HP AlphaServer ES45 Model 68/1000
using
HP Tru64 UNIX V5.1A/IPK
and
Oracle9i Database Enterprise Edition Release 2 with Real Application Clusters and Partitioning Options

TPC Benchmark™ H
Full Disclosure Report

First Edition
July 15, 2002

First Edition – July 15, 2002

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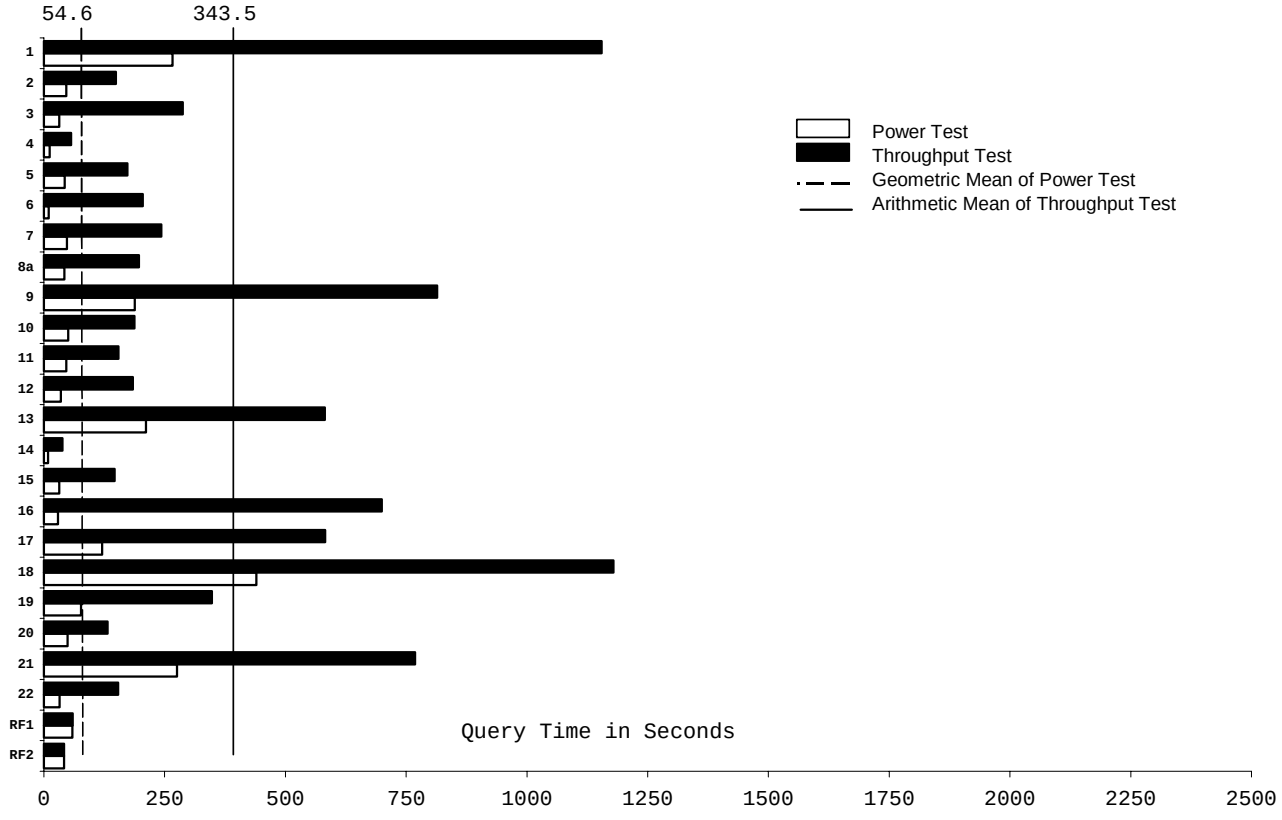
HP AlphaServer ES45 Cluster Using Oracle9*i* Release 2 with Real Application Clusters

TPC-H Rev. 1.5.0

Report Date: July 15, 2002

Total System Cost	Composite Query per Hour Metric	Price / Performance
$2,078,818	**5578.4** QphH@100GB	**$372.65** $/QphH@100GB

Database Size	Database Manager	Operating System	Other Software	Availability Date
100GB	Oracle9*i* Enterprise Edition Release 2 with Real Application Clusters	HP Tru64 UNIX V5.1A/IPK	None	July 15, 2002



Database Load Time = 1:10:42	Load Included Backup: N	Total Data Storage / Database Size = 56.48

RAID (Base tables only): N	RAID (Base tables and auxiliary data structures): N	RAID (All): Y

System Configuration: (4 Node Cluster Aggregate)

Processors: 16 Alpha EV 68/1000 MHz CPUs with 8 MB cache

Memory: 128 GB memory

Disks: 336 Drives

Total Disk Storage: 5,647.7 GB

Compaq AlphaServer ES45 Cluster Using Oracle9*i* Release 2 with Real Application Clusters

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Description	Part Number	Third Party Brand	Unit Price	Qty	Extended Price	5 yr. Maint. Price
Server Hardware						
Compaq AS ES45 68/1000 M2 4GB Unix	DA-68DAA-DA	1	50,809	4	203,236	130,216
ES45 Tower Enclosure	BA61M-CT	1	325	4	1,300	Inc.
ES45 68/1000 SMP CPU Unix	KN610-DB	1	10,400	12	124,800	Inc.
ES45 4GB Memory Option	MS620-DA	1	17,306	28	484,568	Inc.
Optional Power Supply, Self Sensing	H7906-A9	1	813	4	3,252	Inc.
18.2GB 10K RPM Ultra3 SCSI	3R-A0585-AA	1	207	13	2,691	Inc.
Power Cord	BN18J-1K	1	8	8	64	Inc.
SCSI Drive Cage, 6 Slot	BA610-6D	1	488	4	1,952	Inc.
1 CH Wide Ultra-2 (LVD) Adapter	3X-KZPCA-AA	1	246	4	984	Inc.
PCI to Dual-Prt FE TX NIC	3X-DE602-AA	1	246	4	984	Inc.
Memory Channel Hub (w/4 line cards)	CCMHB-AA	1	6,365	1	6,365	Inc.
PCI MC2 Controller	CCMAB-AA	1	1,944	4	7,776	Inc.
10 Meter Cable for MC2	BN39B-10	1	273	4	1,092	Inc.
64 Bit FC HBA T64/VMS	DS-KGPSA-CA	1	2,209	16	35,344	Inc.
D Shelf 180W 1Doc BLW Metric Blue	DS-BA356-JD	1	919	2	1,838	Inc.
PCI to UltraSCSI Adapter UWSE	KZPBA-CA	1	299	2	598	Inc.
Ultra 68VHD 3M Cable Assembly	BN37A-03	1	91	2	182	Inc.
VT510;White; North Amer; No key	VT510-AA	1	397	4	1,588	0
US/CANADA W95 KYBD WHIT	PCXLA-NA	1	16	4	64	0
				Subtotal	**878,678**	**130,216**
STORAGE:						
USA Model 914 Storage Shelf	DS-SWXEB-AA	1	46,406	4	185,624	126,468
Controller w/o ECB Cable Kit	DS-HSG80-BK	1	8,793	24	211,032	Inc.
16-Port SAN Switch	DS-DSGGB-AB	1	18,525	4	74,100	Inc.
Short-Wave Optical GBICs	DS-DXGGA-SA	1	241	40	9,640	Inc.
Model 2200 ECB	DS-SE2CS-CB	1	369	24	8,856	Inc.
Fibre Channel Cables	BNGBX-30	1	246	40	9,840	Inc.
12/24gb 4MM Dat 5.25 Tape Drive	TLZ10-LB	1	444	4	1,776	6,228
9.1GB 7200RPM Disk**	DS-RZ1DA-VW	1	423	6	2,538	Spared
18.2GB 10K RPM Ultra3 SCSI	3R-A0585-AA	1	206	317	65,302	Spared
				Subtotal	**568,708**	**132,696**
Software						
5YR, AS ES40/45 UNIX BRNZ24X7	FM-E4WUS-60	1	3,058	4		12,232
5YR Digital Unix O/S & LP	FM-CDDST-60	1	10,899	4		43,596
TRU64 UNIX AlphaCDROM	QA-MT4AA-H8	1	293	4	1,172	
5YR AS ES45 UNIX SMP	FM-62USM-60	1	1,080	12		12,960
5YR 7X24 HS*80 Platform SW	FM-PLAT2-60	1	670	24		16,080
HSG80 ACSsf All Lic/PCRM Pkg	QB-6BUAA-SB	1	4,550	24	109,200	
Oracle9i Database Enterprise Edition Release 2, v9.2.0.1, w/Real Application Clusters and Partitioning Options (Named Users) for HP Tru64 UNIX v5.1A/IPK	Oracle	2	133,280	1	133,280	
Server Support Package: Database	Oracle	2	8,000	5		40,000
				Subtotal	**243,652**	**124,868**

Notes: 10% Spares**
1=IC System Solutions 2=Oracle (MaryBeth Pierantoni; mary.beth.pierantoni@oracle.com)

	Subtotal	**$1,691,038**	**$387,780**
	Five-Year Cost of Ownership:	**$2,078,818**
Audited by InfoSizing	**QphD**	**5,578.40**
All prices are based on similar quantities and configurations.	**$ / QphD**	**$372.65**

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.

Compaq AlphaServer ES45 Cluster Using Oracle9*i* Release 2 with Real Application Clusters

Report Date: July 15, 2002

Numerical Quantities

Measurement Results:

Database Scale Factor	= 100
Total Data Storage / Database Size	= 56.48
Start of Database Load	= 2002-06-24 16:53:24
End of Database Load	= 2002-06-24 18:04:06
Database Load Time	= 01:10:42
Query Streams for Throughtput Test	= 5
TPC-H Power	= 6596.2 @100GB
TPC-H Throughput	= 4717.7 @100GB
TPC-H Composite Query-per-Hour Metric (QphH@Size)	= 5578.4 @100GB
Total System Price Over 5 Years	= $2,078,818
TPC-H Price/ Performance Metric ($/QphH@Size)	= $372.65

Measurement Intervals:

Measurement Interval in Throughput Test (Ts)	= 8,394.0 seconds

Duration of Stream Execution:

Stream ID	Seed	Start Date	Start Time	End Date	End Time	Duration
Stream 0:	624180406	6/24/2002	21:00:31	6/24/2002	21:37:08	0:36:37
Stream 1:	624180407	6/24/2002	21:37:10	6/24/2002	23:41:28	2:04:18
Stream 2:	624180408	6/24/2002	21:37:10	6/24/2002	23:48:35	2:11:25
Stream 3:	624180409	6/24/2002	21:37:10	6/24/2002	23:44:08	2:06:58
Stream 4:	624180410	6/24/2002	21:37:10	6/24/2002	23:43:31	2:06:21
Stream 5:	624180411	6/24/2002	21:37:10	6/24/2002	23:37:56	2:00:46
Refresh		6/24/2002	23:48:35	6/24/2002	23:57:04	0:08:29

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TPC-H Timing Intervals (in seconds)

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8a	Q9	Q10	Q11	Q12
Stream 00	266.4	46.3	31.5	11.9	43.2	9.9	47.7	42.1	188.3	50.4	46.6	35.4
Stream 01	1144.2	151.9	122.3	36.7	217.3	46.9	231.9	179.7	757.9	198.4	193.7	119.1
Stream 02	1452.4	138.2	83.6	55.9	134.0	36.4	284.7	230.2	1092.2	154.1	91.4	240.4
Stream 03	941.1	144.2	77.7	48.1	167.4	39.1	243.1	189.7	827.7	250.6	188.5	118.6
Stream 04	1133.1	153.5	80.9	69.8	141.1	34.2	234.6	220.2	745.2	189.4	132.1	201.2
Stream 05	1102.9	157.7	157.9	71.0	205.7	53.6	220.7	164.7	646.9	146.1	165.6	241.8
Minimum	941.1	138.2	77.7	36.7	134.0	34.2	220.7	164.7	646.9	146.1	91.4	118.6
Average	1154.7	149.1	287.9	56.3	173.1	204.6	243.0	196.9	814.0	187.7	154.3	184.2
Maximum	1452.4	157.7	157.9	71.0	217.3	53.6	284.7	230.2	1092.2	250.6	193.7	241.8

	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20	Q21	Q22	RF1	RF2
Stream 00	211.3	8.9	31.6	29.7	120.8	440.0	76.9	48.6	275.9	32.5	59.0	42.0
Stream 01	687.6	21.6	81.7	229.8	354.9	1212.4	268.7	156.7	916.3	128.6	62.0	44.0
Stream 02	672.5	52.2	181.4	175.1	894.2	1019.7	354.6	126.0	287.7	128.6	57.0	38.0
Stream 03	499.9	45.4	181.7	114.4	783.9	1135.6	385.7	137.2	848.9	249.5	59.0	44.0
Stream 04	640.7	38.2	183.8	123.2	457.4	1372.9	365.9	80.0	859.3	124.1	59.0	42.0
Stream 05	408.9	33.3	102.6	200.7	421.4	1154.6	364.5	158.8	928.2	136.9	61.0	42.0
Minimum	408.9	21.6	81.7	114.4	354.9	1019.7	268.7	80.0	287.7	124.1	57.0	38.0
Average	581.9	38.1	146.2	699.6	582.4	1179.0	347.9	131.7	768.1	153.5	59.6	42.0
Maximum	687.6	52.2	183.8	229.8	894.2	1372.9	385.7	158.8	928.2	249.5	62.0	44.0

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1 General Items

1.1 Benchmark Sponsor

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

Hewlett-Packard Company and Oracle Corporation are the sponsors of this TPC-H benchmark.

1.2 Parameter Settings

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

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

Appendix A contains the tunable parameters for the database and operating system.

1.3 Configuration Items

Diagrams of both measured and priced configurations must be provided, accompanied by a description of the differences.

The benchmark system is depicted on the following page and consists of (4) ES45 Model 68/1000 nodes each containing:

(1)	Internal SCSI Controller
(4)	KGPSA-CA PCI SCSI Controllers
(1)	10/100 Base-T Ethernet Adapter
(1)	Memory Channel Interconnect Adapters
(1)	Qlogic SCSI Controller (Node 1 only)

Cluster wide:

(1)	Memory Channel Hubs with Line Cards
(4)	I/O Fibre Channel Switches
(24)	HSG80 Disk Controllers (4 Full Cabinets)
(5)	DS-RZ1DA-VW (9.1GB 7200 RPM Disk Drives)
(297)	18.2GB 10K RPM Ultra3 SCSI Disk Drives

System Configuration Diagram
(Measured and Priced)

12 HSG80 Controller Pairs in an Array of (4) Cabinets (24 Controllers)
24 18.2GB 10K RPM Disk Drives per HSG80 Controller Pair
Total Disk Drives in HSG80 Array = 288

2 Clause 1: Logical Database Design

2.1 Table Definitions

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

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

2.2 Physical Organization of Database

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

No record clustering or index clustering were used. Column ordering was changed for some tables. Refer to the table create statements in Appendix B for further details.

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 base tables LINEITEM, ORDERS, PARTSUPP, PART, SUPPLIER and CUSTOMER. The details for this partitioning can be understood by examing the syntax of the table and index definition statements in Appendix B.

2.4 Replication

Any replication of physical objects must be disclosed and must conform to the requirements of Clause1.5.6.

Replication was not used for this benchmark.

3 Clause 2: Queries and Update Functions

3.1 Query Language

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

SQL was the query language used to implement all queries.

3.2 Random Number Generation

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

The TPC supplied version 1.3.0 of DBGEN and QGEN were used for this benchmark.

3.3 Substitution Parameters Generation

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

The supplied QGEN version 1.3.0 was used to generate the substitution parameters.

3.4 Query Text and Output Data from Database

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

1) Appendix C contains the query text and query output.

3.5 Query Substitution Parameters and Seeds Used

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

Appendix D contains the seed and query substitution parameters.

3.6 Query Isolation Level

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

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

3.7 Refresh Function Implementation

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

The refresh function is a part of the driver code. See Appendix E.

4 Clause 3: Database System Properties

4.1 ACID Properties

The ACID (Atomicity, Consistency, Isolation, and Durability) properties of transaction processing systems must be supported by the system under test during the timed portion of this benchmark. Since TPC-H is not a transaction processing benchmark, the ACID properties must be evaluated outside the timed portion of the test.

Source code for the ACID test is included in Appendix B.

4.2 Atomicity

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

4.2.1 Completed Transaction

Perform the ACID Transaction (see Clause 3.1.5) for a randomly selected set of input data and verify that the appropriate rows have been changed in the ORDERS, LINEITEM, and HISTORY tables.

1. The total prices from the ORDER table and the extended price from the LINEITEM table were retrieved for a randomly selected order key.

2. The ACID Transaction was performed using the order key from step 1.

3. The ACID Transaction was committed.

4. The total price from the ORDER table and the extended price from the LINEITEM table were retrieved for the same order key. It was verified that the appropriate rows had been changed.

4.2.2 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 ORDERS, LINEITEM, and HISTORY tables.

1. The total price from the ORDER table and the extended price from the LINEITEM table were retrieved for a randomly selected order key.

2. The ACID Transaction was performed using the order key from step 1. The transaction was stopped prior to the commit.

3. The ACID Transaction was rolled back.

4. The total price from the ORDER table and the extended price from the LINEITEM table were retrieved for the same order key, and were verified to have not been changed.

4.3 Consistency

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

4.3.1 Consistency Test

Verify that ORDERS 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 ORDERS and LINEITEM.

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

2. 100 ACID transactions were submitted from each of 6 execution streams.

3. The consistency of the ORDER and LINEITEM tables was verified a second time.

4.4 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.

4.4.1 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.

1. An ACID transaction was started for a randomly selected O_KEY, L_KEY, and DELTA. The ACID transaction was suspended prior to COMMIT.

2. An ACID query was started for the same O_KEY used in step 1. The ACID query blocked and did not see the uncommitted changes made by the ACID transaction.

3. The ACID transaction was COMMITTED.

4. The ACID Query completed. It returned the data as committed by the ACID Transaction.

4.4.2 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.

1. An ACID transaction was started for a randomly selected O_KEY, L_KEY, and DELTA. The ACID transaction was suspended prior to ROLLBACK.

2. An ACID query was started for the same O_KEY used in step 1. The ACID query completed and did not see the uncommitted changes made by the ACID transaction.

3. The ACID transaction was ROLLED BACK
4. The ACID Query completed.

4.4.3 Write-Write Conflict with Commit

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

1. An ACID transaction, T1, was started for a randomly selected O_KEY, L_KEY, and DELTA. T1 was suspended prior to commit.

2. AnotherACID transaction, T2, was started using the same O_KEY and L_KEY and a randomly selected DELTA.

3. T2 waited.

4. T1 was allowed to COMMIT and T2 completed.

5. It was verified that T2.L_EXTENDEDPRICE = T1.L_EXTENDEDPRICE + (DELTA1*(T1.L_EXTENDEDPRICE/T1.L_QUANTITY)).

4.4.4 Write-Write Conflict with Rollback

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

1. An ACID transaction, T1, was started for a randomly selected O_KEY, L_KEY, and DELTA. T1 was suspended prior to ROLLBACK.

2. Another ACID transaction, T2, was started using the same O_KEYand L_KEY and a randomly selected DELTA.

3. T2 waited.

4. T1 was allowed to ROLLBACK and T2 completed.

5. It was verified that T2.L_EXTENDEDPRICE = T1.L_EXTENDEDPRICE.

4.4.5 Concurrent Read/Write Transactions on Different Tables

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

1. An ACID transaction, T1, was started for a randomly selected O_KEY, L_KEY, and DELTA. T1 was suspended prior to ROLLBACK.

2. Another ACID transaction, T2, was started which did the following:

   For random values of PS_PARTKEY and PS_SUPPKEY, all columns of the PARTSUPP table for which PS_PARTKEY and PS_SUPPKEY are equal, are returned.

3. T2 completed.

4. T1 was allowed COMMIT.

5. It was verified that appropriate rows in ORDERS, LINEITEM and HISTORY tables were changed.

4.4.6 Read-Only Query Conflict with Update Transaction

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

1. A Transaction, T1, executing Q1 against the qualification database, was started using a randomly selected DELTA.
.
2. An ACID Transaction, T2, was started using randomly selected values of O_KEY, L_KEY and DELTA.

3. T2 completed and appropriate rows in the ORDERS, LINEITEM and HISTORY tables were changed.

4. Transaction T1 completed executing Q1.

4.5 Durability

The SUT must guarantee durability: the ability to preserve the effects of committed transactions and ensure database consistency after recovery from any one of the failures listed in Clause3.5.3.

4.5.1 Failure of a Durable Medium

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

The disks containing TPC-H tables and log files and tables were mirrored. During the durability test the disk containing one side of a data file mirror was removed from its cabinet. Similarly the disk containing one side of a log file mirror was removed from its cabinet. The test continued uninterrupted, using the remaining side of the mirror.

4.5.2 System Crash

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

1) The system crash and memory failure tests were combined. Power to both servers was turned off simultaneously by flipping breakers at the main electrical panel during the durability test. When power was restored, the system rebooted and the database was restarted. The durability success file and the HISTORY table were compared successfully.

4.5.3 Memory Failure

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

See section 4.5.2.

5 Clause 4: Scaling and Database Population

5.1 Cardinality of Tables

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

TABLE	ROWS
ORDERS	150,000,000
LINEITEM	600,037,902
CUSTOMER	15,000,000
PART	20,000,000
SUPPLIER	1,000,000
PARTSUPP	80,000,000
NATION	25
REGION	5

5.2 Distribution of Tables and Logs Across Media

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

- All table, index, log and temp data and mirrors were striped across 12 Compaq HSG80 storage controller arrays, each controller array supporting 12 mirrored pairs of disks.

- The following disks were serviced by the internal SCSI controller:

  Node 1:

  - One disk for the operating system (standalone boot)
  - One disk for the operating system (cluster boot)
  - One disk for the operating system (cluster member boot)
  - One disk for Oracle
  - One disk for /oracle_save
  - One spare disk

  Nodes 2-4:

  - One disk for the operating system (member boot)
  - One spare disk

For more details refer to disk configuration section in Appendix B.

5.3 Partitioning and Replication

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

The database was not replicated.

Horizontal partitioning was used for base tables LINEITEM, ORDERS, PARTSUPP, PART, SUPPLIER and CUSTOMER. The details for this partitioning can be understood by examining the syntax of the table and index definition statements in Appendix B.

5.4 RAID Feature

Implementations may use some form of RAID . The RAID level used must be disclosed for each device.

Hardware RAID 1 + 0 (mirroring and striping) was used to store data on log disks and all other database disks.

5.5 RAID Intent

If RAID is used in an implementation, the logical intent of its use must be disclosed. Three levels of usage are defined:

1. *Base tables only: In this case only the Base Tables (see Clause 1.2) are protected by any form of RAID;*

2. *Base tables and auxiliary data structures: in addition to the protection of the base tables, implementations in this class must also employ RAID to protect all auxiliary data structures;*

3. *Everything: implementations in this usage category must employ RAID to protect all database storage, including temporary or scratch space in addition to the base tables and auxiliary data structures.*

The level of intent for RAID was “Everything”.

