hstmt)->lpdbc->dbcarea.change_opts
= 'Y';
                     ((STMT *) hstmt)->lpdbc-
>dbcarea.wait_for_resp = 'Y';
                     break;
              case PclERROR:
              case PclFAILURE:
                     ((STMT *) hstmt)->lpdbc->busy = 0;
                     ((STMT *) hstmt)->lpdbc->dbcarea.change_opts
= 'Y';
                     ((STMT *) hstmt)->lpdbc-
>dbcarea.wait_for_resp = 'Y';
                     failurePtr = (struct CliFailureType *)
((STMT *) hstmt)->lpdbc->dbcarea.fet_data_ptr;
                     ((STMT *) hstmt)->lpdbc->NativeError =
failurePtr->Code;
                     strncpy (((STMT *) hstmt)->lpdbc-
>ErrorMessage, failurePtr->Msg, (size_t) (failurePtr->Length));
                     ((STMT *) hstmt)->lpdbc-
>ErrorMessage[(failurePtr->Length)] = '\0';

                     fprintf (stderr, " Failure: %d %s\n", ((STMT
*) hstmt)->lpdbc->NativeError, ((STMT *) hstmt)->lpdbc-
>ErrorMessage);

                     SQLFreeStmt (hstmt, SQL_CLOSE);
                     assert (0 == strcmp (((STMT *) hstmt)-
>lpdbc->dbcarea.eyecatcher, "DBCAREA"));
```

```
                    assert (((STMT *) hstmt)->lpdbc-
>dbcarea.total_len == sizeof (struct DBCAREA));
                    return (SQL_ERROR);
                    /*break; */
             case PclDATAINFO:
                    datainfoPtr = (struct CliDataInfoType *)
((STMT *) hstmt)->lpdbc->dbcarea.fet_data_ptr;
                    assert (datainfoPtr->FieldCount == ((STMT *)
hstmt)->lpdbc->numResultCols);
                    memcpy (&((STMT *) hstmt)->lpdbc->DataInfo,
datainfoPtr, sizeof (struct CliDataInfoType));
                    assert (((STMT *) hstmt)->lpdbc-
>DataInfo.FieldCount == ((STMT *) hstmt)->lpdbc->numResultCols);
                    assert (0 == strcmp (((STMT *) hstmt)-
>lpdbc->dbcarea.eyecatcher, "DBCAREA"));
                    assert (((STMT *) hstmt)->lpdbc-
>dbcarea.total_len == sizeof (struct DBCAREA));
                    break;
             case PclENDSTATEMENT:
                    ((STMT *) hstmt)->lpdbc->NativeError = 0;
                    ((STMT *) hstmt)->lpdbc->busy = 0;
                    return (SQL_NO_DATA_FOUND);
                    /*break; */
             case PclENDREQUEST:
                    SQLFreeStmt (hstmt, SQL_CLOSE);
                    ((STMT *) hstmt)->lpdbc->NativeError = 0;
                    return (SQL_NO_DATA_FOUND);
                    /*break; */
             case PclRECORD:
                    ((STMT *) hstmt)->lpdbc->NativeError = 0;
                    ((STMT *) hstmt)->lpdbc->p = ((struct
CliRecordType *) ((STMT *) hstmt)->lpdbc->dbcarea.fet_data_ptr)-
>Body;
                    assert (((STMT *) hstmt)->lpdbc->p != NULL);

                    ((STMT *) hstmt)->lpdbc->p += ((((STMT *)
hstmt)->lpdbc->numResultCols + 7) / 8);  /* Skip Indicator bytes
*/
                    return (SQL_SUCCESS);
                    /*break; */

             default:
                    fprintf (stderr, " Dont know this parcel
type\n");
                    ((STMT *) hstmt)->lpdbc->NativeError = (-1);
                    return (SQL_ERROR);
             }
       return (SQL_SUCCESS);