5.6 DBGEN Version and Modifications

The version number, release number, modification number, and patch level of DBGEN must be disclosed. Any modifications to the DBGEN (see Clause 4.2.1) source code (see 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.

The supplied DBGEN version 1.3.0 was used to generate the database population for this benchmark.

5.7 Database Load Time

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

The database load time was 1:10:42.

5.8 Data Storage Ratio

The data storage ratio must be disclosed. It is computed by dividing the total data storage of the priced configuration (expressed in GB) by the size chosen for the test database as defined in Clause 4.1.3.1. The ratio must be reported to the nearest 1/100th, rounded up. For example, a system configured with 96 disks of 2.1 GB capacity for a 300GB test database has a data storage ratio of 2.02.

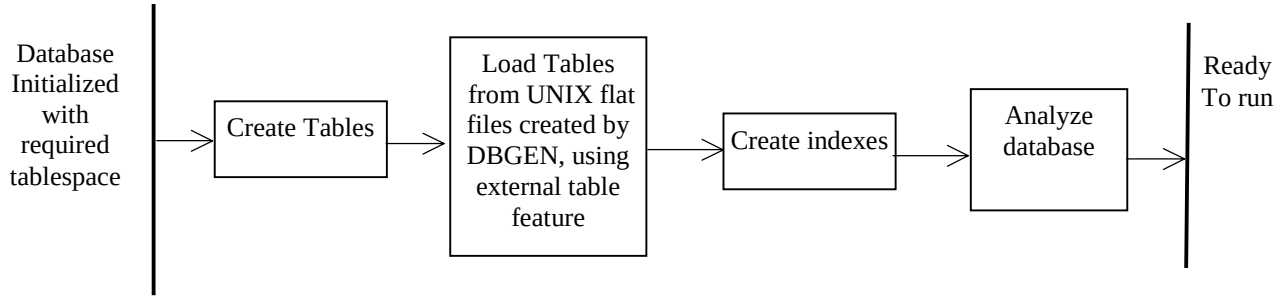
The data storage ration is computed from the following information:

Disk Type	# of Disks	Space per Disk (GB)	Sub-Total Disk Space
18.2GB/OK RPM Ultra3-SCSI	330	16.96	5,596.8GB
9.1 GB 7200 RPM Ultra-SCSI	6	8.48	50.9GB
		Total Space =	5,647.7GB
		Data Storage Ration =	56.48

5.9 Database Load Mechanism Details and Illustration

The details of the database load must be disclosed, including a block diagram illustrating the overall process. Disclosure of the load procedure includes all steps, scripts, input and configuration files required to completely reproduce the test and qualification databases.

All load scripts are included in Appendix B.



5.10 Qualification Database Configuration

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

The qualification database used identical scripts to create and load the data with adjustments for the size difference.

6 Clause 5: Performance Metrics and Execution Rules

6.1 System Activity Between Load and Performance Tests

Any system activity on the SUT that takes place between the conclusion of the load test and the beginning of the performance test must be fully disclosed including listings of scripts or command logs.

1. Executed DBTABLES.SQL using sqlplus
2. Executed FIRSTTEN.SQL using sqlplus
3. Executed CHECKIDX.SQL using sqlplus

The scripts may be found in Appendix F.

6.2 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.

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

6.3 Timing Intervals

The timing intervals (see Clause 5.3.7) for each query and for both refresh functions must be reported for the power test.

The timing intervals for each query and for both refresh functions are listed in the Numerical Quantities Summary earlier in this document (STREAM 00).

6.4 Number of Streams for the Throughput Test

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

Five (5) query streams were used for the throughput test in this benchmark.

6.5 Start/Finish Time of Each Query Stream

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

The start and finish time for each query stream are listed in the Numerical Quantities Summary earlier in this document.

6.6 Total Elapsed Time

The total elapsed time of the measurement interval (see Clause 5.3.6) must be reported for the throughput test.

The total elapsed time of the throughput test is listed in the Numerical Quantities Summary earlier in this document.

6.7 Start/Finish Time for the Refresh Function

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

The start and finish times for each refresh function in the refresh stream is listed in the Numerical Quantities Summary earlier in this document.

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

The timing intervals (see Clause 5.3.7) for each query of each stream and for each refresh function must be reported for the throughput test.

The timing intervals for each query of each stream and for each refresh function is listed in the Numerical Quantities Summary earlier in this document..

6.9 Performance Metrics

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

The computed performance metric, related numerical quantities and the price performance metric is listed in the Numerical Quantities Summary earlier in this document.

6.10 Performance Metric and Numerical Quantities from Both Runs

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

Run ID	QppH@100GB	QthH@100GB	QphH@100GB
Run 1	6581.5	4814.0	5628.8
Run 2	6596.2	4717.7	5578.4
%Difference	.00200	.02006	.00908

6.11 System Activity Between Performance Runs

Any activity on the SUT that takes place between the conclusion of Run1 and the beginning of Run2 must be fully disclosed including listings of scripts or command logs along with any system reboots or database restarts.

There was no activity between Run 1 and Run 2.

7 Clause 6: SUT and Driver Implementation

7.1 Driver

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

The Power Test and Throughput Test are performed by a shell script called runTPCHpt. QGEN is first called with a stream id of 0 to generate the QET for the Power Test. UF1 is then started by executing the runuf1.sh script. Query submission follows, with the qexecpl.c.ISL program. The execution of the UF2 script runuf2.sh rounds out the Power Test execution. Both wall-clock and high-resolution times are collected for all measurement intervals.

Following the Power Test, QGEN is again called with the subsequent 5 stream ids to generate new QET for each Throughput Test. Qexecpl.c is called to run all 5 streams simultaneously to execute the queries as above. Immediately after that, the TPCHus script is called to run all 5 update pairs to finish the throughput run.

7.2 Implementation-Specific Layer

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

Query execution text generated by QGEN is picked up by the ISL program which submits the query to the SUT.

The ISL program (qexecpl.c) utilizes the Oracle Call Interface (OCI) to communicate with the Oracle database on the SUT. EQTs directly generated by QGEN are read and submitted to the SUT via the ISL program (qexecpl.c) as dynamic SQL statements. The ISL program then fetches the query execution output and reports it to the user. Timings are taken at intervals specified in Section 5.3.7 of the TPC-H benchmark specification.

The Update Functions use external tables to load data from flat files. Oracle9*i*'s parallel insert and delete functionality was used to perform the Update Functions, selecting data from the temporary tables.

7.3 Profile-Directed Optimization

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

Profile-directed optimization was not used.

8 Clause 7: Pricing

8.1 Hardware and Software Used

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

A detailed list of hardware and software used in the priced system is listed in the Pricing Summary earlier in this document.

The Oracle software pricing contact is:

MaryBeth Pierantoni of Oracle Corporation
Email Address: mary.beth.pierantoni@oracle.com
Phone Number: 650-506-2118

8.2 Total Five Year Pricing

The total 5-year price of the entire configuration must be reported including: hardware, software, and maintenance charges. Separate component pricing is recommended. The basis of all discounts used must be disclosed.

See the Pricing Summary earlier in this document.

8.3 Availability Date

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

Category	Available Date
Server Hardware	July 15, 2002
Storage	July 15, 2002
Software	July 15, 2002

9 Clause 9: Audit Related Items

9.1 Auditor's Report & 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 whom to contact in order to obtain further information regarding the audit process.

INFO SIZING

Benchmark Sponsor: Dave Stanley
Compaq Computer
110 Spit Brook Road
ZKO2-3/M31
Nashua NH, 03062

July 12, 2002

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

Platform:	**HP AlphaServer ES45 Cluster**
Database Manager:	**Oracle9i Release 2 with Real Application Clusters**
Operating System:	**HP Tru64 UNIX V5.1A/IPK**

The results were:

CPU (Speed)	Memory	Disks	**QphH@100GB**
HP AlphaServer ES45 (4 nodes)			
Per node : 4 Alpha EV 68 (1000 MHz)	Per node : 8 MB Cache/cpu 32 GB Main	297 x 18.2 GB 5 x 9.1 GB ext.	**5,578.4**

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:

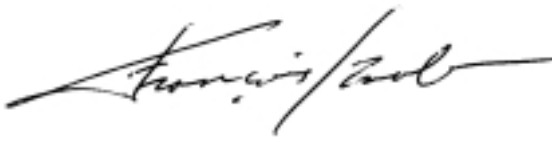
- The database records were defined with the proper layout and size

- The database population was generated using DBGEN
- The database was properly scaled to 100GB 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 5 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

Appendix A: Tru64 UNIX and Oracle9*i* Parameters

Oracle9*i* Parameters

common.ora

```
cluster_database                = true
parallel_automatic_tuning       = true
log_parallelism                 = 2
audit_trail                     = FALSE
compatible                      = 9.2.0
control_files          = (/usr/users/oracle/control_files/cntrl100gb_920_1.dbf,
$SF/control_files/cntrl100gb_920_2.dbf)
db_block_checksum               = false
db_block_size                   = 32768
db_cache_size                   = 5g
db_file_multiblock_read_count   = 32
db_files                        = 2048
db_name                         = tpch
db_writer_processes             = 4
dml_locks                       = 20480
enqueue_resources               = 20480
global_names                    = FALSE
java_pool_size                  = 0
large_pool_size                 = 3g
log_buffer                      = 100000
log_checkpoints_to_alert        = TRUE
max_rollback_segments           = 580
nls_date_format                 = YYYY-MM-DD
open_cursors                    = 1024
optimizer_features_enable       = 9.2.0.1
optimizer_index_cost_adj        = 25
optimizer_mode                  = CHOOSE
parallel_adaptive_multi_user    = FALSE
parallel_execution_message_size = 32768
parallel_max_servers            = 112
parallel_min_servers            = 112
parallel_threads_per_cpu        = 2
partition_view_enabled          = TRUE
processes                       = 1024
query_rewrite_enabled           = TRUE
replication_dependency_tracking = FALSE
sessions                        = 1024
shared_pool_size                = 1g
sort_area_size                  = 24000000
hash_area_size                  = 24000000
transaction_auditing            = FALSE
timed_statistics                = FALSE
trace_enabled                   = FALSE
undo_management                 = auto
max_commit_propagation_delay    = 700
```

dbcreate.ora

```
#  Init.ora for creating the 100GB TPC-H Oracle database
#
db_name                         = tpch
control_files          = (/usr/users/oracle/control_files/cntrl100gb_920_1.dbf,
$SF/control_files/cntrl100gb_920_2.dbf)
cluster_database                = FALSE
audit_trail                     = FALSE
compatible                      = 9.2.0
db_block_buffers                = 2000
db_block_size                   = 32768
db_block_checksum               = FALSE
db_files                        = 1024
db_file_multiblock_read_count   = 16
global_names                    = FALSE
log_checkpoints_to_alert        = true
log_checkpoint_interval         = 0
max_dump_file_size              = 5000
max_rollback_segments           = 160
nls_date_format                 = YYYY-MM-DD
open_cursors                    = 1024
optimizer_mode                  = CHOOSE
processes                       = 256
query_rewrite_enabled           = true
sessions                        = 256
shared_pool_size                = 400000000
sort_area_size                  = 1097152
sort_area_retained_size         = 1097152
transactions                    = 512
undo_management                 = auto
```

tpchorc1.ora (Node 1)

```
# init.ora for 300gb for Node 1 (tpchorc1)
#
instance_name=TPCH1
instance_number=1
parallel_instance_group=groupa
instance_groups=groupa,groupb
thread=1
ifile=$SF/control_files/common.ora
undo_tablespace=ts_undo1
```

tpchorc2.ora (Node 2)

```
# init.ora for 300gb for Node 2 (tpchorc2)
#
instance_name=TPCH2
instance_number=2
instance_groups=groupa
thread=2
ifile=$SF/control_files/common.ora
undo_tablespace=ts_undo2
```

tpchorc3.ora (Node 3)

```
# init.ora for 300gb for Node 3 (tpchorc3)
#
instance_name=TPCH3
instance_number=3
instance_groups=groupa
thread=3
ifile=$SF/control_files/common.ora
undo_tablespace=ts_undo3
```

tpchorc4.ora (Node 4)

```
# init.ora for 300gb for Node 4 (tpchorc4)
#
instance_name=TPCH4
instance_number=4
instance_groups=groupa
thread=4
ifile=$SF/control_files/common.ora
undo_tablespace=ts_undo4
```

Oracle9*i* Environment Variables

tpch.env.oracle

```
#!/usr/bin/csh
set path=(. $HOME $HOME/bin /sbin /usr/sbin /Oracle9i/app/product/9.2.0.0212/bin
/usr/bin/X11 $path /usr/local/bin /Oracle9i/bin /Oracle9i/app/product/9.2.0.0212 )
setenv TPCW_HOME /Oracle9i/app/tpcw
setenv BENCH_HOME /Oracle9i/bench/tpc
```

```
setenv BENCH_GEN $BENCH_HOME/tpcc
setenv GEN_SQL $BENCH_GEN/sql
setenv TPCC_SOURCE $BENCH_HOME/tpcc/source
setenv TPCC_SQL $BENCH_HOME/tpcc/sql
setenv TPCC_BLOCKS $BENCH_HOME/tpcc/blocks
setenv TPCC_SCRIPTS $BENCH_HOME/tpcw/scripts
setenv TPCC_UTILS $TPCC_SCRIPTS/utils
setenv AUDIT_SQL $BENCH_HOME/tpcc/audit/sql
setenv BUILD_SQL sql
setenv OUTDIR outdir
setenv MULT 1200
setenv SCRIPTS $BENCH_HOME/tpcw/scripts
setenv julier_scripts /Oracle9i/app/tpcw/scripts
setenv tool
#
setenv ORACLE_HOME /Oracle9i/app/product/9.2.0.0212
setenv ORACLE_BASE /Oracle9i/app/product/9.2.0.0212
setenv DBS $ORACLE_HOME/dbs
setenv ORACLE_817_HOME /Oracle/app/product/8.1.7
#
setenv ORA_NLS $ORACLE_HOME/ocommon/nls/admin/data
setenv ORA_NLS32 $ORACLE_HOME/ocommon/nls/admin/data
setenv ORACLE_TERM vt100
#
setenv ORACLE_SID TPCH`clu_get_info | grep "this member" | awk '{print $6}'`
#setenv ORACLE_SID valid
setenv SRCHOME $ORACLE_HOME
setenv ALERT_LOG_DIR $ORACLE_HOME/rdbms/log
setenv ALERT_LOG $ORACLE_HOME/rdbms/log/alert_$ORACLE_SID.log
unlimit stacksize
setenv O $ORACLE_HOME
#setenv PATH
$O/bin:$BENCH_HOME/util:$BENCH_HOME/benchrun/bin:$BENCH_HOME/bu
mpx:$BENCH_HOME/source:$PATH
#
########## tpchr Kit variables ##################
#
setenv KIT_DIR $ORACLE_HOME/tpch
setenv SF $KIT_DIR/SF_100GB
setenv SFDIR $KIT_DIR/SF_100GB
setenv SFN 100
setenv SCALE_FACTOR 100
setenv DATABASE_USER tpcd/tpcd
setenv QUAL_DIR $KIT_DIR/SF_1GB
setenv DBNAME tpch
#
# variables that depend on Scale Factor
#
setenv UPDATE_DIR $KIT_DIR/update
setenv RES_DIR $KIT_DIR/queries_run/results
setenv SCHEMA_DIR $SF/schema_load
setenv LOGS $SF/logs
setenv BENCH_RUN $SF/benchmark_run
setenv PIPELOAD $SCHEMA_DIR/pipe_load
setenv NUM_STREAMS 5
#
setenv PERL /usr/bin/perl
setenv BUMPX_DIR $KIT_DIR/bumpx
setenv BUMPX_OUT $KIT_DIR/bumpx
setenv UTILS $KIT_DIR/utils
setenv TEST_DB /tmp
setenv QUAL_DB $TEST_DB
setenv DBGENDIR $KIT_DIR/dbgen
setenv DBGEN $KIT_DIR/dbgen
setenv ACID_DIR $KIT_DIR/acid
setenv QEXEC $KIT_DIR/utils
setenv QUERIES $KIT_DIR/queries
setenv ANSWERS $KIT_DIR/answers
setenv ANS2VAL /tmp
setenv ACID_OUT $QUAL_DB/acid_out
setenv AUDIT $KIT_DIR/audit
setenv DSS_CONFIG $DBGENDIR
setenv DSS_QUERY $KIT_DIR/queries
setenv MAINT $KIT_DIR/maintenance
setenv CC cc
setenv FRAME $KIT_DIR/frame
setenv TEST $ORACLE_HOME/tpch/test
setenv LINKS $SF/links
#setenv REGR_TEST $KIT_DIR/internal/regression_test
#
########### FRAME STUFF
#
setenv FRAME_PATH $KIT_DIR/frame
setenv FRAME_USER tpcd/tpcd
setenv RUN_PATH "."
#setenv ORACORE3INCL /vobs/oracore3/include
#setenv ORACORE3PUBL /vobs/oracore3/public
setenv ORACORE3INCL $ORACLE_HOME/rdbms/demo
setenv ORACORE3PUBL $ORACLE_HOME/rdbms/public
#setenv RDBMSPUBL /vobs/rdbms/public
setenv RDBMSPUBL $ORACLE_HOME/rdbms/public
#setenv NETWORKPUBL /vobs/network_src/public
setenv NETWORKPUBL $ORACLE_HOME/network/public
setenv RDBMSDEMO $ORACLE_HOME/rdbms/demo
setenv PLSQLDEMO $ORACLE_HOME/plsql/demo
setenv PLSQLPUBL $ORACLE_HOME/plsql/public
setenv DSS_PATH /flatfiles
#setenv DSS_PATH /usr/pipe
#setenv PATH
./:${BUMPX_DIR}:${UTILS}:${DBGEN}:${MAINT}:${ACID_DIR}:${FRAME}/
bin:${FRAME}/bin:${REGR_TEST}:${PATH}
setenv PATH
./:${BUMPX_DIR}:${UTILS}:${DBGEN}:${MAINT}:${ACID_DIR}:${FRAME}/
bin:${FRAME}/bin:${PATH}
#
########## ENVIRONMENT VARIABLES #################
#
setenv WORKLOAD TPCH
setenv HOST tpchorc1
#setenv INITORA $KIT_DIR/schema/test_db/testdb.ora
setenv INITORA $KIT_DIR/schema/test_db/sf100.ora
#
########## ALIASES ################################
#
```

TRU64 UNIX Parameters

sysconfig_tpchorc1 (Node 1)

```
generic:
 memberid=1
 msgbuf_size=1048576
 new_vers_high=1445664276479072064
 new_vers_low=51969
 act_vers_high=1445664276479072064
 act_vers_low=51969
 rolls_ver_lookup=0
                version_vendor = Compaq Computer Corporation
                version_avendor = COMPAQ
                version_product = Tru64 UNIX
                version_banner = Compaq Tru64 UNIX
       locktype = 0
       replicate_text = 1
       dump_user_pte_pages = 1
       dump_kernel_text = 1
       live_dump_zero_suppress = 0

vm:
 swapdevice=/dev/disk/dsk58b
 vm_page_free_reserved=20
 vm_page_free_min=30
       vm_swap_eager=0
       dump_user_pte_pages = 1
       new_wire_method = 1
       replicate_user_text = 1
       ubc_minpercent=5
       ubc_maxpercent=10
 gh_chunks = 2750

aud97:
                Subsystem_Description = Creative Ensoniq Audio
                Device_Major_Req = Same
                Device_Char_Major = ANY
                Device_Char_Files = aud97
                Device_Char_Minor = 0
```

```
        Module_Config_Name = aud97
        AUD97_Developer_Debug = 0
        Num_Installed = 1
        PCI_Option =  PCI_SE_Rev - 0x210, Vendor_Id - 0x1274, Device_Id -
0x1371, Rev - 0, Base - 0, Sub - 0, Pif - 0 Sub_Vid - 0, Sub_Did - 0, Vid_Mo_Flag -
1, Did_Mo_Flag - 1, Rev_Mo_Flag - 0, Base_Mo_Flag - 0, Sub_Mo_Flag - 0,
Pif_Mo_Flag - 0, Sub_Vid_Mo_Flag - 0, Sub_Did_Mo_Flag - 0, Driver_Name -
aud97, Type - C, Adpt_Config - N
        CMA_Option = Size - 0x40000, Alignment - 0x10000, Addrlimit - 0,
Type - 29, Flag - 1

mmsess:
    Subsystem_Description = ESS Tech. 1888/1887 audio driver
    Device_Major_Req = Same
    Device_Char_Major = ANY
    Device_Char_Files = mmsess0
    Device_Char_Minor = 0
    Module_Config_Name = mmsess
    Mmsess_Developer_Debug = 0
    Num_Installed = 1
    ISA_Option =  Board_Id - Null, Function_Name - 'ES1888' , Driver_Name -
mmsess, Type - C, Adpt_Config - N
    EISA_Option =  Board_Id - ISA2100, Function_Name - Null, Driver_Name -
mmsess, Type - C, Adpt_Config - N
        CMA_Option = Size - 0x40000, Alignment - 0x10000, Addrlimit - 0,
Type - 29, Flag - 1
        Playback_DMA_Channel_Override = -1
        Playback_Mixer_Not_Used = 0
        Playback_Mixer_Wave_Out = 0xff
        Playback_Mixer_Microphone = 0
        Playback_Mixer_Line_In = 0
        Playback_Mixer_Synthesizer = 0
        Playback_Mixer_Aux_CD = 255
        Playback_Mixer_AuxB = 0
        Record_Mixer_Wave_Out_1887 = 0
        Record_Mixer_Microphone = 0
        Record_Mixer_Line_In = 0
        Record_Mixer_Synthesizer_1887 = 0
        Record_Mixer_Aux_CD = 255
        Record_Mixer_AuxB = 0
        Pc_Speaker = 1
        Input_Source = MIC
        Record_Volume = 12
        Master_Volume_Left = 0x20
        Master_Volume_Right = 0x20
        Microphone_Preamp_Enable = 0

per:
        Module_Config_Name = per
        PER_Developer_Debug = 0
        PCI_Option = PCI_SE_Rev - 0x210, Vendor_Id - 0x10ba, Device_Id -
0x304, Vid_Mo_Flag - 1, Did_Mo_Flag - 1, Rev_Mo_Flag - 0, Base_Mo_Flag - 0,
Sub_Mo_Flag - 0, Pif_Mo_Flag - 0, Sub_Vid_Mo_Flag - 0, Sub_Did_Mo_Flag - 0,
Driver_Name - per, Type - C, Adpt_Config - N

rdg:
    max_objs=8960
    max_async_req=1000
    msg_size=32768

inet:
    udp_recvspace=65535
    udp_sendspace=65535

lsm:
 lsm_rootdev_is_volume=0
        Enable_LSM_Stats = 1

rt:
    aio_task_max_num = 2048

io:
    basic_dma_window_size = 2048

proc:
    give_boost = 0
    max_per_proc_stack_size = 33554432
    max_per_proc_address_space = 128000000000
    max_per_proc_data_size = 128000000000
    max_proc_per_user = 2048
    max_threads_per_user = 2048
    per_proc_address_space = 128000000000
    per_proc_data_size = 128000000000

ipc:
    msg_max = 32768
    msg_mnb = 30000
    msg_mni = 256
    msg_tql = 1024
    sem_aem = 32768
    sem_mni = 1024
    sem_msl = 2000
    sem_opm = 2000
    sem_ume = 2000
    sem_vmx = 320000
        shm_max = 32212254720
    shm_mni = 1024
    shm_seg = 512
    ssm_threshold = 0
    shm_allocate_striped = 1

sec:
 acl_mode = disable

clubase:
 cluster_expected_votes=1
 cluster_name=tpchorch
 cluster_node_name=tpchorc1
 cluster_node_inter_name=tpchorc1-ics0
 cluster_node_votes=1
 cluster_interconnect=mct
 cluster_seqdisk_major=19
 cluster_seqdisk_minor=1016
 cluster_qdisk_major=0
 cluster_qdisk_minor=0
 cluster_qdisk_votes=0

pcount:
        Subsystem_Description = pcount device driver
        Module_Config_Name = pcount
        Module_Type = Dynamic
#       Device_Major_Req = Same
        Device_Char_Major = ANY
        Device_Char_Minor = 0
        Device_Char_Files = pcount0
```

sysconfig_tpchorc2 (Node 2)

```
generic:
 memberid=2
 msgbuf_size=1048576
 new_vers_high=1445664276479072064
 new_vers_low=51969
 act_vers_high =1445664276479072064
 act_vers_low=51969
 rolls_ver_lookup=0
    version_vendor = Compaq Computer Corporation
    version_avendor = COMPAQ
    version_product = Tru64 UNIX
    version_banner = Compaq Tru64 UNIX
    locktype = 0
    replicate_text = 1
    dump_user_pte_pages = 1
    dump_kernel_text = 1
    live_dump_zero_suppress = 0

vm:
 swapdevice=/dev/disk/dsk59b
 vm_page_free_reserved=20
 vm_page_free_min=30
    vm_swap_eager=0
    dump_user_pte_pages = 1
    new_wire_method = 1
    replicate_user_text = 1
    ubc_minpercent=5
    ubc_maxpercent=10
 gh_chunks = 2750
```

```
rdg:
        max_objs=8960
        max_async_req=1000
        msg_size=32768

inet:
        udp_recvspace=65535
        udp_sendspace=65535

lsm:
 lsm_rootdev_is_volume=0
        Enable_LSM_Stats = 1

clubase:
 cluster_expected_votes=1
 cluster_name=tpchorch
 cluster_node_name=tpchorc2
 cluster_node_inter_name=tpchorc2-ics0
 cluster_node_votes=0
 cluster_interconnect=mct
 cluster_seqdisk_major=19
 cluster_seqdisk_minor=1032
 cluster_qdisk_major=0
 cluster_qdisk_minor=0
 cluster_qdisk_votes=0

sec:
 acl_mode = disable

per:
                Module_Config_Name = per
                PER_Developer_Debug = 0
                PCI_Option = PCI_SE_Rev - 0x210, Vendor_Id - 0x10ba, Device_Id -
0x304, Vid_Mo_Flag - 1, Did_Mo_Flag - 1, Rev_Mo_Flag - 0, Base_Mo_Flag - 0,
Sub_Mo_Flag - 0, Pif_Mo_Flag - 0, Sub_Vid_Mo_Flag - 0, Sub_Did_Mo_Flag - 0,
Driver_Name - per, Type - C, Adpt_Config - N

rt:
        aio_task_max_num = 2048

io:
        basic_dma_window_size = 2048

proc:
        give_boost = 0
        max_per_proc_stack_size = 33554432
        max_per_proc_address_space = 128000000000
        max_per_proc_data_size = 128000000000
        max_proc_per_user = 2048
        max_threads_per_user = 2048
        per_proc_address_space = 128000000000
        per_proc_data_size = 128000000000

ipc:
        msg_max = 32768
        msg_mnb = 30000
        msg_mni = 256
        msg_tql = 1024
        sem_aem = 32768
        sem_mni = 1024
        sem_msl = 2000
        sem_opm = 2000
        sem_ume = 2000
        sem_vmx = 320000
        shm_max = 32212254720
        shm_mni = 1024
        shm_seg = 512
        ssm_threshold = 0
        shm_allocate_striped = 1

aud97:
                Subsystem_Description = Creative Ensoniq Audio
                Device_Major_Req = Same
                Device_Char_Major = ANY
                Device_Char_Files = aud97
                Device_Char_Minor = 0
                Module_Config_Name = aud97
                AUD97_Developer_Debug = 0
                Num_Installed = 1
                PCI_Option =  PCI_SE_Rev - 0x210, Vendor_Id - 0x1274, Device_Id -
0x1371, Rev - 0, Base - 0, Sub - 0, Pif - 0 Sub_Vid - 0, Sub_Did - 0, Vid_Mo_Flag -
1, Did_Mo_Flag - 1, Rev_Mo_Flag - 0, Base_Mo_Flag - 0, Sub_Mo_Flag - 0,
Pif_Mo_Flag - 0, Sub_Vid_Mo_Flag - 0, Sub_Did_Mo_Flag - 0, Driver_Name -
aud97, Type - C, Adpt_Config - N
                CMA_Option = Size - 0x40000, Alignment - 0x10000, Addrlimit - 0,
Type - 29, Flag - 1

mmsess:
        Subsystem_Description = ESS Tech. 1888/1887 audio driver
        Device_Major_Req = Same
        Device_Char_Major = ANY
        Device_Char_Files = mmsess0
        Device_Char_Minor = 0
        Module_Config_Name = mmsess
        Mmsess_Developer_Debug = 0
        Num_Installed = 1
        ISA_Option =  Board_Id - Null, Function_Name - 'ES1888' , Driver_Name -
mmsess, Type - C, Adpt_Config - N
        EISA_Option =  Board_Id - ISA2100, Function_Name - Null, Driver_Name -
mmsess, Type - C, Adpt_Config - N
                CMA_Option = Size - 0x40000, Alignment - 0x10000, Addrlimit - 0,
Type - 29, Flag - 1
                Playback_DMA_Channel_Override = -1
                Playback_Mixer_Not_Used = 0
                Playback_Mixer_Wave_Out = 0xff
                Playback_Mixer_Microphone = 0
                Playback_Mixer_Line_In = 0
                Playback_Mixer_Synthesizer = 0
                Playback_Mixer_Aux_CD = 255
                Playback_Mixer_AuxB = 0
                Record_Mixer_Wave_Out_1887 = 0
                Record_Mixer_Microphone = 0
                Record_Mixer_Line_In = 0
                Record_Mixer_Synthesizer_1887 = 0
                Record_Mixer_Aux_CD = 255
                Record_Mixer_AuxB = 0
                Pc_Speaker = 1
                Input_Source = MIC
                Record_Volume = 12
                Master_Volume_Left = 0x20
                Master_Volume_Right = 0x20
                Microphone_Preamp_Enable = 0
```

sysconfig_tpchorc3 (Node 3)

```
generic:
 memberid=3
 msgbuf_size=1048576
 new_vers_high=1445664276479072064
 new_vers_low=51969
 act_vers_high =1445664276479072064
 act_vers_low=51969
 rolls_ver_lookup=0
        version_vendor = Compaq Computer Corporation
        version_avendor = COMPAQ
        version_product = Tru64 UNIX
        version_banner = Compaq Tru64 UNIX
        locktype = 0
        replicate_text = 1
        dump_user_pte_pages = 1
        dump_kernel_text = 1
        live_dump_zero_suppress = 0

vm:
 swapdevice=/dev/disk/dsk60b
 vm_page_free_reserved=20
 vm_page_free_min=30
        vm_swap_eager=0
        dump_user_pte_pages = 1
        new_wire_method = 1
        replicate_user_text = 1
        ubc_minpercent=5
        ubc_maxpercent=10
 gh_chunks = 2750

rdg:
```

```
        max_objs=8960
        max_async_req=1000
        msg_size=32768

inet:
        udp_recvspace=65535
        udp_sendspace=65535

lsm:
 lsm_rootdev_is_volume=0
        Enable_LSM_Stats = 1

rt:
        aio_task_max_num = 2048

io:
        basic_dma_window_size = 2048

proc:
        give_boost = 0
        max_per_proc_stack_size = 33554432
        max_per_proc_address_space = 128000000000
        max_per_proc_data_size = 128000000000
        max_proc_per_user = 2048
        max_threads_per_user = 2048
        per_proc_address_space = 128000000000
        per_proc_data_size = 128000000000

ipc:
        msg_max = 32768
        msg_mnb = 30000
        msg_mni = 256
        msg_tql = 1024
        sem_aem = 32768
        sem_mni = 1024
        sem_msl = 2000
        sem_opm = 2000
        sem_ume = 2000
        sem_vmx = 320000
        shm_max = 32212254720
        shm_mni = 1024
        shm_seg = 512
        ssm_threshold = 0
        shm_allocate_striped = 1

clubase:
 cluster_expected_votes=1
 cluster_name=tpchorch
 cluster_node_name=tpchorc3
 cluster_node_inter_name=tpchorc3-ics0
 cluster_node_votes=0
 cluster_interconnect=mct
 cluster_seqdisk_major=19
 cluster_seqdisk_minor=1080
 cluster_qdisk_major=0
 cluster_qdisk_minor=0
 cluster_qdisk_votes=0

sec:
 acl_mode = disable

per:
                Module_Config_Name = per
                PER_Developer_Debug = 0
                PCI_Option = PCI_SE_Rev - 0x210, Vendor_Id - 0x10ba, Device_Id -
0x304, Vid_Mo_Flag - 1, Did_Mo_Flag - 1, Rev_Mo_Flag - 0, Base_Mo_Flag - 0,
Sub_Mo_Flag - 0, Pif_Mo_Flag - 0, Sub_Vid_Mo_Flag - 0, Sub_Did_Mo_Flag - 0,
Driver_Name - per, Type - C, Adpt_Config - N

aud97:
                Subsystem_Description = Creative Ensoniq Audio
                Device_Major_Req = Same
                Device_Char_Major = ANY
                Device_Char_Files = aud97
                Device_Char_Minor = 0
                Module_Config_Name = aud97
                AUD97_Developer_Debug = 0
                Num_Installed = 1
                PCI_Option =  PCI_SE_Rev - 0x210, Vendor_Id - 0x1274, Device_Id -
0x1371, Rev - 0, Base - 0, Sub - 0, Pif - 0 Sub_Vid - 0, Sub_Did - 0, Vid_Mo_Flag -
1, Did_Mo_Flag - 1, Rev_Mo_Flag - 0, Base_Mo_Flag - 0, Sub_Mo_Flag - 0,
Pif_Mo_Flag - 0, Sub_Vid_Mo_Flag - 0, Sub_Did_Mo_Flag - 0, Driver_Name -
aud97, Type - C, Adpt_Config - N
                CMA_Option = Size - 0x40000, Alignment - 0x10000, Addrlimit - 0,
Type - 29, Flag - 1

mmsess:
        Subsystem_Description = ESS Tech. 1888/1887 audio driver
        Device_Major_Req = Same
        Device_Char_Major = ANY
        Device_Char_Files = mmsess0
        Device_Char_Minor = 0
        Module_Config_Name = mmsess
        Mmsess_Developer_Debug = 0
        Num_Installed = 1
        ISA_Option =  Board_Id - Null, Function_Name - 'ES1888' , Driver_Name -
mmsess, Type - C, Adpt_Config - N
        EISA_Option =  Board_Id - ISA2100, Function_Name - Null, Driver_Name -
mmsess, Type - C, Adpt_Config - N
                CMA_Option = Size - 0x40000, Alignment - 0x10000, Addrlimit - 0,
Type - 29, Flag - 1
                Playback_DMA_Channel_Override = -1
                Playback_Mixer_Not_Used = 0
                Playback_Mixer_Wave_Out = 0xff
                Playback_Mixer_Microphone = 0
                Playback_Mixer_Line_In = 0
                Playback_Mixer_Synthesizer = 0
                Playback_Mixer_Aux_CD = 255
                Playback_Mixer_AuxB = 0
                Record_Mixer_Wave_Out_1887 = 0
                Record_Mixer_Microphone = 0
                Record_Mixer_Line_In = 0
                Record_Mixer_Synthesizer_1887 = 0
                Record_Mixer_Aux_CD = 255
                Record_Mixer_AuxB = 0
                Pc_Speaker = 1
                Input_Source = MIC
                Record_Volume = 12
                Master_Volume_Left = 0x20
                Master_Volume_Right = 0x20
                Microphone_Preamp_Enable = 0
```

sysconfig_tpchorc4 (Node 4)

```
generic:
 memberid=4
 msgbuf_size=1048576
 new_vers_high=1445664276479072064
 new_vers_low=51969
 act_vers_high =1445664276479072064
 act_vers_low=51969
 rolls_ver_lookup=0
        version_vendor = Compaq Computer Corporation
        version_avendor = COMPAQ
        version_product = Tru64 UNIX
        version_banner = Compaq Tru64 UNIX
        locktype = 0
        replicate_text = 1
        dump_user_pte_pages = 1
        dump_kernel_text = 1
        live_dump_zero_suppress = 0

vm:
 swapdevice=/dev/disk/dsk62b
 vm_page_free_reserved=20
 vm_page_free_min=30
        vm_swap_eager=0
        dump_user_pte_pages = 1
        new_wire_method = 1
        replicate_user_text = 1
        ubc_minpercent=5
        ubc_maxpercent=10
 gh_chunks = 2750

rdg:
        max_objs=8960
```

```
        max_async_req=1000
        msg_size=32768

inet:
        udp_recvspace=65535
        udp_sendspace=65535

lsm:
 lsm_rootdev_is_volume=0
        Enable_LSM_Stats = 1

rt:
        aio_task_max_num = 2048

io:
        basic_dma_window_size = 2048

proc:
        give_boost = 0
        max_per_proc_stack_size = 33554432
        max_per_proc_address_space = 128000000000
        max_per_proc_data_size = 128000000000
        max_proc_per_user = 2048
        max_threads_per_user = 2048
        per_proc_address_space = 128000000000
        per_proc_data_size = 128000000000

ipc:
        msg_max = 32768
        msg_mnb = 30000
        msg_mni = 256
        msg_tql = 1024
        sem_aem = 32768
        sem_mni = 1024
        sem_msl = 2000
        sem_opm = 2000
        sem_ume = 2000
        sem_vmx = 320000
        shm_max = 32212254720
        shm_mni = 1024
        shm_seg = 512
        ssm_threshold = 0
        shm_allocate_striped = 1

clubase:
 cluster_expected_votes=1
 cluster_name=tpchorch
 cluster_node_name=tpchorc4
 cluster_node_inter_name=tpchorc4-ics0
 cluster_node_votes=0
 cluster_interconnect=mct
 cluster_seqdisk_major=19
 cluster_seqdisk_minor=1144
 cluster_qdisk_major=0
 cluster_qdisk_minor=0
 cluster_qdisk_votes=0

sec:
 acl_mode = disable

per:
                Module_Config_Name = per
                PER_Developer_Debug = 0
                PCI_Option = PCI_SE_Rev - 0x210, Vendor_Id - 0x10ba, Device_Id -
0x304, Vid_Mo_Flag - 1, Did_Mo_Flag - 1, Rev_Mo_Flag - 0, Base_Mo_Flag - 0,
Sub_Mo_Flag - 0, Pif_Mo_Flag - 0, Sub_Vid_Mo_Flag - 0, Sub_Did_Mo_Flag - 0,
Driver_Name - per, Type - C, Adpt_Config - N

aud97:
                Subsystem_Description = Creative Ensoniq Audio
                Device_Major_Req = Same
                Device_Char_Major = ANY
                Device_Char_Files = aud97
                Device_Char_Minor = 0
                Module_Config_Name = aud97
                AUD97_Developer_Debug = 0
                Num_Installed = 1
                PCI_Option =  PCI_SE_Rev - 0x210, Vendor_Id - 0x1274, Device_Id -
0x1371, Rev - 0, Base - 0, Sub - 0, Pif - 0 Sub_Vid - 0, Sub_Did - 0, Vid_Mo_Flag -
1, Did_Mo_Flag - 1, Rev_Mo_Flag - 0, Base_Mo_Flag - 0, Sub_Mo_Flag - 0,
Pif_Mo_Flag - 0, Sub_Vid_Mo_Flag - 0, Sub_Did_Mo_Flag - 0, Driver_Name -
aud97, Type - C, Adpt_Config - N
                CMA_Option = Size - 0x40000, Alignment - 0x10000, Addrlimit - 0,
Type - 29, Flag - 1

mmsess:
        Subsystem_Description = ESS Tech. 1888/1887 audio driver
        Device_Major_Req = Same
        Device_Char_Major = ANY
        Device_Char_Files = mmsess0
        Device_Char_Minor = 0
        Module_Config_Name = mmsess
        Mmsess_Developer_Debug = 0
        Num_Installed = 1
        ISA_Option =  Board_Id - Null, Function_Name - 'ES1888' , Driver_Name -
mmsess, Type - C, Adpt_Config - N
        EISA_Option =  Board_Id - ISA2100, Function_Name - Null, Driver_Name -
mmsess, Type - C, Adpt_Config - N
                CMA_Option = Size - 0x40000, Alignment - 0x10000, Addrlimit - 0,
Type - 29, Flag - 1
                Playback_DMA_Channel_Override = -1
                Playback_Mixer_Not_Used = 0
                Playback_Mixer_Wave_Out = 0xff
                Playback_Mixer_Microphone = 0
                Playback_Mixer_Line_In = 0
                Playback_Mixer_Synthesizer = 0
                Playback_Mixer_Aux_CD = 255
                Playback_Mixer_AuxB = 0
                Record_Mixer_Wave_Out_1887 = 0
                Record_Mixer_Microphone = 0
                Record_Mixer_Line_In = 0
                Record_Mixer_Synthesizer_1887 = 0
                Record_Mixer_Aux_CD = 255
                Record_Mixer_AuxB = 0
                Pc_Speaker = 1
                Input_Source = MIC
                Record_Volume = 12
                Master_Volume_Left = 0x20
                Master_Volume_Right = 0x20
                Microphone_Preamp_Enable = 0
```

Appendix B: Scripts and Programs

Database Create and Load

create_database_4node.sh

```
#!/bin/ksh
#
# Create 100GB Oracle TPC-H Database - Compaq Computer Corporation
# Performance Engineer: Eric L. Speed
#
date
sqlplus <<EOF
/ as sysdba
set echo on
spool create_database_4node_spool.log
startup nomount pfile= $SF/control_files/dbcreate.ora ;
create database tpch
  controlfile reuse
  logfile  '$LINKS/redolog1' size  3303m reuse,
           '$LINKS/redolog2' size  3303m reuse,
           '$LINKS/redolog3' size  3303m reuse
         datafile '$LINKS/system1'  size  3303m reuse
  undo tablespace ts_undo1 datafile '$SF/links/ts_undo1'  size 3303m reuse
  maxdatafiles 750
maxinstances 4;

alter tablespace ts_undo1 add datafile '$SF/links/ts_undo2'  size 3303m reuse;

-- The next lines are added for the 2nd instance's redolog files

alter database add logfile thread 2 '$LINKS/redolog4'  size  3303m reuse;
alter database add logfile thread 2  '$LINKS/redolog5'  size  3303m reuse;
alter database add logfile thread 2  '$LINKS/redolog6'  size  3303m reuse;

alter database add logfile thread 3 '$LINKS/redolog7'  size  3303m reuse;
alter database add logfile thread 3 '$LINKS/redolog8'  size  3303m reuse;
alter database add logfile thread 3 '$LINKS/redolog9'  size  3303m reuse;

alter database add logfile thread 4 '$LINKS/redolog10'  size  3303m reuse;
alter database add logfile thread 4 '$LINKS/redolog11'  size  3303m reuse;
alter database add logfile thread 4 '$LINKS/redolog12'  size  3303m reuse;

alter database enable public thread 2;
alter database enable public thread 3;
alter database enable public thread 4;

alter tablespace system add datafile  '$SF/links/system2' size  3303m reuse;
alter tablespace system add datafile  '$SF/links/system3' size  3303m reuse;
alter tablespace system add datafile  '$SF/links/system4' size  3303m reuse;

create undo tablespace ts_undo2 datafile '$SF/links/ts_undo3'  size 3303m reuse;
alter tablespace ts_undo2 add datafile '$SF/links/ts_undo4'  size 3303m reuse;

create undo tablespace ts_undo3 datafile '$SF/links/ts_undo5'  size 3303m reuse;
alter tablespace ts_undo3 add datafile '$SF/links/ts_undo6'  size 3303m reuse;

create undo tablespace ts_undo4 datafile '$SF/links/ts_undo7'  size 3303m reuse;
alter tablespace ts_undo4 add datafile '$SF/links/ts_undo8'  size 3303m reuse;

-- Building data dictionary

set termout off
set echo off
@$ORACLE_HOME/rdbms/admin/catalog.sql;
@$ORACLE_HOME/rdbms/admin/catparr.sql;
@$ORACLE_HOME/rdbms/admin/catproc.sql;
exit;
EOF

sqlplus system/manager <<EOF
drop user tpcd cascade;
grant DBA
  to tpcd identified by tpcd;

@$ORACLE_HOME/rdbms/admin/utlxplan.sql;
@$ORACLE_HOME/sqlplus/admin/pupbld.sql;
exit;
EOF

sqlplus <<EOF
/ as sysdba
set echo on
set termout on
@$SF/schema_load/create_tablespace_schema.sql
@$SF/schema_load/create_tablespace_orders.sql
@$SF/schema_load/create_tablespace_lineitem.sql
exit;
EOF

sqlplus tpcd/tpcd <<EOF
@$SF/schema_load/create_tables_all_et.sql
@$ORACLE_HOME/rdbms/admin/utlxplan.sql;
exit;
EOF

sqlplus system/manager <<EOF
alter user tpcd temporary tablespace ts_temp;
alter user tpcd default tablespace ts_s;
spool off
exit;
EOF
date
```