}

SQLRETURN SQL_API
SQLMoreResults (
                                   SQLHSTMT hstmt)
{
       int rc;
       ((STMT *) hstmt)->lpdbc->dbcarea.i_sess_id = ((STMT *)
hstmt)->lpdbc->SessionId;
       ((STMT *) hstmt)->lpdbc->dbcarea.i_req_id = ((STMT *)
hstmt)->lpdbc->ReqId;
       ((STMT *) hstmt)->lpdbc->dbcarea.wait_for_resp = 'Y';
       ((STMT *) hstmt)->lpdbc->dbcarea.change_opts = 'Y';
       ((STMT *) hstmt)->lpdbc->numResultCols = 0;
       ((STMT *) hstmt)->lpdbc->RowCount = 0;

       if ((rc = SQLFetch (hstmt)) != SQL_SUCCESS)
              return ((SQLRETURN) rc);    /* The success parcel */
       assert (0 == strcmp (((STMT *) hstmt)->lpdbc-
>dbcarea.eyecatcher, "DBCAREA"));
       assert (((STMT *) hstmt)->lpdbc->dbcarea.total_len ==
sizeof (struct DBCAREA));
       ((STMT *) hstmt)->lpdbc->dbcarea.using_data_len = 0;
       ((STMT *) hstmt)->lpdbc->dbcarea.using_data_ptr = NULL;
       while (((STMT *) hstmt)->lpdbc->dbcarea.fet_parcel_flavor
== PclRECORD)
              if ((rc = SQLFetch (hstmt)) != SQL_SUCCESS)
                     return ((SQLRETURN) rc);
       if (((STMT *) hstmt)->lpdbc->dbcarea.fet_parcel_flavor ==
PclENDSTATEMENT)
              if ((rc = SQLFetch (hstmt)) != SQL_SUCCESS)
                     return ((SQLRETURN) rc);
       if (((STMT *) hstmt)->lpdbc->dbcarea.fet_parcel_flavor ==
PclENDREQUEST)
              return (SQL_NO_DATA_FOUND);

       if ((rc = SQLFetch (hstmt)) != SQL_SUCCESS)
              {
                     if (rc != SQL_NO_DATA_FOUND)
                            return ((SQLRETURN) rc);    /* Data
Info parcel or End */
              }
       assert (0 == strcmp (((STMT *) hstmt)->lpdbc-
>dbcarea.eyecatcher, "DBCAREA"));
```

```
	assert (((STMT *) hstmt)->lpdbc->dbcarea.total_len ==
sizeof (struct DBCAREA));
	return (SQL_SUCCESS);
}

SQLRETURN SQL_API
SQLConnect (
                        SQLHDBC hdbc,
                        SQLCHAR FAR * szDSN,
                        SQLSMALLINT cbDSN,
                        SQLCHAR FAR * szUID,
                        SQLSMALLINT cbUID,
                        SQLCHAR FAR * szAuthStr,
                        SQLSMALLINT cbAuthStr)
{
	SQLHSTMT fakehstmt;

	Int32 ReturnCode;
	static char UserInfo[250];


	assert (((DBC *) hdbc)->dbcarea.total_len == sizeof
(struct DBCAREA));
	strncpy (((DBC *) hdbc)->dbcarea.eyecatcher, "DBCAREA",
8);

	((DBC *) hdbc)->dbcarea.req_buf_len = 8192;
	((DBC *) hdbc)->dbcarea.resp_buf_len = 32700;
	((DBC *) hdbc)->dbcarea.max_num_sess = 16;
	((DBC *) hdbc)->dbcarea.resp_mode = 'I';
	((DBC *) hdbc)->dbcarea.keep_resp = 'N';
	((DBC *) hdbc)->dbcarea.use_presence_bits = 'N';
	((DBC *) hdbc)->dbcarea.wait_for_resp = 'Y';
	((DBC *) hdbc)->dbcarea.loc_mode = 'Y';
	((DBC *) hdbc)->dbcarea.var_len_req = 'N';
	((DBC *) hdbc)->dbcarea.var_len_fetch = 'N';
	((DBC *) hdbc)->dbcarea.save_resp_buf = 'N';
	((DBC *) hdbc)->dbcarea.two_resp_bufs = 'N';
	((DBC *) hdbc)->dbcarea.req_proc_opt = 'E';
	((DBC *) hdbc)->dbcarea.change_opts = 'Y';
	((DBC *) hdbc)->dbcarea.wait_for_resp = 'Y';
	((DBC *) hdbc)->dbcarea.ret_time = 'Y';
	((DBC *) hdbc)->dbcarea.parcel_mode = 'Y';
	((DBC *) hdbc)->dbcarea.tell_about_crash = 'Y';       /*
Set crash options */
	((DBC *) hdbc)->dbcarea.wait_across_crash = 'N';      /*
Set crash options */
	((DBC *) hdbc)->dbcarea.msg_security = 'N';

	strcpy (UserInfo, (char *) szDSN);
	strcat (UserInfo, "/");
	strcat (UserInfo, (char *) szUID);
	strcat (UserInfo, ",");
	strcat (UserInfo, (char *) szAuthStr);
	((DBC *) hdbc)->dbcarea.logon_ptr = (char *) UserInfo;
	((DBC *) hdbc)->dbcarea.logon_len = strlen (UserInfo);
	((DBC *) hdbc)->dbcarea.run_ptr = NULL;
/*      dbcarea.run_ptr = (char *) connect_struct;
   dbcarea.run_len = sizeof (struct CliCONNECTType);
   dbcarea.inter_ptr = CharSet;
   dbcarea.charset_type = CharSetType; */
	((DBC *) hdbc)->dbcarea.sess_2pc_mode = 'N';
	((DBC *) hdbc)->dbcarea.using_data_len = 0;
	((DBC *) hdbc)->dbcarea.using_data_ptr = NULL;