create_tablespace_lineitem.sql

```
set echo on ;

-- tablespace ts_l1 thru ts_l12 are for the LineItem Partitions

drop tablespace ts_l1 including contents;
create tablespace ts_l1 datafile '$SF/links/ts_l1_1' size 10240m reuse
;
drop tablespace ts_l2 including contents;
create tablespace ts_l2 datafile '$SF/links/ts_l2_1' size 10240m reuse
;
drop tablespace ts_l3 including contents;
create tablespace ts_l3 datafile '$SF/links/ts_l3_1' size 10240m reuse
;
drop tablespace ts_l4 including contents;
create tablespace ts_l4 datafile '$SF/links/ts_l4_1' size 10240m reuse
;
drop tablespace ts_l5 including contents;
create tablespace ts_l5 datafile '$SF/links/ts_l5_1' size 10240m reuse
;
drop tablespace ts_l6 including contents;
create tablespace ts_l6 datafile '$SF/links/ts_l6_1' size 10240m reuse
;
drop tablespace ts_l7 including contents;
create tablespace ts_l7 datafile '$SF/links/ts_l7_1' size 10240m reuse
;
drop tablespace ts_l8 including contents;
create tablespace ts_l8 datafile '$SF/links/ts_l8_1' size 10240m reuse
;
drop tablespace ts_l9 including contents;
create tablespace ts_l9 datafile '$SF/links/ts_l9_1' size 10240m reuse
;
drop tablespace ts_l10 including contents;
create tablespace ts_l10 datafile '$SF/links/ts_l10_1' size 10240m reuse
;
drop tablespace ts_l11 including contents;
create tablespace ts_l11 datafile '$SF/links/ts_l11_1' size 10240m reuse
;
drop tablespace ts_l12 including contents;
create tablespace ts_l12 datafile '$SF/links/ts_l12_1' size 10240m reuse
;
alter tablespace ts_l1 add datafile '$SF/links/ts_l1_2' size 10240m reuse;
alter tablespace ts_l2 add datafile '$SF/links/ts_l2_2' size 10240m reuse;
alter tablespace ts_l3 add datafile '$SF/links/ts_l3_2' size 10240m reuse;
alter tablespace ts_l4 add datafile '$SF/links/ts_l4_2' size 10240m reuse;
```

```
alter tablespace ts_l5 add datafile '$SF/links/ts_l5_2' size 10240m reuse;
alter tablespace ts_l6 add datafile '$SF/links/ts_l6_2' size 10240m reuse;
alter tablespace ts_l7 add datafile '$SF/links/ts_l7_2' size 10240m reuse;
alter tablespace ts_l8 add datafile '$SF/links/ts_l8_2' size 10240m reuse;
alter tablespace ts_l9 add datafile '$SF/links/ts_l9_2' size 10240m reuse;
alter tablespace ts_l10 add datafile '$SF/links/ts_l10_2' size 10240m reuse;
alter tablespace ts_l11 add datafile '$SF/links/ts_l11_2' size 10240m reuse;
alter tablespace ts_l12 add datafile '$SF/links/ts_l12_2' size 10240m reuse;
```

create_tablespace_orders.sql

```
set echo on ;
-- tablespace ts_o1 thru ts_o12 are for the Orders Partitions

drop tablespace ts_o1 including contents;
create tablespace ts_o1 datafile '$SF/links/ts_o1_1' size 2400m reuse;
drop tablespace ts_o2 including contents;
create tablespace ts_o2 datafile '$SF/links/ts_o2_1' size 2400m reuse;
drop tablespace ts_o3 including contents;
create tablespace ts_o3 datafile '$SF/links/ts_o3_1' size 2400m reuse;
drop tablespace ts_o4 including contents;
create tablespace ts_o4 datafile '$SF/links/ts_o4_1' size 2400m reuse;
drop tablespace ts_o5 including contents;
create tablespace ts_o5 datafile '$SF/links/ts_o5_1' size 2400m reuse;
drop tablespace ts_o6 including contents;
create tablespace ts_o6 datafile '$SF/links/ts_o6_1' size 2400m reuse;
drop tablespace ts_o7 including contents;
create tablespace ts_o7 datafile '$SF/links/ts_o7_1' size 2400m reuse;
drop tablespace ts_o8 including contents;
create tablespace ts_o8 datafile '$SF/links/ts_o8_1' size 2400m reuse;
drop tablespace ts_o9 including contents;
create tablespace ts_o9 datafile '$SF/links/ts_o9_1' size 2400m reuse;
drop tablespace ts_o10 including contents;
create tablespace ts_o10 datafile '$SF/links/ts_o10_1' size 2400m reuse;
drop tablespace ts_o11 including contents;
create tablespace ts_o11 datafile '$SF/links/ts_o11_1' size 2400m reuse;
drop tablespace ts_o12 including contents;
create tablespace ts_o12 datafile '$SF/links/ts_o12_1' size 2400m reuse;
alter tablespace ts_o1 add datafile '$SF/links/ts_o1_2' size 2400m reuse;
alter tablespace ts_o2 add datafile '$SF/links/ts_o2_2' size 2400m reuse;
alter tablespace ts_o3 add datafile '$SF/links/ts_o3_2' size 2400m reuse;
alter tablespace ts_o4 add datafile '$SF/links/ts_o4_2' size 2400m reuse;
alter tablespace ts_o5 add datafile '$SF/links/ts_o5_2' size 2400m reuse;
alter tablespace ts_o6 add datafile '$SF/links/ts_o6_2' size 2400m reuse;
alter tablespace ts_o7 add datafile '$SF/links/ts_o7_2' size 2400m reuse;
alter tablespace ts_o8 add datafile '$SF/links/ts_o8_2' size 2400m reuse;
alter tablespace ts_o9 add datafile '$SF/links/ts_o9_2' size 2400m reuse;
alter tablespace ts_o10 add datafile '$SF/links/ts_o10_2' size 2400m reuse;
alter tablespace ts_o11 add datafile '$SF/links/ts_o11_2' size 2400m reuse;
alter tablespace ts_o12 add datafile '$SF/links/ts_o12_2' size 2400m reuse;
```

create_tablespace_schema.sql

```
--
-- Schema Tablespace Creation Phase
-- 100GB Schema
--  Edit History
--
--  ELS        24-May-2002  Create.
--
set echo on ;

-- Creating tablespaces

drop tablespace ts_s including contents;
create tablespace ts_s
                datafile '$SF/links/ts_s1' size 5120m reuse
                extent management local
                autoallocate;
alter tablespace ts_s add datafile '$SF/links/ts_s2' size 5120m reuse;

drop tablespace ts_c including contents;
create tablespace ts_c
                datafile '$SF/links/ts_c1' size 5120m reuse
                extent management local
                autoallocate;
alter tablespace ts_c add datafile '$SF/links/ts_c2' size 5120m reuse;

drop tablespace ts_ps including contents;
create tablespace ts_ps
                datafile '$SF/links/ts_ps1' size 5120m reuse
                extent management local
                autoallocate;

alter tablespace ts_ps add datafile '$SF/links/ts_ps2'  size 5120m reuse;
alter tablespace ts_ps add datafile '$SF/links/ts_ps3'  size 5120m reuse;
alter tablespace ts_ps add datafile '$SF/links/ts_ps4'  size 5120m reuse;
alter tablespace ts_ps add datafile '$SF/links/ts_ps5'  size 5120m reuse;
alter tablespace ts_ps add datafile '$SF/links/ts_ps6'  size 5120m reuse;
alter tablespace ts_ps add datafile '$SF/links/ts_ps7'  size 5120m reuse;
alter tablespace ts_ps add datafile '$SF/links/ts_ps8'  size 5120m reuse;

drop tablespace ts_p including contents;
create tablespace ts_p
                datafile '$SF/links/ts_p1' size 5120m reuse
                extent management local
                autoallocate;
alter tablespace ts_p add datafile '$SF/links/ts_p2' size 5120m reuse;
alter tablespace ts_p add datafile '$SF/links/ts_p3' size 5120m reuse;
alter tablespace ts_p add datafile '$SF/links/ts_p4' size 5120m reuse;

drop tablespace ts_i_l including contents;
create tablespace ts_i_l
                datafile '$SF/links/ts_i_l1' size 5120m reuse
                extent management local
                autoallocate;
alter tablespace ts_i_l add datafile '$SF/links/ts_i_l2' size 5120m reuse;
alter tablespace ts_i_l add datafile '$SF/links/ts_i_l3' size 5120m reuse;
alter tablespace ts_i_l add datafile '$SF/links/ts_i_l4' size 5120m reuse;

-- creating tpcd's ts_i_o tablespace

drop tablespace ts_i_o including contents;
create tablespace ts_i_o
                datafile '$SF/links/ts_i_o1' size 5120m reuse
                extent management local
                autoallocate;
alter tablespace ts_i_o add datafile '$SF/links/ts_i_o2' size 5120m reuse;
alter tablespace ts_i_o add datafile '$SF/links/ts_i_o3' size 5120m reuse;
alter tablespace ts_i_o add datafile '$SF/links/ts_i_o4' size 5120m reuse;

drop tablespace ts_i_ps including contents;
create tablespace ts_i_ps
                datafile '$SF/links/ts_i_ps1' size 5120m reuse
                extent management local
                autoallocate;
alter tablespace ts_i_ps add datafile '$SF/links/ts_i_ps2' size 5120m reuse;
alter tablespace ts_i_ps add datafile '$SF/links/ts_i_ps3' size 5120m reuse;
alter tablespace ts_i_ps add datafile '$SF/links/ts_i_ps4' size 5120m reuse;

drop tablespace ts_i_c including contents;
create tablespace ts_i_c
                datafile '$SF/links/ts_i_c1' size 5120m reuse
                extent management local
                autoallocate;
alter tablespace ts_i_c add datafile '$SF/links/ts_i_c2' size 5120m reuse;

drop tablespace ts_temp including contents;
create temporary tablespace ts_temp tempfile '$SF/links/ts_temp1'size 8192m reuse;
alter tablespace ts_temp add tempfile '$SF/links/ts_temp2'  size 8192m reuse;
alter tablespace ts_temp add tempfile '$SF/links/ts_temp3'  size 8192m reuse;
alter tablespace ts_temp add tempfile '$SF/links/ts_temp4'  size 8192m reuse;
alter tablespace ts_temp add tempfile '$SF/links/ts_temp5'  size 8192m reuse;
alter tablespace ts_temp add tempfile '$SF/links/ts_temp6'  size 8192m reuse;
alter tablespace ts_temp add tempfile '$SF/links/ts_temp7'  size 8192m reuse;
alter tablespace ts_temp add tempfile '$SF/links/ts_temp8'  size 8192m reuse;
alter tablespace ts_temp add tempfile '$SF/links/ts_temp9'  size 8192m reuse;
alter tablespace ts_temp add tempfile '$SF/links/ts_temp10' size 8192m reuse;
alter tablespace ts_temp add tempfile '$SF/links/ts_temp11' size 8192m reuse;
alter tablespace ts_temp add tempfile '$SF/links/ts_temp12' size 8192m reuse;
alter tablespace ts_temp add tempfile '$SF/links/ts_temp13' size 8192m reuse;
alter tablespace ts_temp add tempfile '$SF/links/ts_temp14' size 8192m reuse;
alter tablespace ts_temp add tempfile '$SF/links/ts_temp15' size 8192m reuse;
alter tablespace ts_temp add tempfile '$SF/links/ts_temp16' size 8192m reuse;
alter tablespace ts_temp add tempfile '$SF/links/ts_temp17' size 8192m reuse;
alter tablespace ts_temp add tempfile '$SF/links/ts_temp18' size 8192m reuse;
alter tablespace ts_temp add tempfile '$SF/links/ts_temp19' size 8192m reuse;
```

```
alter tablespace ts_temp add tempfile '$SF/links/ts_temp20' size 8192m reuse;
alter tablespace ts_temp add tempfile '$SF/links/ts_temp21' size 8192m reuse;
alter tablespace ts_temp add tempfile '$SF/links/ts_temp22' size 8192m reuse;
alter tablespace ts_temp add tempfile '$SF/links/ts_temp23' size 8192m reuse;
alter tablespace ts_temp add tempfile '$SF/links/ts_temp24' size 8192m reuse;
alter tablespace ts_temp add tempfile '$SF/links/ts_temp25' size 8192m reuse;
alter tablespace ts_temp add tempfile '$SF/links/ts_temp26' size 8192m reuse;
alter tablespace ts_temp add tempfile '$SF/links/ts_temp27' size 8192m reuse;
alter tablespace ts_temp add tempfile '$SF/links/ts_temp28' size 8192m reuse;
alter tablespace ts_temp add tempfile '$SF/links/ts_temp29' size 8192m reuse;
alter tablespace ts_temp add tempfile '$SF/links/ts_temp30' size 8192m reuse;
alter tablespace ts_temp add tempfile '$SF/links/ts_temp31' size 8192m reuse;
alter tablespace ts_temp add tempfile '$SF/links/ts_temp32' size 8192m reuse;
alter tablespace ts_temp add tempfile '$SF/links/ts_temp33' size 8192m reuse;
alter tablespace ts_temp add tempfile '$SF/links/ts_temp34' size 8192m reuse;
alter tablespace ts_temp add tempfile '$SF/links/ts_temp35' size 8192m reuse;
alter tablespace ts_temp add tempfile '$SF/links/ts_temp36' size 8192m reuse;
```

create_tables_all_et.sql

```
drop directory data_dir;
create directory data_dir as '/flatfiles';

drop table lineitem_et;
create table lineitem_et (
   l_shipdate          date ,
   l_orderkey          number ,
   l_discount          number ,
   l_extendedprice     number ,
   l_suppkey           number ,
   l_quantity          number ,
   l_returnflag        char(1) ,
   l_partkey           number ,
   l_linestatus        char(1) ,
   l_tax               number ,
   l_commitdate        date ,
   l_receiptdate       date ,
   l_shipmode          char(10) ,
   l_linenumber        number ,
   l_shipinstruct      char(25) ,
   l_comment           varchar(44)
)
organization external (
type ORACLE_LOADER
default directory data_dir
access parameters
(
      records delimited by newline
      nobadfile
      nologfile
      nodiscardfile
      fields terminated by '|'
      missing field values are null
)
location (
'lineitem.tbl.1','lineitem.tbl.2','lineitem.tbl.3',
'lineitem.tbl.4','lineitem.tbl.5','lineitem.tbl.6',
'lineitem.tbl.7','lineitem.tbl.8','lineitem.tbl.9',
'lineitem.tbl.10','lineitem.tbl.11','lineitem.tbl.12',
'lineitem.tbl.13','lineitem.tbl.14','lineitem.tbl.15',
'lineitem.tbl.16'
))reject limit unlimited;
alter table lineitem_et parallel;

drop table orders_et;
create table orders_et (
   o_orderdate         date ,
   o_orderkey          number ,
   o_custkey           number ,
   o_orderpriority     char(15) ,
   o_shippriority      number ,
   o_clerk             char(15) ,
   o_orderstatus       char(1) ,
   o_totalprice        number ,
   o_comment           varchar(79)
)
organization external (
type ORACLE_LOADER
default directory data_dir
access parameters
(
      records delimited by newline
      nobadfile
      nologfile
      nodiscardfile
      fields terminated by '|'
      missing field values are null
)
location (
'orders.tbl.1','orders.tbl.2','orders.tbl.3',
'orders.tbl.4','orders.tbl.5','orders.tbl.6',
'orders.tbl.7','orders.tbl.8','orders.tbl.9',
'orders.tbl.10','orders.tbl.11','orders.tbl.12',
'orders.tbl.13','orders.tbl.14','orders.tbl.15',
'orders.tbl.16'
))reject limit unlimited;
alter table orders_et parallel;


drop table part_et;
create table part_et (
   p_partkey           number ,
   p_type              varchar(25) ,
   p_size              number ,
   p_brand             char(10) ,
   p_name              varchar(55) ,
   p_container         char(10) ,
   p_mfgr              char(25) ,
   p_retailprice       number ,
   p_comment           varchar(23)
)
organization external (
type ORACLE_LOADER
default directory data_dir
access parameters
(
      records delimited by newline
      nobadfile
      nologfile
      nodiscardfile
      fields terminated by '|'
      missing field values are null
)
location (
'part.tbl.1','part.tbl.2','part.tbl.3',
'part.tbl.4','part.tbl.5','part.tbl.6',
'part.tbl.7','part.tbl.8','part.tbl.9',
'part.tbl.10','part.tbl.11','part.tbl.12',
'part.tbl.13','part.tbl.14','part.tbl.15',
'part.tbl.16'
))reject limit unlimited;
alter table part_et parallel;

drop table partsupp_et;
create table partsupp_et (
   ps_partkey          number ,
   ps_suppkey          number ,
   ps_supplycost       number ,
   ps_availqty         number ,
   ps_comment          varchar(199)
)
organization external (
type ORACLE_LOADER
default directory data_dir
access parameters
(
      records delimited by newline
      nobadfile
      nologfile
      nodiscardfile
      fields terminated by '|'
      missing field values are null
)
location (
'partsupp.tbl.1','partsupp.tbl.2','partsupp.tbl.3',
'partsupp.tbl.4','partsupp.tbl.5','partsupp.tbl.6',
'partsupp.tbl.7','partsupp.tbl.8','partsupp.tbl.9',
```

```
'partsupp.tbl.10','partsupp.tbl.11','partsupp.tbl.12',
'partsupp.tbl.13','partsupp.tbl.14','partsupp.tbl.15',
'partsupp.tbl.16'
))reject limit unlimited;
alter table partsupp_et parallel;

drop table supplier_et;
create table supplier_et (
   s_suppkey          number ,
   s_nationkey        number ,
   s_comment          varchar(101) ,
   s_name             char(25) ,
   s_address          varchar(40) ,
   s_phone            char(15) ,
   s_acctbal          number
)
organization external (
type ORACLE_LOADER
default directory data_dir
access parameters
(
      records delimited by newline
      nobadfile
      nologfile
      nodiscardfile
      fields terminated by '|'
      missing field values are null
)
location (
'supplier.tbl.1','supplier.tbl.2','supplier.tbl.3',
'supplier.tbl.4','supplier.tbl.5','supplier.tbl.6',
'supplier.tbl.7','supplier.tbl.8','supplier.tbl.9',
'supplier.tbl.10','supplier.tbl.11','supplier.tbl.12',
'supplier.tbl.13','supplier.tbl.14','supplier.tbl.15',
'supplier.tbl.16'
))reject limit unlimited;
alter table supplier_et parallel;


drop table customer_et;
create table customer_et (
   c_custkey          number ,
   c_mktsegment       char(10) ,
   c_nationkey        number ,
   c_name             varchar(25) ,
   c_address          varchar(40) ,
   c_phone            char(15) ,
   c_acctbal          number ,
   c_comment          varchar(117)
)
organization external (
type ORACLE_LOADER
default directory data_dir
access parameters
(
      records delimited by newline
      nobadfile
      nologfile
      nodiscardfile
      fields terminated by '|'
      missing field values are null
)
location (
'customer.tbl.1','customer.tbl.2','customer.tbl.3',
'customer.tbl.4','customer.tbl.5','customer.tbl.6',
'customer.tbl.7','customer.tbl.8','customer.tbl.9',
'customer.tbl.10','customer.tbl.11','customer.tbl.12',
'customer.tbl.13','customer.tbl.14','customer.tbl.15',
'customer.tbl.16'
))reject limit unlimited;
alter table customer_et parallel;

drop table nation_et;
create table nation_et (
   n_nationkey        number ,
   n_name             char(25) ,
   n_regionkey        number ,
   n_comment          varchar(152)
)
organization external (
type ORACLE_LOADER
default directory data_dir
access parameters
(
      records delimited by newline
      nobadfile
      nologfile
      nodiscardfile
      fields terminated by '|'
      missing field values are null
)
location (
'nation.tbl'
))reject limit unlimited;
alter table nation_et parallel;


drop table region_et;
create table region_et (
   r_regionkey        number ,
   r_name             char(25) ,
   r_comment          varchar(152)
)
organization external (
type ORACLE_LOADER
default directory data_dir
access parameters
(
      records delimited by newline
      nobadfile
      nologfile
      nodiscardfile
      fields terminated by '|'
      missing field values are null
)
location (
'region.tbl'
))reject limit unlimited;
alter table region_et parallel;
```

dbgen_flatfiles.sh

```
#!/bin/ksh

#########################################################################
########
# Data (Flat File) Generation Phase
#########################################################################
########

# Lineitem Table Flatfile Generation

dbgen -f -T L -s 100 -C 16 -S 1 &
dbgen -f -T L -s 100 -C 16 -S 2 &
dbgen -f -T L -s 100 -C 16 -S 3 &
dbgen -f -T L -s 100 -C 16 -S 4 &
dbgen -f -T L -s 100 -C 16 -S 5 &
dbgen -f -T L -s 100 -C 16 -S 6 &
dbgen -f -T L -s 100 -C 16 -S 7 &
dbgen -f -T L -s 100 -C 16 -S 8 &
wait

dbgen -f -T L -s 100 -C 16 -S 9 &
dbgen -f -T L -s 100 -C 16 -S 10 &
dbgen -f -T L -s 100 -C 16 -S 11 &
dbgen -f -T L -s 100 -C 16 -S 12 &
dbgen -f -T L -s 100 -C 16 -S 13 &
dbgen -f -T L -s 100 -C 16 -S 14 &
dbgen -f -T L -s 100 -C 16 -S 15 &
dbgen -f -T L -s 100 -C 16 -S 16 &
wait

# Orders Table Flatfile Generation

dbgen -f -T O -s 100 -C 16 -S 1 &
dbgen -f -T O -s 100 -C 16 -S 2 &
dbgen -f -T O -s 100 -C 16 -S 3 &
```

```
dbgen -f -T O -s 100 -C 16 -S 4 &
dbgen -f -T O -s 100 -C 16 -S 5 &
dbgen -f -T O -s 100 -C 16 -S 6 &
dbgen -f -T O -s 100 -C 16 -S 7 &
dbgen -f -T O -s 100 -C 16 -S 8 &
wait

dbgen -f -T O -s 100 -C 16 -S 9 &
dbgen -f -T O -s 100 -C 16 -S 10 &
dbgen -f -T O -s 100 -C 16 -S 11 &
dbgen -f -T O -s 100 -C 16 -S 12 &
dbgen -f -T O -s 100 -C 16 -S 13 &
dbgen -f -T O -s 100 -C 16 -S 14 &
dbgen -f -T O -s 100 -C 16 -S 15 &
dbgen -f -T O -s 100 -C 16 -S 16 &
wait

# Part Table Flatfile Generation

dbgen -f -T P -s 100 -C 16 -S 1 &
dbgen -f -T P -s 100 -C 16 -S 2 &
dbgen -f -T P -s 100 -C 16 -S 3 &
dbgen -f -T P -s 100 -C 16 -S 4 &
dbgen -f -T P -s 100 -C 16 -S 5 &
dbgen -f -T P -s 100 -C 16 -S 6 &
dbgen -f -T P -s 100 -C 16 -S 7 &
dbgen -f -T P -s 100 -C 16 -S 8 &
wait

dbgen -f -T P -s 100 -C 16 -S 9 &
dbgen -f -T P -s 100 -C 16 -S 10 &
dbgen -f -T P -s 100 -C 16 -S 11 &
dbgen -f -T P -s 100 -C 16 -S 12 &
dbgen -f -T P -s 100 -C 16 -S 13 &
dbgen -f -T P -s 100 -C 16 -S 14 &
dbgen -f -T P -s 100 -C 16 -S 15 &
dbgen -f -T P -s 100 -C 16 -S 16 &
wait

# Partsupp Table Flatfile Generation

dbgen -f -T S -s 100 -C 16 -S 1
dbgen -f -T S -s 100 -C 16 -S 2
dbgen -f -T S -s 100 -C 16 -S 3
dbgen -f -T S -s 100 -C 16 -S 4
dbgen -f -T S -s 100 -C 16 -S 5
dbgen -f -T S -s 100 -C 16 -S 6
dbgen -f -T S -s 100 -C 16 -S 7
dbgen -f -T S -s 100 -C 16 -S 8
dbgen -f -T S -s 100 -C 16 -S 9
dbgen -f -T S -s 100 -C 16 -S 10
dbgen -f -T S -s 100 -C 16 -S 11
dbgen -f -T S -s 100 -C 16 -S 12
dbgen -f -T S -s 100 -C 16 -S 13
dbgen -f -T S -s 100 -C 16 -S 14
dbgen -f -T S -s 100 -C 16 -S 15
dbgen -f -T S -s 1300 -C 16 -S 16

# Supplier Table Flatfile Generation

dbgen -f -T s -s 100 -C 16 -S 1
dbgen -f -T s -s 100 -C 16 -S 2
dbgen -f -T s -s 100 -C 16 -S 3
dbgen -f -T s -s 100 -C 16 -S 4
dbgen -f -T s -s 100 -C 16 -S 5
dbgen -f -T s -s 100 -C 16 -S 6
dbgen -f -T s -s 100 -C 16 -S 7
dbgen -f -T s -s 100 -C 16 -S 8
dbgen -f -T s -s 100 -C 16 -S 9
dbgen -f -T s -s 100 -C 16 -S 10
dbgen -f -T s -s 100 -C 16 -S 11
dbgen -f -T s -s 100 -C 16 -S 12
dbgen -f -T s -s 100 -C 16 -S 13
dbgen -f -T s -s 100 -C 16 -S 14
dbgen -f -T s -s 100 -C 16 -S 15
dbgen -f -T s -s 100 -C 16 -S 16

# Customer Table Flatfile Generation

dbgen -f -T c -s 100 -C 16 -S 1
dbgen -f -T c -s 100 -C 16 -S 2
dbgen -f -T c -s 100 -C 16 -S 3
dbgen -f -T c -s 100 -C 16 -S 4
dbgen -f -T c -s 100 -C 16 -S 5
dbgen -f -T c -s 100 -C 16 -S 6
dbgen -f -T c -s 100 -C 16 -S 7
dbgen -f -T c -s 100 -C 16 -S 8
dbgen -f -T c -s 100 -C 16 -S 9
dbgen -f -T c -s 100 -C 16 -S 10
dbgen -f -T c -s 100 -C 16 -S 11
dbgen -f -T c -s 100 -C 16 -S 12
dbgen -f -T c -s 100 -C 16 -S 13
dbgen -f -T c -s 100 -C 16 -S 14
dbgen -f -T c -s 100 -C 16 -S 15
dbgen -f -T c -s 100 -C 16 -S 16

# Nation and Region Table Flatfile Generation

dbgen -f -T n -s 100 -C 1 -S 1
dbgen -f -T r -s 100 -C 1 -S 1

echo FlatFile Generation Complete...
```

shutdown_instance.sh

```
#!/bin/ksh

sqlplus <<EOF
/ as sysdba
shutdown
exit
EOF
```

startup_4_instances.sh

```
#!/bin/ksh

echo "Starting Up Oracle on tpchorc1 Now..."

$SF/scripts/startup_tpchorc1.sh

echo "...Oracle Startup Complete on tpchorc1"

sleep 3

echo "Starting Up Oracle on tpchorc2 Now..."

rsh tpchorc2 $SF/scripts/startup_tpchorc2.sh

echo "...Oracle Startup Complete on tpchorc2"

sleep 3

echo "Starting Up Oracle on tpchorc3 Now..."

rsh tpchorc3 $SF/scripts/startup_tpchorc3.sh

echo "...Oracle Startup Complete on tpchorc3"

sleep 3

echo "Starting Up Oracle on tpchorc4 Now..."

rsh tpchorc4 $SF/scripts/startup_tpchorc4.sh

echo "...Oracle Startup Complete on tpchorc4"
```

startup_tpchorc1.sh

```
#!/bin/ksh

sqlplus <<EOF
/ as sysdba
startup parallel pfile=$SF/control_files/tpchorc1.ora
```

```
exit
EOF
```

startup_tpchorc2.sh

```
#!/bin/ksh

sqlplus <<EOF
/ as sysdba
startup parallel pfile=$SF/control_files/tpchorc2.ora
exit
EOF
```

startup_tpchorc3.sh

```
#!/bin/ksh

sqlplus <<EOF
/ as sysdba
startup parallel pfile=$SF/control_files/tpchorc3.ora
exit
EOF
```

startup_tpchorc4.sh

```
#!/bin/ksh

sqlplus <<EOF
/ as sysdba
startup parallel pfile=$SF/control_files/tpchorc4.ora
exit
EOF
```

database_load_tables_et.sh

```
#!/bin/ksh

# Create All TPC-H Schema Tables and Load....

sqlplus tpcd/tpcd <<EOF
spool database_load_tables_et.log
set echo on;
drop table lineitem;
create table lineitem(
   l_shipdate      ,
   l_orderkey      NOT NULL,
   l_discount      ,
   l_extendedprice ,
   l_suppkey       NOT NULL,
   l_quantity      ,
   l_returnflag    ,
   l_partkey       NOT NULL,
   l_linestatus    ,
   l_tax           NOT NULL,
   l_commitdate    ,
   l_receiptdate   ,
   l_shipmode      ,
   l_linenumber    NOT NULL,
   l_shipinstruct  ,
   l_comment
)
pctfree 1
pctused 99
initrans 10
compress
parallel(degree 8 instances 4)
nologging
partition by range (l_shipdate)
subpartition by hash(l_partkey)
subpartitions 16
(
partition item1 values less than (to_date('1992-01-01','YYYY-MM-DD'))
tablespace ts_l1,
partition item2 values less than (to_date('1992-02-01','YYYY-MM-DD'))
tablespace ts_l2,
partition item3 values less than (to_date('1992-03-01','YYYY-MM-DD'))
tablespace ts_l3,
partition item4 values less than (to_date('1992-04-01','YYYY-MM-DD'))
tablespace ts_l4,
partition item5 values less than (to_date('1992-05-01','YYYY-MM-DD'))
tablespace ts_l5,
partition item6 values less than (to_date('1992-06-01','YYYY-MM-DD'))
tablespace ts_l6,
partition item7 values less than (to_date('1992-07-01','YYYY-MM-DD'))
tablespace ts_l7,
partition item8 values less than (to_date('1992-08-01','YYYY-MM-DD'))
tablespace ts_l8,
partition item9 values less than (to_date('1992-09-01','YYYY-MM-DD'))
tablespace ts_l9,
partition item10 values less than (to_date('1992-10-01','YYYY-MM-DD'))
tablespace ts_l10,
partition item11 values less than (to_date('1992-11-01','YYYY-MM-DD'))
tablespace ts_l11,
partition item12 values less than (to_date('1992-12-01','YYYY-MM-DD'))
tablespace ts_l12,
partition item13 values less than (to_date('1993-01-01','YYYY-MM-DD'))
tablespace ts_l1,
partition item14 values less than (to_date('1993-02-01','YYYY-MM-DD'))
tablespace ts_l2,
partition item15 values less than (to_date('1993-03-01','YYYY-MM-DD'))
tablespace ts_l3,
partition item16 values less than (to_date('1993-04-01','YYYY-MM-DD'))
tablespace ts_l4,
partition item17 values less than (to_date('1993-05-01','YYYY-MM-DD'))
tablespace ts_l5,
partition item18 values less than (to_date('1993-06-01','YYYY-MM-DD'))
tablespace ts_l6,
partition item19 values less than (to_date('1993-07-01','YYYY-MM-DD'))
tablespace ts_l7,
partition item20 values less than (to_date('1993-08-01','YYYY-MM-DD'))
tablespace ts_l8,
partition item21 values less than (to_date('1993-09-01','YYYY-MM-DD'))
tablespace ts_l9,
partition item22 values less than (to_date('1993-10-01','YYYY-MM-DD'))
tablespace ts_l10,
partition item23 values less than (to_date('1993-11-01','YYYY-MM-DD'))
tablespace ts_l11,
partition item24 values less than (to_date('1993-12-01','YYYY-MM-DD'))
tablespace ts_l12,
partition item25 values less than (to_date('1994-01-01','YYYY-MM-DD'))
tablespace ts_l1,
partition item26 values less than (to_date('1994-02-01','YYYY-MM-DD'))
tablespace ts_l2,
partition item27 values less than (to_date('1994-03-01','YYYY-MM-DD'))
tablespace ts_l3,
partition item28 values less than (to_date('1994-04-01','YYYY-MM-DD'))
tablespace ts_l4,
partition item29 values less than (to_date('1994-05-01','YYYY-MM-DD'))
tablespace ts_l5,
partition item30 values less than (to_date('1994-06-01','YYYY-MM-DD'))
tablespace ts_l6,
partition item31 values less than (to_date('1994-07-01','YYYY-MM-DD'))
tablespace ts_l7,
partition item32 values less than (to_date('1994-08-01','YYYY-MM-DD'))
tablespace ts_l8,
partition item33 values less than (to_date('1994-09-01','YYYY-MM-DD'))
tablespace ts_l9,
partition item34 values less than (to_date('1994-10-01','YYYY-MM-DD'))
tablespace ts_l10,
partition item35 values less than (to_date('1994-11-01','YYYY-MM-DD'))
tablespace ts_l11,
partition item36 values less than (to_date('1994-12-01','YYYY-MM-DD'))
tablespace ts_l12,
partition item37 values less than (to_date('1995-01-01','YYYY-MM-DD'))
tablespace ts_l1,
```

```
partition item38 values less than (to_date('1995-02-01','YYYY-MM-DD'))
tablespace ts_l2,
partition item39 values less than (to_date('1995-03-01','YYYY-MM-DD'))
tablespace ts_l3,
partition item40 values less than (to_date('1995-04-01','YYYY-MM-DD'))
tablespace ts_l4,
partition item41 values less than (to_date('1995-05-01','YYYY-MM-DD'))
tablespace ts_l5,
partition item42 values less than (to_date('1995-06-01','YYYY-MM-DD'))
tablespace ts_l6,
partition item43 values less than (to_date('1995-07-01','YYYY-MM-DD'))
tablespace ts_l7,
partition item44 values less than (to_date('1995-08-01','YYYY-MM-DD'))
tablespace ts_l8,
partition item45 values less than (to_date('1995-09-01','YYYY-MM-DD'))
tablespace ts_l9,
partition item46 values less than (to_date('1995-10-01','YYYY-MM-DD'))
tablespace ts_l10,
partition item47 values less than (to_date('1995-11-01','YYYY-MM-DD'))
tablespace ts_l11,
partition item48 values less than (to_date('1995-12-01','YYYY-MM-DD'))
tablespace ts_l12,
partition item49 values less than (to_date('1996-01-01','YYYY-MM-DD'))
tablespace ts_l1,
partition item50 values less than (to_date('1996-02-01','YYYY-MM-DD'))
tablespace ts_l2,
partition item51 values less than (to_date('1996-03-01','YYYY-MM-DD'))
tablespace ts_l3,
partition item52 values less than (to_date('1996-04-01','YYYY-MM-DD'))
tablespace ts_l4,
partition item53 values less than (to_date('1996-05-01','YYYY-MM-DD'))
tablespace ts_l5,
partition item54 values less than (to_date('1996-06-01','YYYY-MM-DD'))
tablespace ts_l6,
partition item55 values less than (to_date('1996-07-01','YYYY-MM-DD'))
tablespace ts_l7,
partition item56 values less than (to_date('1996-08-01','YYYY-MM-DD'))
tablespace ts_l8,
partition item57 values less than (to_date('1996-09-01','YYYY-MM-DD'))
tablespace ts_l9,
partition item58 values less than (to_date('1996-10-01','YYYY-MM-DD'))
tablespace ts_l10,
partition item59 values less than (to_date('1996-11-01','YYYY-MM-DD'))
tablespace ts_l11,
partition item60 values less than (to_date('1996-12-01','YYYY-MM-DD'))
tablespace ts_l12,
partition item61 values less than (to_date('1997-01-01','YYYY-MM-DD'))
tablespace ts_l1,
partition item62 values less than (to_date('1997-02-01','YYYY-MM-DD'))
tablespace ts_l2,
partition item63 values less than (to_date('1997-03-01','YYYY-MM-DD'))
tablespace ts_l3,
partition item64 values less than (to_date('1997-04-01','YYYY-MM-DD'))
tablespace ts_l4,
partition item65 values less than (to_date('1997-05-01','YYYY-MM-DD'))
tablespace ts_l5,
partition item66 values less than (to_date('1997-06-01','YYYY-MM-DD'))
tablespace ts_l6,
partition item67 values less than (to_date('1997-07-01','YYYY-MM-DD'))
tablespace ts_l7,
partition item68 values less than (to_date('1997-08-01','YYYY-MM-DD'))
tablespace ts_l8,
partition item69 values less than (to_date('1997-09-01','YYYY-MM-DD'))
tablespace ts_l9,
partition item70 values less than (to_date('1997-10-01','YYYY-MM-DD'))
tablespace ts_l10,
partition item71 values less than (to_date('1997-11-01','YYYY-MM-DD'))
tablespace ts_l11,
partition item72 values less than (to_date('1997-12-01','YYYY-MM-DD'))
tablespace ts_l12,
partition item73 values less than (to_date('1998-01-01','YYYY-MM-DD'))
tablespace ts_l1,
partition item74 values less than (to_date('1998-02-01','YYYY-MM-DD'))
tablespace ts_l2,
partition item75 values less than (to_date('1998-03-01','YYYY-MM-DD'))
tablespace ts_l3,
partition item76 values less than (to_date('1998-04-01','YYYY-MM-DD'))
tablespace ts_l4,
partition item77 values less than (to_date('1998-05-01','YYYY-MM-DD'))
tablespace ts_l5,
partition item78 values less than (to_date('1998-06-01','YYYY-MM-DD'))
tablespace ts_l6,
partition item79 values less than (to_date('1998-07-01','YYYY-MM-DD'))
tablespace ts_l7,
partition item80 values less than (to_date('1998-08-01','YYYY-MM-DD'))
tablespace ts_l8,
partition item81 values less than (to_date('1998-09-01','YYYY-MM-DD'))
tablespace ts_l9,
partition item82 values less than (to_date('1998-10-01','YYYY-MM-DD'))
tablespace ts_l10,
partition item83 values less than (to_date('1998-11-01','YYYY-MM-DD'))
tablespace ts_l11,
partition item84 values less than (MAXVALUE)
tablespace ts_l12)
as select * from lineitem_et;
drop table orders;
create table orders(
   o_orderdate         ,
   o_orderkey          NOT NULL,
   o_custkey           NOT NULL,
   o_orderpriority     ,
   o_shippriority      ,
   o_clerk             ,
   o_orderstatus       ,
   o_totalprice        ,
   o_comment
)
pctfree 1
pctused 99
initrans 10
compress
parallel(degree 8 instances 4)
nologging
partition by range (o_orderdate)
subpartition by hash(o_custkey)
subpartitions 16
(
partition ord1 values less than (to_date('1992-01-01','YYYY-MM-DD'))
tablespace ts_o1,
partition ord2 values less than (to_date('1992-02-01','YYYY-MM-DD'))
tablespace ts_o2,
partition ord3 values less than (to_date('1992-03-01','YYYY-MM-DD'))
tablespace ts_o3,
partition ord4 values less than (to_date('1992-04-01','YYYY-MM-DD'))
tablespace ts_o4,
partition ord5 values less than (to_date('1992-05-01','YYYY-MM-DD'))
tablespace ts_o5,
partition ord6 values less than (to_date('1992-06-01','YYYY-MM-DD'))
tablespace ts_o6,
partition ord7 values less than (to_date('1992-07-01','YYYY-MM-DD'))
tablespace ts_o7,
partition ord8 values less than (to_date('1992-08-01','YYYY-MM-DD'))
tablespace ts_o8,
partition ord9 values less than (to_date('1992-09-01','YYYY-MM-DD'))
tablespace ts_o9,
partition ord10 values less than (to_date('1992-10-01','YYYY-MM-DD'))
tablespace ts_o10,
partition ord11 values less than (to_date('1992-11-01','YYYY-MM-DD'))
tablespace ts_o11,
partition ord12 values less than (to_date('1992-12-01','YYYY-MM-DD'))
tablespace ts_o12,
partition ord13 values less than (to_date('1993-01-01','YYYY-MM-DD'))
tablespace ts_o1,
partition ord14 values less than (to_date('1993-02-01','YYYY-MM-DD'))
tablespace ts_o2,
partition ord15 values less than (to_date('1993-03-01','YYYY-MM-DD'))
tablespace ts_o3,
partition ord16 values less than (to_date('1993-04-01','YYYY-MM-DD'))
tablespace ts_o4,
partition ord17 values less than (to_date('1993-05-01','YYYY-MM-DD'))
tablespace ts_o5,
partition ord18 values less than (to_date('1993-06-01','YYYY-MM-DD'))
tablespace ts_o6,
partition ord19 values less than (to_date('1993-07-01','YYYY-MM-DD'))
tablespace ts_o7,
partition ord20 values less than (to_date('1993-08-01','YYYY-MM-DD'))
tablespace ts_o8,
partition ord21 values less than (to_date('1993-09-01','YYYY-MM-DD'))
```

```
tablespace ts_o9,
partition ord22 values less than (to_date('1993-10-01','YYYY-MM-DD'))
tablespace ts_o10,
partition ord23 values less than (to_date('1993-11-01','YYYY-MM-DD'))
tablespace ts_o11,
partition ord24 values less than (to_date('1993-12-01','YYYY-MM-DD'))
tablespace ts_o12,
partition ord25 values less than (to_date('1994-01-01','YYYY-MM-DD'))
tablespace ts_o1,
partition ord26 values less than (to_date('1994-02-01','YYYY-MM-DD'))
tablespace ts_o2,
partition ord27 values less than (to_date('1994-03-01','YYYY-MM-DD'))
tablespace ts_o3,
partition ord28 values less than (to_date('1994-04-01','YYYY-MM-DD'))
tablespace ts_o4,
partition ord29 values less than (to_date('1994-05-01','YYYY-MM-DD'))
tablespace ts_o5,
partition ord30 values less than (to_date('1994-06-01','YYYY-MM-DD'))
tablespace ts_o6,
partition ord31 values less than (to_date('1994-07-01','YYYY-MM-DD'))
tablespace ts_o7,
partition ord32 values less than (to_date('1994-08-01','YYYY-MM-DD'))
tablespace ts_o8,
partition ord33 values less than (to_date('1994-09-01','YYYY-MM-DD'))
tablespace ts_o9,
partition ord34 values less than (to_date('1994-10-01','YYYY-MM-DD'))
tablespace ts_o10,
partition ord35 values less than (to_date('1994-11-01','YYYY-MM-DD'))
tablespace ts_o11,
partition ord36 values less than (to_date('1994-12-01','YYYY-MM-DD'))
tablespace ts_o12,
partition ord37 values less than (to_date('1995-01-01','YYYY-MM-DD'))
tablespace ts_o1,
partition ord38 values less than (to_date('1995-02-01','YYYY-MM-DD'))
tablespace ts_o2,
partition ord39 values less than (to_date('1995-03-01','YYYY-MM-DD'))
tablespace ts_o3,
partition ord40 values less than (to_date('1995-04-01','YYYY-MM-DD'))
tablespace ts_o4,
partition ord41 values less than (to_date('1995-05-01','YYYY-MM-DD'))
tablespace ts_o5,
partition ord42 values less than (to_date('1995-06-01','YYYY-MM-DD'))
tablespace ts_o6,
partition ord43 values less than (to_date('1995-07-01','YYYY-MM-DD'))
tablespace ts_o7,
partition ord44 values less than (to_date('1995-08-01','YYYY-MM-DD'))
tablespace ts_o8,
partition ord45 values less than (to_date('1995-09-01','YYYY-MM-DD'))
tablespace ts_o9,
partition ord46 values less than (to_date('1995-10-01','YYYY-MM-DD'))
tablespace ts_o10,
partition ord47 values less than (to_date('1995-11-01','YYYY-MM-DD'))
tablespace ts_o11,
partition ord48 values less than (to_date('1995-12-01','YYYY-MM-DD'))
tablespace ts_o12,
partition ord49 values less than (to_date('1996-01-01','YYYY-MM-DD'))
tablespace ts_o1,
partition ord50 values less than (to_date('1996-02-01','YYYY-MM-DD'))
tablespace ts_o2,
partition ord51 values less than (to_date('1996-03-01','YYYY-MM-DD'))
tablespace ts_o3,
partition ord52 values less than (to_date('1996-04-01','YYYY-MM-DD'))
tablespace ts_o4,
partition ord53 values less than (to_date('1996-05-01','YYYY-MM-DD'))
tablespace ts_o5,
partition ord54 values less than (to_date('1996-06-01','YYYY-MM-DD'))
tablespace ts_o6,
partition ord55 values less than (to_date('1996-07-01','YYYY-MM-DD'))
tablespace ts_o7,
partition ord56 values less than (to_date('1996-08-01','YYYY-MM-DD'))
tablespace ts_o8,
partition ord57 values less than (to_date('1996-09-01','YYYY-MM-DD'))
tablespace ts_o9,
partition ord58 values less than (to_date('1996-10-01','YYYY-MM-DD'))
tablespace ts_o10,
partition ord59 values less than (to_date('1996-11-01','YYYY-MM-DD'))
tablespace ts_o11,
partition ord60 values less than (to_date('1996-12-01','YYYY-MM-DD'))
tablespace ts_o12,
partition ord61 values less than (to_date('1997-01-01','YYYY-MM-DD'))
tablespace ts_o1,
partition ord62 values less than (to_date('1997-02-01','YYYY-MM-DD'))
tablespace ts_o2,
partition ord63 values less than (to_date('1997-03-01','YYYY-MM-DD'))
tablespace ts_o3,
partition ord64 values less than (to_date('1997-04-01','YYYY-MM-DD'))
tablespace ts_o4,
partition ord65 values less than (to_date('1997-05-01','YYYY-MM-DD'))
tablespace ts_o5,
partition ord66 values less than (to_date('1997-06-01','YYYY-MM-DD'))
tablespace ts_o6,
partition ord67 values less than (to_date('1997-07-01','YYYY-MM-DD'))
tablespace ts_o7,
partition ord68 values less than (to_date('1997-08-01','YYYY-MM-DD'))
tablespace ts_o8,
partition ord69 values less than (to_date('1997-09-01','YYYY-MM-DD'))
tablespace ts_o9,
partition ord70 values less than (to_date('1997-10-01','YYYY-MM-DD'))
tablespace ts_o10,
partition ord71 values less than (to_date('1997-11-01','YYYY-MM-DD'))
tablespace ts_o11,
partition ord72 values less than (to_date('1997-12-01','YYYY-MM-DD'))
tablespace ts_o12,
partition ord73 values less than (to_date('1998-01-01','YYYY-MM-DD'))
tablespace ts_o1,
partition ord74 values less than (to_date('1998-02-01','YYYY-MM-DD'))
tablespace ts_o2,
partition ord75 values less than (to_date('1998-03-01','YYYY-MM-DD'))
tablespace ts_o3,
partition ord76 values less than (to_date('1998-04-01','YYYY-MM-DD'))
tablespace ts_o4,
partition ord77 values less than (to_date('1998-05-01','YYYY-MM-DD'))
tablespace ts_o5,
partition ord78 values less than (to_date('1998-06-01','YYYY-MM-DD'))
tablespace ts_o6,
partition ord79 values less than (to_date('1998-07-01','YYYY-MM-DD'))
tablespace ts_o7,
partition ord80 values less than (to_date('1998-08-01','YYYY-MM-DD'))
tablespace ts_o8,
partition ord81 values less than (to_date('1998-09-01','YYYY-MM-DD'))
tablespace ts_o9,
partition ord82 values less than (to_date('1998-10-01','YYYY-MM-DD'))
tablespace ts_o10,
partition ord83 values less than (to_date('1998-11-01','YYYY-MM-DD'))
tablespace ts_o11,
partition ord84 values less than (MAXVALUE)
tablespace ts_o12)
as select * from orders_et;
drop table partsupp;
create table partsupp(
   ps_partkey          NOT NULL,
   ps_suppkey          NOT NULL,
   ps_supplycost       NOT NULL,
   ps_availqty         ,
   ps_comment
)
pctfree 1
pctused 99
tablespace ts_ps
parallel(degree 8 instances 4)
nologging
partition by hash (ps_suppkey)
partitions 16
as select * from partsupp_et
;
drop table part;
create table part(
   p_partkey           NOT NULL,
   p_type              ,
   p_size              ,
   p_brand             ,
   p_name              ,
   p_container         ,
   p_mfgr              ,
   p_retailprice       ,
   p_comment
)
pctfree 1
```

```
pctused 99
tablespace ts_p
parallel(degree 8 instances 4)
nologging
partition by hash (p_partkey)
partitions 16
as select * from part_et
;
drop table customer;
create table customer(
   c_custkey            NOT NULL,
   c_mktsegment         ,
   c_nationkey          ,
   c_name               ,
   c_address            ,
   c_phone              ,
   c_acctbal            ,
   c_comment
)
pctfree 1
pctused 99
tablespace ts_c
parallel(degree 8 instances 4)
nologging
partition by hash (c_custkey)
partitions 16
as select * from customer_et
;
drop table supplier;
create table supplier(
   s_suppkey            NOT NULL,
   s_nationkey          ,
   s_comment            ,
   s_name               ,
   s_address            ,
   s_phone              ,
   s_acctbal
)
pctfree 1
pctused 99
tablespace ts_s
parallel(degree 8 instances 4)
nologging
partition by hash (s_suppkey)
partitions 16
as select * from supplier_et
;
drop table nation;
create table nation(
   n_nationkey          NOT NULL,
   n_name               ,
   n_regionkey          ,
   n_comment
)
tablespace ts_s
parallel(degree 1 instances 4)
as select * from nation_et
;
drop table region;
create table region(
   r_regionkey          ,
   r_name               ,
   r_comment
)
tablespace ts_s
parallel(degree 1 instances 4)
as select * from region_et
;
drop table lineitem_et;
drop table orders_et;
drop table part_et;
drop table supplier_et;
drop table partsupp_et;
drop table customer_et;
drop table nation_et;
drop table region_et;
spool off;
exit;
EOF
```