	((DBC *) hdbc)->dbcarea.func = DBFCON;
	DBCHCL (&ReturnCode, CLICTXT, &((DBC *) hdbc)->dbcarea);
	if (ReturnCode == EM_NETCONN)
		{
			fprintf (stderr, "Teradata system is down,
waiting to logon...\n");
			strcpy (((DBC *) hdbc)->ErrorMessage,
"Teradata system is down.");
			return (-1);
		}
	//while (ReturnCode == EM_NETCONN) {
	//     /* loop until connected or some other error then
DBC down.  */
	//     dbcarea.func = DBFCON;
	//     DBCHCL (&ReturnCode, CLICTXT, dbcarea);
	//   }

	if (ReturnCode != 0)
		{
			fprintf (stderr, " The logon return code was
%ld\n", ReturnCode);
			strncpy (((DBC *) hdbc)->ErrorMessage, ((DBC
*) hdbc)->dbcarea.msg_text, ((DBC *) hdbc)->dbcarea.msg_len);
			((DBC *) hdbc)->ErrorMessage[((DBC *) hdbc)-
>dbcarea.msg_len] = '\0';
			((DBC *) hdbc)->NativeError = ReturnCode;
		}
```

```
	((DBC *) hdbc)->dbcarea.i_sess_id = ((DBC *) hdbc)-
>dbcarea.o_sess_id;
	((DBC *) hdbc)->dbcarea.i_req_id = ((DBC *) hdbc)-
>dbcarea.o_req_id;
	((DBC *) hdbc)->SessionId = ((DBC *) hdbc)-
>dbcarea.o_sess_id;
	((DBC *) hdbc)->ReqId = ((DBC *) hdbc)->dbcarea.o_req_id;

	fakehstmt = (SQLHSTMT) malloc (sizeof (struct STMT));
	((STMT *) fakehstmt)->lpdbc = (DBC *) hdbc;
	if (SQLFetch (fakehstmt) == SQL_ERROR)
		return (SQL_ERROR);

	assert (0 == strcmp (((DBC *) hdbc)->dbcarea.eyecatcher,
"DBCAREA"));
	assert (((DBC *) hdbc)->dbcarea.total_len == sizeof
(struct DBCAREA));

	//fprintf(stderr,"Session %d, Req %d logged on\n",((DBC
*)hdbc)->dbcarea.o_sess_id,((DBC *)hdbc)->dbcarea.o_req_id);
	return (SQL_SUCCESS);
}



SQLRETURN SQL_API
SQLExecDirect (
			SQLHSTMT hstmt,
			SQLCHAR FAR * szSqlStr,
			SQLINTEGER cbSqlStr)
{
	Int32 ReturnCode;
	int rc;


	assert (((STMT *) hstmt)->lpdbc->SessionId > 0);
	assert (((STMT *) hstmt)->lpdbc->ReqId >= 0);
	assert (0 == strcmp (((STMT *) hstmt)->lpdbc-
>dbcarea.eyecatcher, "DBCAREA"));
	assert (((STMT *) hstmt)->lpdbc->dbcarea.total_len ==
sizeof (struct DBCAREA));

	((STMT *) hstmt)->lpdbc->dbcarea.i_sess_id = ((STMT *)
hstmt)->lpdbc->SessionId;
	((STMT *) hstmt)->lpdbc->dbcarea.i_req_id = ((STMT *)
hstmt)->lpdbc->ReqId;
	((STMT *) hstmt)->lpdbc->dbcarea.change_opts = 'Y';
	if (((STMT *) hstmt)->lpdbc->busy == 0)
		{
			assert (szSqlStr != NULL);



			((STMT *) hstmt)->lpdbc-
>dbcarea.wait_for_resp = 'Y';
			((STMT *) hstmt)->lpdbc->dbcarea.req_ptr =
(char *) szSqlStr;
			((STMT *) hstmt)->lpdbc->dbcarea.req_len =
strlen ((char *) szSqlStr);

			((STMT *) hstmt)->lpdbc->numResultCols = 0;
			((STMT *) hstmt)->lpdbc->RowCount = 0;
			((STMT *) hstmt)->lpdbc->dbcarea.token =
(Int32) hstmt;

			((STMT *) hstmt)->lpdbc->dbcarea.func =
DBFIRQ;
			DBCHCL (&ReturnCode, CLICTXT, &((STMT *)
hstmt)->lpdbc->dbcarea);
			if (ReturnCode != 0)
				{
					fprintf (stderr, " The IRQ
return code was %ld\n", ReturnCode);
					strncpy (((STMT *) hstmt)-
>lpdbc->ErrorMessage, ((STMT *) hstmt)->lpdbc->dbcarea.msg_text,
((STMT *) hstmt)->lpdbc->dbcarea.msg_len);
					((STMT *) hstmt)->lpdbc-
>ErrorMessage[((STMT *) hstmt)->lpdbc->dbcarea.msg_len] = '\0';
					((STMT *) hstmt)->lpdbc-
>NativeError = ReturnCode;
					return (SQL_ERROR);
				}
			((STMT *) hstmt)->lpdbc->busy = 1;
			//fprintf(stderr,"SQL request running on
Session %d, Req %d\n",((STMT*)hstmt)->lpdbc-
>dbcarea.o_sess_id,((STMT*)hstmt)->lpdbc->dbcarea.o_req_id);
			if (((STMT *) hstmt)->lpdbc->Async ==
SQL_ASYNC_ENABLE_ON)
				return SQL_STILL_EXECUTING;
		}
```

```
      //assert(((STMT *)hstmt)->lpdbc->SessionId ==
dbcarea.o_sess_id);
      ((STMT *) hstmt)->lpdbc->SessionId = ((STMT *) hstmt)-
>lpdbc->dbcarea.o_sess_id;
      ((STMT *) hstmt)->lpdbc->ReqId = ((STMT *) hstmt)->lpdbc-
>dbcarea.o_req_id;
      assert (((STMT *) hstmt)->lpdbc->SessionId > 0);
      assert (((STMT *) hstmt)->lpdbc->ReqId >= 0);
      assert (0 == strcmp (((STMT *) hstmt)->lpdbc-
>dbcarea.eyecatcher, "DBCAREA"));
      assert (((STMT *) hstmt)->lpdbc->dbcarea.total_len ==
sizeof (struct DBCAREA));



      ((STMT *) hstmt)->lpdbc->dbcarea.i_sess_id = ((STMT *)
hstmt)->lpdbc->SessionId;
      ((STMT *) hstmt)->lpdbc->dbcarea.i_req_id = ((STMT *)
hstmt)->lpdbc->ReqId;

      rc = SQLFetch (hstmt);
      if (rc != SQL_SUCCESS)
            return ((SQLRETURN) rc);    /* The success parcel */
      assert (0 == strcmp (((STMT *) hstmt)->lpdbc-
>dbcarea.eyecatcher, "DBCAREA"));
      assert (((STMT *) hstmt)->lpdbc->dbcarea.total_len ==
sizeof (struct DBCAREA));
      ((STMT *) hstmt)->lpdbc->dbcarea.using_data_len = 0;
      ((STMT *) hstmt)->lpdbc->dbcarea.using_data_ptr = NULL;
      ((STMT *) hstmt)->lpdbc->dbcarea.wait_for_resp = 'Y';
      ((STMT *) hstmt)->lpdbc->dbcarea.change_opts = 'Y';
      ((STMT *) hstmt)->lpdbc->busy = 0;

      rc = SQLFetch (hstmt);
      if (rc != SQL_SUCCESS)
            {
                  if (rc == SQL_NO_DATA_FOUND)
                        return SQL_SUCCESS;
                  return ((SQLRETURN) rc);    /* Data Info
parcel or End */
            }
      assert (0 == strcmp (((STMT *) hstmt)->lpdbc-
>dbcarea.eyecatcher, "DBCAREA"));
      assert (((STMT *) hstmt)->lpdbc->dbcarea.total_len ==
sizeof (struct DBCAREA));
      return (SQL_SUCCESS);