create_indexes_all.sh

```
#!/bin/ksh

# Create All TPC-H Schema Indexes...

sqlplus tpcd/tpcd <<EOF
spool create_indexes_all_spool.log;
drop index i_ps_partkey_suppkey;
create unique index i_ps_partkey_suppkey
on partsupp (ps_partkey,ps_suppkey)
pctfree 2
initrans 10
nologging
compute statistics
tablespace ts_i_ps
parallel (degree 8 instances 4);
drop index i_c_custkey;
create unique index i_c_custkey
on customer (c_custkey)
pctfree 2
initrans 10
nologging
compute statistics
tablespace ts_i_c
parallel (degree 8 instances 4);
drop index i_o_orderkey;
create unique index i_o_orderkey
on orders (o_orderkey)
pctfree 2
initrans 10
nologging
compute statistics
tablespace ts_i_o
parallel (degree 8 instances 4);
drop index i_l_orderkey;
create index i_l_orderkey
on lineitem (l_orderkey)
pctfree 2
initrans 10
nologging
compute statistics
tablespace ts_i_l
parallel (degree 8 instances 4);
spool off;
EOF
```

analyze_ops.sh

```
#!/bin/ksh

echo "Starting Database Analyze Step..." `date`

sqlplus tpcd/tpcd <<EOF
spool analyze_ops_spool.log;
rem alter session set parallel_instance_group = 'groupb';
execute dbms_stats.gather_schema_stats('tpcd' , estimate_percent => 1 , degree => 64
, granularity => 'GLOBAL')
spool off;
EOF

echo "Completed Database Analyze Step..." `date`
```

ACID Test Source Code

atom.sh

```
#!/bin/ksh
#
# $Header: atom.sh 05-sep-2001.08:03:33 mpoess Exp $
#
# atom.sh
```

```
#
# Copyright (c) 1999, 2001, Oracle Corporation.  All rights reserved.
#
#   NAME
#     atom.sh - <one-line expansion of the name>
#
#  DESCRIPTION
#     Performs atomicity tests.
#     Usage: atom.sh [-n iter] [-p prog] [-u usr/pswd] -h
#
#     Options: See usage below
#
#   NOTES
#     <other useful comments, qualifications, etc.>
#
#   MODIFIED   (MM/DD/YY)
#   mpoess      09/05/01 - reduce lines
#   mpoess      07/10/01 - change scale factor to 1
#   mpoess      08/08/99 - Creation
#   mpoess      08/08/99 - Creation
#

. $KIT_DIR/env

ITER=3
SF=1
PROG=atranspl
OUT=${ACID_OUT}/atom
USER=${DATABASE_USER}

echo "Starting Atomicity Test at `date`..."
echo ""
echo "Performing $ITER ACID transactions with COMMIT"
echo ""

randkey $ITER $SF u$USER | $PROG 1 1 1 0 u$USER > ${OUT}c 2>&1

echo "ACID transactions with COMMIT ended. Output in ${OUT}c"
echo ""
echo "Performing $ITER ACID transactions with ROLLBACK"
echo ""

randkey $ITER $SF u$USER | $PROG 1 1 0 0 u$USER > ${OUT}r 2>&1

echo "ACID transactions with ROLLBACK ended. Output in ${OUT}r"
echo ""
echo "Ending Atomicity Test at `date`..."
```

atrans.sql

```
Rem
Rem $Header: atrans.sql 07-aug-99.21:27:13 mpoess Exp $
Rem
Rem atrans.sql
Rem
Rem  Copyright (c) Oracle Corporation 1999. All Rights Reserved.
Rem
Rem    NAME
Rem      atrans.sql - <one-line expansion of the name>
Rem
Rem   DESCRIPTION
Rem       Creates ACID Transaction Package for TPC-D benchmark.
Rem       Asks user to input values for o_key, delta and output file.
Rem
Rem    NOTES
Rem      <other useful comments, qualifications, etc.>
Rem
Rem    MODIFIED   (MM/DD/YY)
Rem    mpoess      08/07/99 - Creation
Rem    mpoess      08/07/99 - Created
Rem


set serverout on;
set termout on;
set echo on;

CREATE OR REPLACE PACKAGE d_atrans
IS
PROCEDURE doatrans
(
                l_key                   IN OUT integer,
                o_key                   IN OUT integer,
                delta                   IN OUT integer,
                l_pkey          IN OUT integer,
                l_skey          IN OUT integer,
                l_quan          IN OUT integer,
                l_newquan       IN OUT integer,
                l_tax           IN OUT number,
                l_disc          IN OUT number,
                l_eprice        IN OUT number,
                l_neweprice     IN OUT number,
                o_tprice        IN OUT number,
                o_newtprice IN OUT number,
                rprice                  IN OUT number,
                cost                    IN OUT number
);
END;
/

CREATE OR REPLACE PACKAGE BODY d_atrans
IS
PROCEDURE doatrans
(
                l_key                   IN OUT integer,
                o_key                   IN OUT integer,
                delta                   IN OUT integer,
                l_pkey          IN OUT integer,
                l_skey          IN OUT integer,
                l_quan          IN OUT integer,
                l_newquan       IN OUT integer,
                l_tax           IN OUT number,
                l_disc          IN OUT number,
                l_eprice        IN OUT number,
                l_neweprice     IN OUT number,
                o_tprice        IN OUT number,
                o_newtprice IN OUT number,
                rprice                  IN OUT number,
                cost                    IN OUT number
)
IS
        ototal number;
        not_serializable EXCEPTION;
        PRAGMA EXCEPTION_INIT(not_serializable,-8177);
BEGIN
 LOOP BEGIN

   select o_totalprice
                into o_tprice
                from orders
                where o_orderkey = o_key;

   select l_quantity, l_extendedprice, l_partkey, l_suppkey, l_tax, l_discount
      into l_quan, l_eprice, l_pkey, l_skey, l_tax, l_disc
      from lineitem
      where l_orderkey = o_key
      and   l_linenumber = l_key;

   ototal := o_tprice - trunc((trunc((l_eprice * (1.0-l_disc)),2) * (1.0+l_tax)),2);
   rprice := trunc((l_eprice/l_quan), 2);
   cost := trunc((rprice * delta), 2);
   l_neweprice := l_eprice + cost;
   o_newtprice := trunc((l_neweprice * (1.0 - l_disc)), 2);
   o_newtprice := ototal + trunc((o_newtprice * (1.0 + l_tax)), 2);
   l_newquan := l_quan + delta;

   update lineitem
      set l_extendedprice = l_neweprice,
      l_quantity = l_newquan
      where l_orderkey = o_key
      and l_linenumber = l_key;

   update orders
      set o_totalprice = o_newtprice
      where o_orderkey = o_key;
```

```
    insert into history (h_p_key, h_s_key, h_o_key, h_l_key, h_delta, h_date_t)
      values (l_pkey, l_skey, o_key, l_key, delta, sysdate);

   EXIT;

  EXCEPTION
    WHEN not_serializable THEN
      ROLLBACK;
  END;

  END LOOP;

END doatrans;
END;
/

exit;
```

atranspl.c

```
/* Copyright (c) 2001, Oracle Corporation.  All rights reserved.  */

/*

   NAME
     atranspl.c - <one-line expansion of the name>

   DESCRIPTION
     TPC-HR benchmark ACID transaction driver, OCI version 8

   NOTES
     <other useful comments, qualifications, etc.>

   MODIFIED   (MM/DD/YY)
   mpoess      10/17/01 - add parameter in ACIDinit
   mpoess      02/22/01 - enlarge timing array
   mpoess      01/04/01 - Creation

*/

#include <stdio.h>
#include <stdlib.h>
#include <sys/types.h>
#include <sys/stat.h>
#include <fcntl.h>

#include "atranspl.h"

/* Declare error handling functions */

double gettime();
void sql_error();
void usage();
void ACIDinit();
void ACIDexit();
int atoi();
void srand48();
long lrand48();

/* declarations for ORDERS */

int o_key = 0;
double o_tprice = 0.0;
double o_newtprice = 0.0;

/* declarations for LINEITEM */

int l_key = 0;
int l_pkey = 0;
int l_skey = 0;

int l_quan = 0;
int l_newquan = 0;
double l_eprice = 0.0;
double l_neweprice = 0.0;
double l_disc = 0.0;
double l_tax = 0.0;
sb2 l_npricei;

/* other declarations */

int delta = 0;
double rprice;
double cost;

int proc_no = 1;          /* process number, global             */
int num_streams = 1;      /* number of transaction streams      */
int trig = 0;             /* Trigger Time                       */
int slp = 0;              /* Sleep Time                         */

int logfile;              /* fdes for logfile for durability (optional)   */
int outfile = 1;          /* output file (optional)             */
#ifdef LINUX
  FILE *infile;     /* input file (optional)              */
#else
  FILE *infile = stdin;     /* input file (optional)              */
                            /* in the format of <o_key> <delta>    */
#endif
char lname[UNAME_LEN];    /* username/passwd combo              */
char *passwd;             /* pointer to password                */

char buf[WRITE_BUF_LEN];  /* buffer to write                    */

unsigned flag = (unsigned) 0;       /* flag to store all sorts of options  */

#define INFILE  0x01u
#define OUTFILE 0x02u
#define LOGFILE 0x04u
#define COMMIT  0x08u
#define DELTA   0x10u

double tr_end = 0.0;      /* transaction end time               */
double tr_start = 0.0;    /* transaction start time             */

int num_iter = 0;         /* number of iterations               */

time_t curr_time;         /* Current Time                       */

/* OCI handles */

OCIEnv *tpcenv = NULL;
OCIServer *tpcsrv = NULL;
OCIError *errhp = NULL;
OCISvcCtx *tpcsvc = NULL;
OCISession *tpcusr = NULL;
OCIStmt *curi = NULL;
OCIStmt *curr = NULL;
OCIStmt *cure1 = NULL;
OCIStmt *cure2 = NULL;

/* OCI bind handles */

#ifdef NOLKEY
OCIBind *l_keyi_bp = NULL;
OCIBind *o_keyi_bp = NULL;
#endif /* NOLKEY */

OCIBind *l_key_bp = NULL;
OCIBind *o_key_bp = NULL;
OCIBind *delta_bp = NULL;
OCIBind *l_pkey_bp = NULL;
OCIBind *l_skey_bp = NULL;
OCIBind *l_quan_bp = NULL;
OCIBind *l_newquan_bp = NULL;
OCIBind *l_tax_bp = NULL;
OCIBind *l_disc_bp = NULL;
OCIBind *l_eprice_bp = NULL;
OCIBind *l_neweprice_bp = NULL;
OCIBind *o_tprice_bp = NULL;
OCIBind *o_newtprice_bp = NULL;
OCIBind *rprice_bp = NULL;
OCIBind *cost_bp = NULL;

OCIBind *l_neweprice1_bp = NULL;
OCIBind *l_newquan1_bp = NULL;
```

```
OCIBind *o_key1_bp = NULL;
OCIBind *l_key1_bp = NULL;

OCIBind *o_newtprice2_bp = NULL;
OCIBind *o_key2_bp = NULL;

sword status = OCI_SUCCESS;  /* OCI return value */

char sqlstmt[1024];

/* usage: prints the usage of the program */

void usage()
{

  fprintf (stderr,"\nUsage: atrans.o[st]t <proc_no> <num_streams> <commit>
<delta>\n[i<pathname for input>] [o<pathname for output>] [d<pathname for
durability file>] [u<uid/passwd>] \n\n");

  fprintf(stderr,"    proc_no      :the process number within this ACID\n");
  fprintf(stderr,"    num_streams  :the total number of ACID transaction streams\n");
  fprintf(stderr,"    commit       :1 to commit transaction, abort otherwise\n\n");
  fprintf(stderr,"    delta        :1 to generate new random delta, otherwise obtain delta
from input\n\n");
  fprintf(stderr,"    OPTIONAL PARAMETERS:\n");
  fprintf(stderr,"    i<pathname for input>      :full path name for input file - default is
stdin\n");
  fprintf(stderr,"    o<pathname for output>     :full path name for output file - default is
stdout\n");
  fprintf(stderr,"    d<pathname for durability> :full path name for durability success
file - must specify for durability test\n");
  fprintf(stderr,"    u<uid/passwd>              :Username/Password string - default is
tcpd/tpcd\n");
  fprintf(stderr,"    t<trigger>                 :Trigger Time - sleep <trigger> seconds before
start\n\n");
  fprintf(stderr,"    s<sleep>                   :Sleep Time - sleep <sleep> seconds before
commit or rollback\n\n");
  exit(-1);

}


void ACIDexit() {

  OCILogoff(tpcsvc,errhp);
  OCIhfree(tpcenv,OCI_HTYPE_STMT);
  OCIhfree(tpcsvc,OCI_HTYPE_SVCCTX);
  OCIhfree(tpcsrv,OCI_HTYPE_SERVER);
  OCIhfree(tpcusr,OCI_HTYPE_SESSION);

}



/* type: 0 if environment handle is passed, 1 if error handle is passwd */

void sql_error(errhp,status,type)
    OCIError *errhp;
    sword status;
    sword type;
{
  char msg[2048];
  ub4 errcode;
  ub4 msglen;
  int i,j;

  switch(status) {
  case OCI_SUCCESS_WITH_INFO:
    fprintf(stderr, "Error: Statement returned with info.\n");
    if (type)
      (void) OCIErrorGet(errhp,1,NULL,(sb4*) &errcode, (text*) msg,
                  2048, OCI_HTYPE_ERROR);
    else
      (void) OCIErrorGet(errhp,1,NULL,(sb4*) &errcode, (text*) msg,
                  2048, OCI_HTYPE_ENV);
    fprintf(stderr,"%s\n",msg);
    break;
  case OCI_ERROR:
    fprintf(stderr, "Error: OCI call error.\n");
    if (type)
      (void) OCIErrorGet(errhp,1,NULL, (sb4 *) &errcode, (text*) msg,
                  2048,OCI_HTYPE_ERROR);
    else
      (void) OCIErrorGet(errhp,1,NULL, (sb4 *) &errcode, (text*) msg,
                  2048,OCI_HTYPE_ENV);
    fprintf(stderr,"%s\n",msg);
    break;
  case OCI_INVALID_HANDLE:
    fprintf(stderr, "Error: Invalid Handle.\n");
    if (type)
      (void) OCIErrorGet(errhp,1,NULL, (sb4 *) &errcode, (text*) msg,
                  2048,OCI_HTYPE_ERROR);
    else
      (void) OCIErrorGet(errhp,1,NULL, (sb4 *) &errcode, (text*) msg,
                  2048,OCI_HTYPE_ENV);
    fprintf(stderr,"%s\n",msg);
    break;
  }
  /* Rollback just in case */

  (void) OCITransRollback(tpcsvc,errhp,OCI_DEFAULT);

  fprintf(stderr, "Exiting Oracle...\n");
  fflush(stderr);

  ACIDexit();

  exit(1);
}

#ifdef LINUX
int main(argc,argv)
#else
void main(argc,argv)
#endif
     int argc;
     char *argv[];
{

  int i;
  char line[64];
  ub4 errcode;
  char msg[2048];
  int need_commit = 0;

  /* Initialize some variables */
#ifdef LINUX
  infile=fopen("/dev/stdin","r");
#endif
  strcpy((char *) lname, "tpcd/tpcd");

  if ((argc > 10) || (argc < 5)) {
    usage();
  }

  /* argv[1] -- Process Number */

  proc_no = atoi(argv[1]);

  /* argv[2] -- Number of Streams */

  num_streams = atoi(argv[2]);

  /* argv[3] -- Commit? */

  if (atoi(argv[3]) == 1)
    BIS(flag, COMMIT);

  /* argv[4] -- Delta? */

  if (atoi(argv[4]) == 1)
    BIS(flag, DELTA);

  /* Process  optional parameters */

  argc -= 4;
  argv += 4;
```

```
  while(--argc) {
    ++argv;
    switch(argv[0][0]) {
    case 'u':
      strncpy((char *) lname, ++(argv[0]), UNAME_LEN);
      if (strchr((char *) lname, '/') == NULL) {
        fprintf(stderr, "Login name must be in the format of userid/passwd\n");
        usage();
        exit(-1);
      }
      break;
    case 'i':
      if ((infile = fopen(++(argv[0]), "r")) == NULL) {
        fprintf(stderr,"Cannot open input file %s\n", argv[0]);
        fprintf(stderr,"%s\n",strerror(errno));
        exit(-1);
      }
      BIS(flag, INFILE);
      break;
    case 'o':
      if ((outfile = open(++(argv[0]), (O_RDWR | O_SYNC | O_CREAT), S_IRWXU))
== -1) {
        fprintf(stderr,"Cannot open output file %s\n", argv[0]);
        fprintf(stderr,"%s\n",strerror(errno));
        exit(-1);
      }
      BIS(flag, OUTFILE);
      break;
    case 'd':
      if ((logfile = open(++(argv[0]), (O_RDWR | O_SYNC | O_CREAT), S_IRWXU))
== -1) {
        fprintf(stderr,"Cannot open durability success file %s\n", argv[0]);
        fprintf(stderr,"%s\n",strerror(errno));
        exit(-1);
      }
      BIS(flag, LOGFILE);
      break;
    case 'b':
      num_iter = atoi(++(argv[0]));
      break;
    case 't':
      trig = atoi(++(argv[0]));
      break;
    case 's':
      slp = atoi(++(argv[0]));
      break;
    default:
      fprintf(stderr, "Unknown argument %s\n", argv[0]);
      usage();
      break;
    }
  }

  FPRTF(outfile,"-------------------------------------------------\n");

  /* Initialize the cursors etc. */

  (void) ACIDinit();

  /* sleep for some time (triggering) */

  sleep(trig);

  /* start doing the ACID transactions */

  tr_start = gettime();

  /* The number of iteration we will run depends on the number of */
  /* input lines                                                  */

  while (fgets(line, 64, infile) != NULL) {

#ifdef NOLKEY
    sscanf(line, "%d %d\n", &o_key, &delta);

    /* Obtain l_key from l_key query */

    OCIsexec(tpcsvc,curi,errhp,1);

    /* l_key is the highest l_linenumber available.  We need to pick */
    /* at random a number between 1..l_key.                          */

    l_key = (int) ((lrand48() % l_key) + 1);
#else
    sscanf(line, "%d %d %d\n", &o_key, &l_key, &delta);
#endif /* NOLKEY */

    /* Generate delta if necessary */

    if (BIT(flag, DELTA))
      delta = (int) (floor((drand48() * 100)) + 1);

    /* Now, we are ready to run the ACID transaction. */

    curr_time = time(NULL);

    FPRTF2(outfile, "Starting ACID transaction %d at %s...\n", (++num_iter),
          ctime(&curr_time));

    FPRTF1(outfile, "o_key: %d\n", (int) o_key);
    FPRTF1(outfile, "l_key: %d\n", (int) l_key);
    FPRTF1(outfile, "delta: %d\n", (int) delta);

    OCIsexec(tpcsvc,curr,errhp,1);

    curr_time = time(NULL);

    if (!BIT(flag, LOGFILE)) {
    FPRTF1(outfile, "BEFORE COMMIT/ROLLBACK TRANSACTION at %s\n",
ctime(&curr_time));
    FPRTF1(outfile, "l_extendedprice: %.2f\n", l_eprice);
    FPRTF1(outfile, "l_quantity:      %d\n", (int) l_quan);
    FPRTF1(outfile, "o_totalprice:    %.2f\n\n", o_tprice);
    }

    FPRTF1(outfile, "Sleep %d seconds before COMMIT/ROLLBACK...\n\n", slp);
    sleep(slp);

    /* Shall we commit? */

    if (BIT(flag, COMMIT)) {
      need_commit = 1;
      while (need_commit) {
        if((status=OCITransCommit(tpcsvc,errhp,OCI_DEFAULT)) != OCI_SUCCESS)
{
            OCIrol(tpcsvc,errhp);
            OCIsexec(tpcsvc,curr,errhp,1);
        } else {
            need_commit = 0;
            curr_time = time(NULL);
            FPRTF2(outfile, "ACID Transaction iteration %d COMMITED at %s\n",
              num_iter, ctime(&curr_time));
        }
      }
    } else {
      OCIrol(tpcsvc,errhp);
      curr_time = time(NULL);
      FPRTF2(outfile, "ACID Transaction iteration %d ROLLBACK at %s\n",
           num_iter, ctime(&curr_time));
    }

    /* Report all results to outfile and if necessary, to success file. */

    /* Report initial and new values for o_totalprice, l_extendedprice, */
    /* l_quantity.                                                      */

    /*
    curr_time = time(NULL);
    FPRTF1(outfile, "Transaction Completed at %s\n", ctime(&curr_time));
    */

    /* Get the values in LINEITEM and ORDERS after the transaction */

    if (BIT(flag, LOGFILE)) {
      FPRTF1(logfile, "p_key:      %d\n", (int) l_pkey);
      FPRTF1(logfile, "s_key:      %d\n", (int) l_skey);
      FPRTF1(logfile, "o_key:      %d\n", (int) o_key);
      FPRTF1(logfile, "l_key:      %d\n", (int) l_key);
```

```
    FPRTF1(logfile, "delta:      %d\n", (int) delta);
    FPRTF1(logfile, "Transaction Completed at %s\n", ctime(&curr_time));
    FPRTF(logfile, "-----------------------------------------------------\n");
   } else {

    OCIsexec(tpcsvc,cure1,errhp,1);
    OCIsexec(tpcsvc,cure2,errhp,1);

    FPRTF(outfile, "AFTER TRANSACTION:\n");
    FPRTF1(outfile, "l_extendedprice: %.2lf\n", l_neweprice);
    FPRTF1(outfile, "l_quantity:      %d\n", (int) l_newquan);
    FPRTF1(outfile, "o_totalprice:    %.2lf\n\n", o_newtprice);
    FPRTF1(outfile, "l_tax:           %.2lf\n", l_tax);
    FPRTF1(outfile, "l_discount:      %.2lf\n", l_disc);
    FPRTF1(outfile, "rprice:          %.2lf\n", rprice);
    FPRTF1(outfile, "cost:            %.2lf\n", cost);
    FPRTF(outfile, "-----------------------------------------------------\n");
   }
  }

  tr_end = gettime();

  if (!BIT(flag,LOGFILE)) {
   FPRTF1(outfile, "Start Time: %.2f\n", tr_start);
   FPRTF1(outfile, "End Time: %.2f\n", tr_end);
   FPRTF1(outfile, "Elapsed Time: %.2f\n", (tr_end - tr_start));
   FPRTF1(outfile, "Transaction Count: %d\n", num_iter);
   FPRTF1(outfile, "Transaction Rate: %.2f\n", num_iter/(tr_end - tr_start));
  } else {
   FPRTF1(logfile, "Start Time: %.2f\n", tr_start);
   FPRTF1(logfile, "End Time: %.2f\n", tr_end);
   FPRTF1(logfile, "Elapsed Time: %.2f\n", (tr_end - tr_start));
   FPRTF1(logfile, "Transaction Count: %d\n", num_iter);
  }

  /*  Disconnect from ORACLE. */

  if (BIT(flag, INFILE))
   fclose(infile);
  if (BIT(flag, OUTFILE))
   close(outfile);
  if (BIT(flag, LOGFILE))
   close(logfile);

  ACIDexit();

  exit(0);
}


void ACIDinit()
{

  /* run random seed */

  srand48(getpid());

  /* Connect to ORACLE.  Program will call sql_error()
     if an error occurs in connecting to the default database. */

  (void) OCIInitialize(OCI_DEFAULT,(dvoid *)0,0,0,0);
  if((status=OCIEnvInit((OCIEnv **)&tpcenv,OCI_DEFAULT,0,(dvoid **)0)) !=
     OCI_SUCCESS)
   sql_error(tpcenv, status, 0);

  OCIhalloc(tpcenv,&errhp,OCI_HTYPE_ERROR);
  OCIhalloc(tpcenv,&curi,OCI_HTYPE_STMT);
  OCIhalloc(tpcenv,&curr,OCI_HTYPE_STMT);
  OCIhalloc(tpcenv,&cure1,OCI_HTYPE_STMT);
  OCIhalloc(tpcenv,&cure2,OCI_HTYPE_STMT);
  OCIhalloc(tpcenv,&tpcsvc,OCI_HTYPE_SVCCTX);
  OCIhalloc(tpcenv,&tpcsrv,OCI_HTYPE_SERVER);
  OCIhalloc(tpcenv,&tpcusr,OCI_HTYPE_SESSION);

  /* Disables auto commit */
/*
  if (ocof(&tpclda)) {
   sql_error(&tpclda, &tpclda);
   ologof(&tpclda);
    exit(-1);
   }
*/

   /* get username and password */

   passwd = strchr(lname, '/');
   *passwd = '\0';
   passwd++;

   if ((status = OCIServerAttach(tpcsrv,errhp,(text *)0,0,OCI_DEFAULT)) !=
OCI_SUCCESS)
     sql_error(errhp,status,1);

   OCIaset(tpcsvc,OCI_HTYPE_SVCCTX,tpcsrv,0,OCI_ATTR_SERVER,errhp);

OCIaset(tpcusr,OCI_HTYPE_SESSION,lname,strlen(lname),OCI_ATTR_USERNA
ME,
         errhp);

OCIaset(tpcusr,OCI_HTYPE_SESSION,passwd,strlen(passwd),OCI_ATTR_PASSW
ORD,
         errhp);

   if ((status = OCISessionBegin(tpcsvc, errhp, tpcusr, OCI_CRED_RDBMS,
                        OCI_DEFAULT)) != OCI_SUCCESS)
     sql_error(errhp,status,1);

   OCIaset(tpcsvc,OCI_HTYPE_SVCCTX,tpcusr,0,OCI_ATTR_SESSION,errhp);

   /* Enable session parallel dml */

   sprintf((char *) sqlstmt, PDMLTXT);
   OCIStmtPrepare(curi,errhp,(text *)sqlstmt,strlen((char *)sqlstmt),
            OCI_NTV_SYNTAX,OCI_DEFAULT);
   OCIsexec(tpcsvc,curi,errhp,1);

   /* Enable session parallel ddl */

   /*sprintf((char *) sqlstmt, PDDLTXT);
   OCIStmtPrepare(curi,errhp,(text *)sqlstmt,strlen((char *)sqlstmt),
            OCI_NTV_SYNTAX,OCI_DEFAULT);
   OCIsexec(tpcsvc,curi,errhp,1);*/


   /* Make session serializable */

   sprintf ((char *) sqlstmt, ISOTXT);
   OCIStmtPrepare(curi,errhp,(text *)sqlstmt,strlen((char *)sqlstmt),
            OCI_NTV_SYNTAX,OCI_DEFAULT);
   OCIsexec(tpcsvc,curi,errhp,1);

   /* Set optimizer_index_cost_adj = 25 */

   sprintf ((char *) sqlstmt, OICATXT);
   OCIStmtPrepare(curi,errhp,(text *)sqlstmt,strlen((char *)sqlstmt),
            OCI_NTV_SYNTAX,OCI_DEFAULT);
   OCIsexec(tpcsvc,curi,errhp,1);

   curr_time = time(NULL);
   printf("\nConnected to ORACLE as user: %s at %s\n\n", lname, ctime(&curr_time));


#ifdef NOLKEY
   /* Open and Parse cursor for query to choose determine l_key. */
   /* Binds l_key to :l_key.                                     */

   sprintf((char *) sqlstmt,SQLTXT1);
   OCIStmtPrepare(curi,errhp,sqlstmt,strlen((char
*)sqlstmt),OCI_NTV_SYNTAX,OCI_DEFAULT);


   OCIbbname(curi,&l_keyi_bp,errhp,":l_key",ADR(l_key),SIZ(l_key),SQLT_INT);
   OCIbbname(curi,&o_keyi_bp,errhp,":o_key",ADR(o_key),SIZ(o_key),SQLT_INT);

#endif /* NOLKEY */

   /* Open and Parse cursor for the ACID transaction.           */
```

```
  sprintf((char *) sqlstmt,SQLTXT2);
  OCIStmtPrepare(curr,errhp,(text *)sqlstmt,strlen((char *)sqlstmt),
              OCI_NTV_SYNTAX,OCI_DEFAULT);

  /* bind variables */

  OCIbbname(curr,l_key_bp,errhp,":l_key",ADR(l_key),SIZ(l_key),SQLT_INT);
  OCIbbname(curr,o_key_bp,errhp,":o_key",ADR(o_key),SIZ(o_key),SQLT_INT);
  OCIbbname(curr,delta_bp,errhp,":delta",ADR(delta),SIZ(delta),SQLT_INT);
  OCIbbname(curr,l_pkey_bp,errhp,":l_pkey",ADR(l_pkey),SIZ(l_pkey),SQLT_INT);
  OCIbbname(curr,l_skey_bp,errhp,":l_skey",ADR(l_skey),SIZ(l_skey),SQLT_INT);
  OCIbbname(curr,l_quan_bp,errhp,":l_quan",ADR(l_quan),SIZ(l_quan),SQLT_INT);
  OCIbbname(curr,l_newquan_bp,errhp,":l_newquan",ADR(l_newquan),
          SIZ(l_newquan),SQLT_INT);
  OCIbbname(curr,l_tax_bp,errhp,":l_tax",ADR(l_tax),SIZ(l_tax),SQLT_FLT);
  OCIbbname(curr,l_disc_bp,errhp,":l_disc",ADR(l_disc),SIZ(l_disc),SQLT_FLT);
  OCIbbname(curr,l_eprice_bp,errhp,":l_eprice",ADR(l_eprice),SIZ(l_eprice),
          SQLT_FLT);
  OCIbbname(curr,l_neweprice_bp,errhp,":l_neweprice",ADR(l_neweprice),
          SIZ(l_neweprice),SQLT_FLT);

  OCIbbname(curr,o_tprice_bp,errhp,":o_tprice",ADR(o_tprice),SIZ(o_tprice),
          SQLT_FLT);
  OCIbbname(curr,o_newtprice_bp,errhp,":o_newtprice",ADR(o_newtprice),
          SIZ(o_newtprice), SQLT_FLT);
  OCIbbname(curr,rprice_bp,errhp,":rprice",ADR(rprice),SIZ(rprice), SQLT_FLT);
  OCIbbname(curr,cost_bp,errhp,":cost",ADR(cost),SIZ(cost), SQLT_FLT);

  /* Open & Parse cursor for end values query */

  sprintf((char *) sqlstmt,SQLTXT3);
  OCIStmtPrepare(cure1,errhp,(text *)sqlstmt,strlen((char *)sqlstmt),
              OCI_NTV_SYNTAX,OCI_DEFAULT);

  sprintf((char *) sqlstmt,SQLTXT4);
  OCIStmtPrepare(cure2,errhp,(text *)sqlstmt,strlen((char *)sqlstmt),
              OCI_NTV_SYNTAX,OCI_DEFAULT);

  /* bind variables */

  OCIbbname(cure1,l_neweprice1_bp,errhp,":l_neweprice",ADR(l_neweprice),
          SIZ(l_neweprice),SQLT_FLT);
  OCIbbname(cure1,l_newquan1_bp,errhp,":l_newquan",ADR(l_newquan),
          SIZ(l_newquan),SQLT_INT);
  OCIbbname(cure1,o_key1_bp,errhp,":o_key",ADR(o_key),SIZ(o_key),SQLT_INT);
  OCIbbname(cure1,l_key1_bp,errhp,":l_key",ADR(l_key),SIZ(l_key),SQLT_INT);

  OCIbbname(cure2,o_newtprice2_bp,errhp,":o_newtprice",ADR(o_newtprice),
          SIZ(o_newtprice),SQLT_FLT);
  OCIbbname(cure2,o_key2_bp,errhp,":o_key",ADR(o_key),SIZ(o_key),SQLT_INT);

}
```

atranspl.h

```
/* Copyright (c) 2001, Oracle Corporation.  All rights reserved.  */

/*
   NAME
     atranspl.h - <one-line expansion of the name>

   DESCRIPTION

   MODIFIED   (MM/DD/YY)
   mpoess     10/17/01 - add TXT parameter
   mpoess     04/09/01 - add hint to find max linenumber
   mpoess     01/04/01 - Creation

*/
#ifndef ATRANSPL_H

#define ATRANSPL_H

#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#include <sys/param.h>
#include <sys/types.h>
#include <time.h>
#include <errno.h>
#include <math.h>

#include <oratypes.h>
#ifndef OCIDFN
#include <ocidfn.h>
#endif /* OCIDFN */

#ifndef OCI_ORACLE
#include <oci.h>
#endif /* OCI_ORACLE */

/*
#ifdef __STDC__
#include <ociapr.h>
#else
#include <ocikpr.h>
#endif */ /* __STDC__ */

extern int errno;

#ifndef NULL
#define NULL 0
#endif

#ifndef NULLP
# define NULLP (void *)NULL
#endif /* NULLP */

#ifndef DISCARD
# define DISCARD (void)
#endif

#ifndef sword
# define sword int
#endif

#ifndef ub1
#define ub1 unsigned char
#endif

#define UNAME_LEN 64
#define WRITE_BUF_LEN 1024

#define NA              -1      /* ANSI SQL NULL */
#define VER7            2
#define NOT_SERIALIZABLE  8177  /* ORA-08177: transaction not serializable */
#define WRITE_BUF_LEN 1024

#define ADR(object) ((ub1 *)&(object))
#define SIZ(object) ((sword)sizeof(object))
#define BIS(flg,mask) (unsigned) (flg |= (unsigned) mask)
#define BIT(flg,mask) (unsigned) ((unsigned) flg & (unsigned) mask)

#define FPRTF(fd,s) \
{sprintf(buf,s); write(fd, buf, strlen(s));}
#define FPRTF1(fd,s,p) \
{sprintf(buf,s,p); write(fd, buf, strlen(buf));}
#define FPRTF2(fd,s,p1,p2) \
{sprintf(buf,s,p1,p2); write(fd, buf, strlen(buf));}

#define OCIhalloc(envh,hndl,htyp) \
    if((status=OCIHandleAlloc((dvoid *)envh,(dvoid **)hndl,htyp,0,(dvoid
**)0))!=OCI_SUCCESS) \
        sql_error(envh,status,0); \
    else \
        DISCARD 0

#define OCIhfree(hndl,htyp) \
    if((status=OCIHandleFree((dvoid *)hndl,htyp)) == OCI_SUCCESS) \
        fprintf(stderr, "Error freeing handle of type %d\n", htyp)

#define OCIaget(hndl,htyp,attp,size,atyp,errh) \
    if((status=OCIAttrGet((dvoid *)hndl,htyp,(dvoid *)attp,(dvoid *)size,atyp,errh)) !=
OCI_SUCCESS) \
        sql_error(errh,status,1); \
    else \
```

```
    DISCARD 0

#define OCIaset(hndl,htyp,attp,size,atyp,errh) \
   if((status=OCIAttrSet((dvoid *)hndl,htyp,(dvoid *)attp,size,atyp,errh)) !=
OCI_SUCCESS) \
      sql_error(errh,status,1); \
   else \
      DISCARD 0

#define OCIsexec(svch,stmh,errh,iter) \
   if((status=OCIStmtExecute(svch,stmh,errh,iter,0,NULL,NULL,OCI_DEFAULT))
!= OCI_SUCCESS) \
      sql_error(errh,status,1); \
   else \
      DISCARD 0

#define OCIbbname(stmh,bindp,errh,sqlvar,progv,progvl,ftype) \
   if((status=OCIBindByName(stmh,&bindp,errh,(text *)sqlvar,strlen(sqlvar), \
           progv,progvl,ftype,0,0,0,0,0,OCI_DEFAULT)) != OCI_SUCCESS) \
      sql_error(errh,status,1); \
   else \
      DISCARD 0

#define OCIbbnamei(stmh,bindp,errh,sqlvar,progv,progvl,ftype,indp) \
   if((status=OCIHandleAlloc((dvoid *)stmh,(dvoid **)&bindp,OCI_HTYPE_BIND,
\
                     0,(dvoid **)0))!=OCI_SUCCESS) \
      sql_error(stmh,status,0); \
   if((status=OCIBindByName(stmh,&bindp,errh,(text *)sqlvar,strlen(sqlvar), \
           progv,progvl,ftype,indp,0,0,0,0,OCI_DEFAULT)) != OCI_SUCCESS) \
      sql_error(errh,status,1); \
   else \
      DISCARD 0

#define OCIcom(svcp,errh) \
    if((status=OCITransCommit(svcp,errh,OCI_DEFAULT)) != OCI_SUCCESS) \
      sql_error(errh,status,1); \
    else \
      DISCARD 0

#define OCIrol(svcp,errh) \
    if((status=OCITransRollback(svcp,errh,OCI_DEFAULT)) != OCI_SUCCESS) \
      sql_error(errh,status,1); \
    else \
      DISCARD 0

#define ISOTXT "alter session set isolation_level = serializable"
#define PDMLTXT "alter session force parallel dml parallel (degree 4)"
#define PDDLTXT "alter session force parallel ddl parallel (degree 4)"
#define OICATXT "alter session set optimizer_index_cost_adj=25"

#define SQLTXT1 "BEGIN SELECT /*+ index(lineitem,i_l_orderkey) */
MAX(l_linenumber) INTO :l_key FROM lineitem \
WHERE l_orderkey = :o_key; END;"

#define SQLTXT2 "BEGIN d_atrans.doatrans(:l_key, :o_key, :delta, :l_pkey, \
:l_skey, :l_quan, :l_newquan, :l_tax, :l_disc, :l_eprice, :l_neweprice, \
:o_tprice, :o_newtprice, :rprice, :cost); END;"

#define SQLTXT3 "BEGIN SELECT l_extendedprice, l_quantity \
INTO :l_neweprice, :l_newquan \
FROM lineitem \
WHERE l_orderkey = :o_key \
AND l_linenumber = :l_key; END;"

#define SQLTXT4 "BEGIN SELECT o_totalprice INTO :o_newtprice \
FROM orders \
WHERE o_orderkey = :o_key; END;"

#define SQLTXT5 "BEGIN SELECT l_extendedprice, l_quantity \
INTO :l_eprice, :l_quan \
FROM lineitem \
WHERE l_orderkey = :o_key \
AND l_linenumber = :l_key; END;"

#define SQLTXT6 "BEGIN SELECT o_totalprice INTO :o_tprice \
FROM orders \
WHERE o_orderkey = :o_key; END;"

#endif /* ATRANSPL_H */
```

ckpt.sh

```
#!/bin/ksh
#
# $Header: ckpt.sh 10-jul-2001.11:12:03 mpoess Exp $
#
# ckpt.sh
#
# Copyright (c) 1999, 2001, Oracle Corporation.  All rights reserved.
#
#    NAME
#      ckpt.sh - <one-line expansion of the name>
#
#  DESCRIPTION
#      Usage: ckpt.sh
#      Start database checkpoint
#
#    NOTES
#      <other useful comments, qualifications, etc.>
#
#    MODIFIED   (MM/DD/YY)
#    mpoess      07/10/01 - change svrmgrl to sqlplus
#    mpoess      08/08/99 - Creation
#    mpoess      08/08/99 - Creation
#

. $KIT_DIR/env

sqlplus -s /NOLOG<< !

       connect / as sysdba;
               alter system switch logfile;
               alter system switch logfile;
               exit;
!
```

cnt_hist.sql

```
select count(*) from history;
exit;
```

consist.sh

```
#!/bin/ksh
#
# $Header: consist.sh 05-sep-2001.08:09:57 mpoess Exp $
#
# consist.sh
#
# Copyright (c) 1999, 2001, Oracle Corporation.  All rights reserved.
#
#    NAME
#      consist.sh - <one-line expansion of the name>
#
#  DESCRIPTION
#      Performs consistency tests.
#      Usage: consist.sh [-n iter] [-s number of stream] [-p prog]
#                        [-u usr/pswd] -h
#
#      Options: See usage below
#
#    NOTES
#      <other useful comments, qualifications, etc.>
#
#    MODIFIED   (MM/DD/YY)
#    mpoess      09/05/01 - reduce lines
#    mpoess      07/10/01 - add automatic stream setting
#    mpoess      08/08/99 - Creation
#    mpoess      08/08/99 - Creation
#
```

```
. $KIT_DIR/env

KEY=${ACID_DIR}/key$$_
OUTFILE=${ACID_OUT}/consrte
CON1=${ACID_OUT}/conb
CON2=${ACID_OUT}/cona
CHK=${ACID_OUT}/consckpt
SF=1

/bin/rm -rf ${KEY}* $CON1 $CON2 $OUTFILE $CHK

trap "/bin/rm -rf ${KEY}*; exit 1" 1 2 3 15

STREAM=5
let STREAM="$STREAM + 1" # add one for the update stream
ITER=100
PROG=atranspl
USER=${DATABASE_USER}
CK=10

usage() {

  echo ""
  echo "Usage: $0 [-n iter] [-s number of stream] [-p prog] [-u usr/pswd] -h"
  echo ""
  echo "-n iter             : number of iterations, default is 100"
  echo "-s number of stream : number of streams, default is 2"
  echo "-p prog             : program to run, default is atranspl.ott"
  echo "-u usr/pswd         : user/password for database access, default is tpcd/tpcd"
  echo "-t chkpt            : time after the start of ACID transaction to perform the
checkpoint"
  echo "                    default is 10 seconds"
  echo "-h                  : print this usage summary"
  exit 1;
}

set -- `getopt "n:p:u:s:h" "$@"` || usage

while :
do
  case "$1" in
  -s) shift; STREAM=$1;;
  -n) shift; ITER=$1;;
  -p) shift; PROG=$1;;
  -u) shift; USER=$1;;
  -t) shift; CK=$1;;
  -h) usage; exit 0;;
  --) break;;
  esac
  shift
done


if [ $ITER -lt 100 ]
then
echo "Error: Must at least run 100 iterations!"
echo "Exiting..."
exit 1
fi

if [ $STREAM -lt 2 ]
then
echo "Error: Must at least run 2 streams!"
echo "Exiting..."
exit 1
fi

echo "Starting Consistency Test at `date`..."
echo ""
echo "Generate some keys first"
echo ""

i=0

while [ $i -lt $STREAM ]
do
  echo randkey $ITER $SF u$USER
  randkey $ITER $SF u$USER > ${KEY}$i
  i=`expr $i + 1`
done

echo "Check consistency before Submitting Transactions `date`"
echo "Check consistency before Submitting Transactions `date`" >> $CON1

echo "Obtain 10 keys from the each key file to check consistency"

i=0
while [ $i -lt $STREAM ]
do
KEYS=`head -10 ${KEY}${i} | awk '{printf "%d ", $1}'`
echo "The 10 Keys for file $i are: $KEYS"
#for j in `head -10 ${KEY}${i} | awk '{printf "%d ", $1}'`
for j in $KEYS
do
   sqlplus $USER @consist $j >> $CON1
   echo "------------------------------" >> $CON1
done
   i=`expr $i + 1`
done

echo ""
echo "Starting ACID transactions at `date`"
echo ""

i=0

while [ $i -lt $STREAM ]
do
   $PROG $i $STREAM 1 0 u${USER} i${KEY}${i} o${OUTFILE}${i} s1 &
   i=`expr $i + 1`
done

echo "Schedule a Checkpoint"
echo "Checkpoint scheduled at $CK seconds after `date`"

(sleep $CK; $ACID_DIR/consistency/ckpt.sh) &

wait

echo ""
echo "Ending ACID transactions at `date`"
echo ""

echo "Completed $STREAM transaction streams with $ITER iterations each"
echo ""

echo "Check consistency after Submitting Transactions `date`"
echo "Check consistency after Submitting Transactions `date`" >> $CON2

cat ${ORACLE_HOME}/rdbms/log/alert_${ORACLE_SID}.log >> $CHK

i=0
while [ $i -lt $STREAM ]
do
KEYS=`head -10 ${KEY}$i | awk '{printf "%d ", $1}'`
echo "The keys to check for consistency after the test from file $i are:"
echo "$KEYS"
for j in $KEYS
do
   sqlplus $USER @consist $j >> $CON2
   echo "------------------------------" >> $CON2
done
   i=`expr $i + 1`
done
```