}
```

```
SQLRETURN SQL_API
SQLDisconnect (
                                 SQLHDBC hdbc)
{
      Int32 ReturnCode;

      assert (((DBC *) hdbc)->SessionId > 0);
      assert (((DBC *) hdbc)->ReqId >= 0);
      assert (0 == strcmp (((DBC *) hdbc)->dbcarea.eyecatcher,
"DBCAREA"));
      assert (((DBC *) hdbc)->dbcarea.total_len == sizeof
(struct DBCAREA));
      ((DBC *) hdbc)->dbcarea.i_sess_id = ((DBC *) hdbc)-
>SessionId;
      ((DBC *) hdbc)->dbcarea.i_req_id = ((DBC *) hdbc)->ReqId;
      ((DBC *) hdbc)->dbcarea.using_data_len = 0;
      ((DBC *) hdbc)->dbcarea.using_data_ptr = NULL;
      ((DBC *) hdbc)->dbcarea.func = DBFDSC;
      DBCHCL (&ReturnCode, CLICTXT, &((DBC *) hdbc)->dbcarea);
      if (ReturnCode != 0)
            {
                  fprintf (stderr, " The LOGOFF return code
was %ld\n", ReturnCode);
                  strncpy (((DBC *) hdbc)->ErrorMessage, ((DBC
*) hdbc)->dbcarea.msg_text, ((DBC *) hdbc)->dbcarea.msg_len);
                  ((DBC *) hdbc)->ErrorMessage[((DBC *) hdbc)-
>dbcarea.msg_len] = '\0';
                  ((DBC *) hdbc)->NativeError = ReturnCode;
                  return (SQL_ERROR);
            }

/*  DBCHCLN (&ReturnCode, CLICTXT);
   if (ReturnCode!=0) {
   fprintf(stderr," The HCLN return code was %ld\n",ReturnCode);
   strncpy(((DBC *)hdbc)-
>ErrorMessage,dbcarea.msg_text,dbcarea.msg_len);
   ((DBC *)hdbc)->ErrorMessage[dbcarea.msg_len]='\0';
   ((DBC *)hdbc)->NativeError= ReturnCode;
   return(SQL_ERROR);
   }       */

      return (SQL_SUCCESS);

}

SQLRETURN SQL_API
```

```
SQLSetUsingParcel (
                                    SQLHSTMT hstmt,
                                    char *uptr,
                                    long ulen)
{
       ((STMT *) hstmt)->lpdbc->dbcarea.using_data_ptr = uptr;
       ((STMT *) hstmt)->lpdbc->dbcarea.using_data_len = ulen;
       return (SQL_SUCCESS);

}

SQLRETURN SQL_API
SQLWaitForAny (
                              SQLHENV henv,
                              SQLHSTMT * lphstmt,
                              int *stmtno)
{
       Int32 ReturnCode;
       Int32 sessionid;
       Int32 reqtoken;
       STMT *lpstmt;
       int rc;
       sessionid = 0;
       reqtoken = 0;
       *lphstmt = SQL_NULL_HSTMT;
       *stmtno = -1;

       DBCHWAT (&ReturnCode, CLICTXT, &sessionid, &reqtoken);
       if (ReturnCode == NOACTIVE)
              {
                     fprintf (stderr, " DBCHWAT says nothing was
active %ld, %ld\n", sessionid, reqtoken);
                     return SQL_NO_DATA_FOUND;
              }
       if (ReturnCode != 0)
              {
                     fprintf (stderr, " DBCHWAT returned %d\n",
ReturnCode);
                     return SQL_ERROR;
              }

       lpstmt = (STMT *) reqtoken;
       if (lpstmt->lpdbc->SessionId != sessionid)
              fprintf (stderr, " DBCHWAT returned the wrong
session?\n");
       *lphstmt = (SQLHSTMT) lpstmt;
       *stmtno = lpstmt->hstmt_num;
       if (lpstmt->lpdbc->busy)
              {
                     //fprintf(stderr," DBCHWAT returned a busy
session completion on %d\n",sessionid);
                     lpstmt->lpdbc->dbcarea.wait_for_resp = 'Y';
                     lpstmt->lpdbc->dbcarea.change_opts = 'Y';
                     rc = SQLExecDirect ((SQLHSTMT) lpstmt,
(SQLCHAR *) NULL, 0);
                     if (rc != SQL_SUCCESS && rc !=
SQL_SUCCESS_WITH_INFO)
                            {
                                   //fprintf (stderr, "
Completion of request failed! rc = %d\n", rc);
                                   if (rc == SQL_NO_DATA_FOUND)
                                          rc = SQL_SUCCESS;
                                   return (SQLRETURN) rc;
                            }
              }

       //fprintf(stderr," ***DBCHWAT returned an idle session
%d\n",sessionid);
       return SQL_SUCCESS;


}
```