consist.sql

```
Rem
Rem $Header: template.sql 16-feb-2001.19:27:01 mpoess   Exp $
Rem
Rem consist.sql
Rem
Rem  Copyright (c) Oracle Corporation 2001. All Rights Reserved.
Rem
Rem    NAME
Rem      consist.sql - <one-line expansion of the name>
Rem
```

```
Rem    DESCRIPTION
Rem      Verifies the consistency of TPC-D database using the
Rem      consistency condition.
Rem
Rem    NOTES
Rem    REQUIRES PACKAGES prvtotpt and dbmsotpt
Rem
Rem    MODIFIED   (MM/DD/YY)
Rem    mpoess      07/10/01 - Created
Rem

SET FEEDBACK 1
SET NUMWIDTH 10
SET LINESIZE 80
SET TRIMSPOOL ON
SET TAB OFF
SET PAGESIZE 100
SET ECHO ON

set verify off
rem set termout on
rem set echo on


REM
REM Get today's date.
REM

select
substr(TO_CHAR(sysdate,'YYYY-MM-DD HH:MI:SS'),1,20) as CURRENT_TIME
from dual;

set serverout on;

DECLARE
                o_okey          number;
                o_tprice        number;
                l_tprice        number;
                diff                            number;
BEGIN
   select o_totalprice
                into o_tprice
                from orders
                where o_orderkey = &&1;


   select sum(trunc((trunc((l_extendedprice * (1-l_discount)), 2)
        * (1+l_tax)), 2))
                into l_tprice
                from lineitem
                where l_orderkey = &&1;

   diff := l_tprice - o_tprice;

   dbms_output.put_line('O_TOTALPRICE: ' || TO_CHAR(trunc(o_tprice,2)));
   dbms_output.put_line('L_TOTALPRICE: ' || TO_CHAR(trunc(l_tprice,2)));
   dbms_output.put_line('Difference:   ' || TO_CHAR(trunc(diff,2)));

END;
.
/


spool off
exit
```

count_tx.sh

```
#!/bin/ksh

STEM=$1
ITER=$2
OUT=$3
FIN=FALSE
while [ "$FIN" = "FALSE" ]
do
 s=0
 FIN=TRUE
 while [ $s -lt $STEM ]
 do
  nt=`grep "Transaction Completed" $OUT/dura${s} | wc -l`
  if [ $nt -lt $ITER ];then
    FIN=FALSE
  fi
  s=`expr $s + 1`
 done
 sleep 5
done
echo all streams have commited $ITER transactions
```

d_hist.sql

```
Rem
Rem $Header: d_hist.sql 07-aug-99.21:33:08 mpoess Exp $
Rem
Rem d_hist.sql
Rem
Rem  Copyright (c) Oracle Corporation 1999. All Rights Reserved.
Rem
Rem    NAME
Rem      d_hist.sql - <one-line expansion of the name>
Rem
Rem    DESCRIPTION
Rem      Creates a history table for ACID test purpose.
Rem
Rem    NOTES
Rem      <other useful comments, qualifications, etc.>
Rem
Rem    MODIFIED   (MM/DD/YY)
Rem    mpoess      08/07/99 - Creation
Rem    mpoess      08/07/99 - Created
Rem


set termout on;
set serverout on;
set echo on;

drop table history;

create table history
(
                h_p_key       number,
                h_s_key       number,
                h_o_key number,
                h_l_key       number,
                h_delta number,
                h_date_t date
);

exit;
```

end_acid.sh

```
#!/bin/ksh
#
# $Header: end_acid.sh 08-aug-99.17:06:20 mpoess Exp $
#
# end_acid.sh
#
#  Copyright (c) Oracle Corporation 1999. All Rights Reserved.
#
#    NAME
#      end_acid.sh - <one-line expansion of the name>
#
#  DESCRIPTION
#      end_cons.sh <pid of the durability run>
#      Options: See usage below
#
#    NOTES
#      <other useful comments, qualifications, etc.>
#
```

```
#    MODIFIED   (MM/DD/YY)
#    mpoess      08/08/99 - Creation
#    mpoess      08/08/99 - Creation
#

. $KIT_DIR/env

OH=$ORACLE_HOME
# ACID_DIR=$OH/tpcd/audit set in env
OUT_DIR=$ACID_OUT/
DURA_DIR=$ACID_OUT/dura
RUN_ID_FILE=$ACID_DIR/run_id

ITER=100
STEM=6
PROG=${ACID_DIR}/atranspl.ott
IN=${ACID_DIR}/acid_in
DURA=${DURA_DIR}/dura
OUT=${DURA_DIR}/drate
DSMPL=${DURA_DIR}/durasmpl
KEY=${DURA_DIR}/key${1}_
USER=tpcd/tpcd
TRIG=1
HCNT=duracnta

# get history count

sqlplus $USER @cnt_hist > $DURA_DIR/$HCNT 2>&1

# perform the consistency

i=0
while [ $i -lt $STEM ]
do
  for j in `head -10 ${KEY}${i} | awk '{printf "%d ",$1}'`
  do
    sqlplus tpcd/tpcd @consist $j >> $DURA_DIR/duraconsa
  done
  i=`expr $i + 1`
done

i=0
while [ $i -lt $STEM ]
do
sample.sh $DURA${i} > ${DSMPL}${i} 2>&1
i=`expr $i + 1`
done
```

gettime.c

```
#ifdef RCSID
static char *RCSid =
  "$Header: gettime.c 15-jul-99.14:27:44 mpoess Exp $ ";
#endif /* RCSID */

/* Copyright (c) Oracle Corporation 1999. All Rights Reserved. */

/*

  NAME
    gettime.c

  DESCRIPTION
    get wall clock time.
    get cpu time.

  FUNCTIONS
    get wall clock time.
    get cpu time.

  NOTES
    Both routines return time in seconds as a double.
  MODIFIED   (MM/DD/YY)
  mpoess      07/15/99 - Creation
  mpoess      07/15/99 - Creation
  espeed      01/15/02 - Customize for Compaq Tru64 UNIX

*/

/*
**  Options:
**     TIME_W_TIMES:      implement gettime() with times().
**     TIME_W_GETTIME:    implement gettime() with gettimeofday().
**     CPU_W_TIMES:       implement getcpu()  with times().
**     CPU_W_GETRU:       implement getcpu()  with getrusage().
**     GETRU_STATS:       collect getrusage statistics
**     GET_P_STATS:       collect get_process_stats statistics
*/

#define SUN_OS5

#if defined(SUN_OS5)
#define TIME_W_GETTIME
#define CPU_W_TIMES
#undef GETRU_STATS
#undef CPU_W_GETRU
#endif /* SUN_OS5 */

#if defined(sequent) || defined(SEQ_PSX)
# define GET_P_STATS
#endif /* sequent */

#if defined(aix) || defined(AIXRIOS)
# define TIME_W_GETTIME
# define CPU_W_TIMES
# define GETRU_STATS
#endif /* AIXRIOS */

#if defined(a_osf) || defined(A_OSF)
# define TIME_W_GETTIME
# define CPU_W_GETRU
# define GETRU_STATS
#endif /* AIXRIOS */

#if defined(HPUX) || defined(XENIX_386) || defined(SYSV_386) ||
defined(ATT_3B)
# define TIME_W_TIMES
# define CPU_W_TIMES
#endif /* HPUX || XENIX_386 || SYSV_386 */

#if !defined(TIME_W_GETTIME) && !defined(TIME_W_TIMES)
# define TIME_W_TIMES
#endif

#if !defined(CPU_W_GETRU) && !defined(CPU_W_TIMES)
# define CPU_W_TIMES
#endif

#ifdef GET_P_STATS
# ifdef GETRU_STATS
#  undef GETRU_STATS
# endif
#endif

#if defined(TIME_W_GETTIME) || defined(CPU_W_GETRU) ||
defined(GETRU_STATS)
# include <sys/time.h>
#endif /* TIME_W_GETTIME || CPU_W_GETRU || GETRU_STATS */

#if defined(CPU_W_GETRU) || defined(GETRU_STATS)
# include <sys/resource.h>
#endif /* CPU_W_GETRU || GETRU_STATS */

#if defined(TIME_W_TIMES) || defined (CPU_W_TIMES)
# include <sys/types.h>
# include <sys/times.h>
/* # include <sys/param.h>   most systems define HZ here */
/* but Compaq Tru64 UNIX requires the following 2 includes  */
# include <sys/sysinfo.h>
# include <machine/hal_sysinfo.h>
#endif /* TIME_W_TIMES or CPU_W_TIMES */

#ifdef GET_P_STATS
# include <sys/types.h>
# include <sys/procstats.h>
#endif /* GET_P_STATS */
```

```
# include <stdio.h>

#ifdef GETRU_STATS
struct rusage selfru;
struct rusage kidsru;
#endif /* GETRU_STATS */

#ifdef GET_P_STATS
struct process_stats selfru;
struct process_stats kidsru;
#endif /* GET_P_STATS */



double gettime ()

{

#ifdef TIME_W_GETTIME
  struct timeval tv;

  (void) gettimeofday (&tv, (struct timezone *) 0);
  return ((double) tv.tv_sec + (1.0e-6 * (double) tv.tv_usec));
#endif /* TIME_W_GETTIME */

#ifdef TIME_W_TIMES
  struct tms buf;

/* Next 2 lines for Compaq Tru64 UNIX   */
  int HZ;
  getsysinfo(GSI_CLK_TCK, (char *)&HZ, sizeof(HZ));

  return ((double) times (&buf) / HZ);
#endif /* TIME_W_TIMES */

}



double getcpu ()

{

#ifdef CPU_W_TIMES
  struct tms buf;

/* Next 2 lines for Compaq Tru64 UNIX   */
  int HZ;
  getsysinfo(GSI_CLK_TCK, (char *)&HZ, sizeof(HZ));

  (void) times (&buf);
  return (((double) buf.tms_utime + (double) buf.tms_stime) / HZ);
#endif /* CPU_W_TIMES */

#ifdef CPU_W_GETRU
  struct rusage ru;
  double usecs;

  (void) getrusage (0, &ru);
  usecs = 1.0e-6 * (double) (ru.ru_utime.tv_usec + ru.ru_stime.tv_usec);
  return ((double) (ru.ru_utime.tv_sec + ru.ru_stime.tv_sec) + usecs);
#endif /* CPU_W_GETRU */

}



getru (fp, kids, config, runname, proc_no)

FILE *fp;
int kids;
char *config;
char *runname;
int proc_no;

{

#ifdef GETRU_STATS
  struct rusage ru;

  fprintf (fp, "%-10.10s %-10.10s %10d %10d ", config,runname, proc_no, kids);
  getrusage (kids ? RUSAGE_CHILDREN : RUSAGE_SELF, &ru);
  print_ru (fp, &ru);
  fprintf (fp, "\n");
#endif /* GETRU_STATS */

#ifdef GET_P_STATS
  timeval_t tv;
  struct process_stats ru;

  fprintf (fp, "%-10.10s %-10.10s %10d %10d ", config,runname, proc_no, kids);
  if (kids)
    get_process_stats (&tv, PS_SELF, (struct process_stats *) 0, &ru);
  else
    get_process_stats (&tv, PS_SELF, &ru, (struct process_stats *) 0);
  print_ru (fp, &ru);
  fprintf (fp, "\n");
#endif /* GET_P_STATS */

}



getru1 (kids)

int kids;

{

#ifdef GETRU_STATS
  if (kids) {
    memset (&kidsru, 0, sizeof (kidsru));
    getrusage (RUSAGE_CHILDREN, &kidsru);
  }
  else {
    memset (&selfru, 0, sizeof (selfru));
    getrusage (RUSAGE_SELF, &selfru);
  }
#endif /* GETRU_STATS */

#ifdef GET_P_STATS
  timeval_t tv;

  if (kids) {
    memset (&kidsru, 0, sizeof (kidsru));
    get_process_stats (&tv, PS_SELF, (struct process_stats *) 0, &kidsru);
  }
  else {
    memset (&selfru, 0, sizeof (selfru));
    get_process_stats (&tv, PS_SELF, &selfru, (struct process_stats *) 0);
  }
#endif /* GET_P_STATS */

}



getru2 (fp, kids, config, runname, proc_no)

FILE *fp;
int kids;
char *config;
char *runname;
int proc_no;

{

#ifdef GETRU_STATS
  struct rusage ru;

  fprintf (fp, "%-10.10s %-10.10s %10d %10d ", config, runname, proc_no, kids);
  getrusage (kids ? RUSAGE_CHILDREN : RUSAGE_SELF, &ru);
  if (kids)
    diffru (&ru, &kidsru);
  else
    diffru (&ru, &selfru);
  print_ru (fp, &ru);
```

```
  fprintf (fp, "\n");
#endif /* GETRU_STATS */

#ifdef GET_P_STATS
  timeval_t tv;
  struct process_stats ru;

  fprintf (fp, "%-10.10s %-10.10s %10d %10d ", config, runname, proc_no, kids);
  if (kids)
    get_process_stats (&tv, PS_SELF, (struct process_stats *) 0, &ru);
  else
    get_process_stats (&tv, PS_SELF, &ru, (struct process_stats *) 0);
  if (kids)
    diffru (&ru, &kidsru);
  else
    diffru (&ru, &selfru);
  print_ru (fp, &ru);
  fprintf (fp, "\n");
#endif /* GET_P_STATS */

}



#ifdef GETRU_STATS

print_ru (fp, ru)

FILE *fp;
struct rusage *ru;

{

  fprintf (fp, "%10ld ", ru->ru_utime.tv_sec * 1000 +
                   (ru->ru_utime.tv_usec/1000));
  fprintf (fp, "%10ld ", ru->ru_stime.tv_sec * 1000 +
                   (ru->ru_stime.tv_usec/1000));
  fprintf (fp, "%10ld ", ru->ru_maxrss);
  fprintf (fp, "%10ld ", ru->ru_majflt);
  fprintf (fp, "%10ld ", ru->ru_minflt);
  fprintf (fp, "%10ld ", 0);
  fprintf (fp, "%10ld ", 0);
  fprintf (fp, "%10ld ", 0);
  fprintf (fp, "%10ld ", ru->ru_nswap);
  fprintf (fp, "%10ld ", 0);
  fprintf (fp, "%10ld ", ru->ru_nvcsw);
  fprintf (fp, "%10ld ", ru->ru_nivcsw);
  fprintf (fp, "%10ld ", ru->ru_nsignals);
  fprintf (fp, "%10ld ", 0);
  fprintf (fp, "%10ld ", 0);
  fprintf (fp, "%10ld ", ru->ru_inblock);
  fprintf (fp, "%10ld ", ru->ru_oublock);
  fprintf (fp, "%10ld ", 0);
  fprintf (fp, "%10ld",  0);

}



diffru (ru2, ru)

struct rusage *ru2;
struct rusage *ru;

{

  ru2->ru_utime.tv_sec -= ru->ru_utime.tv_sec;
  ru2->ru_utime.tv_usec -= ru->ru_utime.tv_usec;
  ru2->ru_stime.tv_sec -= ru->ru_stime.tv_sec;
  ru2->ru_stime.tv_usec -= ru->ru_stime.tv_usec;
  ru2->ru_maxrss -= ru->ru_maxrss;
  ru2->ru_ixrss -= ru->ru_ixrss;
  ru2->ru_idrss -= ru->ru_idrss;
  ru2->ru_minflt -= ru->ru_minflt;
  ru2->ru_majflt -= ru->ru_majflt;
  ru2->ru_nswap -= ru->ru_nswap;
  ru2->ru_inblock -= ru->ru_inblock;
  ru2->ru_oublock -= ru->ru_oublock;
  ru2->ru_msgsnd -= ru->ru_msgsnd;
  ru2->ru_msgrcv -= ru->ru_msgrcv;
  ru2->ru_nsignals -= ru->ru_nsignals;
  ru2->ru_nvcsw -= ru->ru_nvcsw;
  ru2->ru_nivcsw -= ru->ru_nivcsw;

}

#endif /* GETRU_STATS */



#ifdef GET_P_STATS

print_ru (fp, ps)

FILE *fp;
struct process_stats *ps;

{

  fprintf (fp, "%lu ", ps->ps_utime.tv_sec * 1000 +
                   (ps->ps_utime.tv_usec/1000));
  fprintf (fp, "%lu ", ps->ps_stime.tv_sec * 1000 +
                   (ps->ps_stime.tv_usec/1000));
  fprintf (fp, "%lu ", ps->ps_maxrss);
  fprintf (fp, "%lu ", ps->ps_pagein);
  fprintf (fp, "%lu ", ps->ps_reclaim);
  fprintf (fp, "%lu ", ps->ps_zerofill);
  fprintf (fp, "%lu ", ps->ps_pffincr);
  fprintf (fp, "%lu ", ps->ps_pffdecr);
  fprintf (fp, "%lu ", ps->ps_swap);
  fprintf (fp, "%lu ", ps->ps_syscall);
  fprintf (fp, "%lu ", ps->ps_volcsw);
  fprintf (fp, "%lu ", ps->ps_involcsw);
  fprintf (fp, "%lu ", ps->ps_signal);
  fprintf (fp, "%lu ", ps->ps_lread);
  fprintf (fp, "%lu ", ps->ps_lwrite);
  fprintf (fp, "%lu ", ps->ps_bread);
  fprintf (fp, "%lu ", ps->ps_bwrite);
  fprintf (fp, "%lu ", ps->ps_phread);
  fprintf (fp, "%lu",  ps->ps_phwrite);

}



diffru (ru2, ru)

struct process_stats *ru2;
struct process_stats *ru;

{

  ru2->ps_utime.tv_sec -= ru->ps_utime.tv_sec;
  ru2->ps_utime.tv_usec -= ru->ps_utime.tv_usec;
  ru2->ps_stime.tv_sec -= ru->ps_stime.tv_sec;
  ru2->ps_stime.tv_usec -= ru->ps_stime.tv_usec;
  ru2->ps_maxrss -= ru->ps_maxrss;
  ru2->ps_pagein -= ru->ps_pagein;
  ru2->ps_reclaim -= ru->ps_reclaim;
  ru2->ps_zerofill -= ru->ps_zerofill;
  ru2->ps_pffincr -= ru->ps_pffincr;
  ru2->ps_pffdecr -= ru->ps_pffdecr;
  ru2->ps_swap -= ru->ps_swap;
  ru2->ps_syscall -= ru->ps_syscall;
  ru2->ps_volcsw -= ru->ps_volcsw;
  ru2->ps_involcsw -= ru->ps_involcsw;
  ru2->ps_signal -= ru->ps_signal;
  ru2->ps_lread -= ru->ps_lread;
  ru2->ps_lwrite -= ru->ps_lwrite;
  ru2->ps_bread -= ru->ps_bread;
  ru2->ps_bwrite -= ru->ps_bwrite;
  ru2->ps_phread -= ru->ps_phread;
  ru2->ps_phwrite -= ru->ps_phwrite;

}

#endif /* GET_P_STATS */
```

iso1.sh

```
#!/bin/ksh
#
# $Header: iso1.sh 10-jul-2001.11:17:34 mpoess Exp $
#
# iso1.sh
#
# Copyright (c) 1998, 2001, Oracle Corporation.  All rights reserved.
#
#    NAME
#      iso1.sh
#
#  DESCRIPTION
#       Usage: iso1.sh [-u user/password] [-n remote_node] -h
#       Options: See usage below
#  NOTES
#               For a cross node isolation test, assume the local node is
#               one of the participating nodes.  The other node can be
#               specified by the -n option.
#       You need to set the environment variable TPCD_KIT_DIR
#
#    MODIFIED   (MM/DD/YY)
#    mpoess      07/10/01 - change tpcd/tpcd to DATABASE_USER
#    mpoess      12/16/98 - update to version 8.1.6
#    mpoess      09/25/98 - update audit
#    akarasik    07/29/98 -
#    akarasik    07/29/98 - Creation
#

. $KIT_DIR/env

# May need to change the following:
RSH=rsh

OH=$ORACLE_HOME
#ACID_DIR=$KIT_DIR/acid is set in env
OUT_DIR=$ACID_OUT

TXN1FILE=$OUT_DIR/txn1$$.out
TXN2FILE=$OUT_DIR/txn2$$.out
KEYFILE=$OUT_DIR/key$$.out
ISOFILE=$OUT_DIR/iso1

USER=$DATABASE_USER
PROG=atranspl


/bin/rm -rf $TXN1FILE $TXN2FILE $KEYFILE

trap "/bin/rm -rf $TXN1FILE $TXN2FILE $KEYFILE; exit 1" 1 2 3 15

usage() {

  echo ""
  echo "Usage: $0 [-u user/passwd] [-n remote_node] -h"
  echo ""
  exit 1;
}

set -- `getopt "u:n:h" "$@"` || usage

while :
do
  case "$1" in
  -u) shift; USER=$1;;
  -n) shift; RHOST="$1";;
  -h) usage; exit 0;;
  --) break;;
  esac
  shift;
done


de=`direxists.sh $ACID_OUT c` # I am not using $de afterward, but I want to avoid
the output of direxists

# generate key files

randkey 1 0.1 u"$USER" > $KEYFILE

OKEY=`cat $KEYFILE | awk '{print $1}'`
echo "o_key is "$OKEY

# before the ACID transaction, let's run a ACID query to record the
# initial state of lineitem

echo "Running ACID query BEFORE the start of Isolation Test 1" >> $TXN2FILE
echo "`date`" >> $TXN2FILE
echo "" >> $TXN2FILE
sqlplus $USER @$ACID_DIR/isolation/a_query $OKEY >> $TXN2FILE
echo "" >> $TXN2FILE
echo "-------------------------------------------------" >> $TXN2FILE

sleep 1

# start ACID transaction, Sleep for 60 second before COMMIT

$PROG 1 1 1 0 i$KEYFILE u$USER s60 >> $TXN1FILE &

# let's sleep 10 seconds before starting ACID query

sleep 10

# start ACID query with the same OKEY

echo "Running ACID query 10 seconds AFTER the start of ACID Transaction" \
>> $TXN2FILE
echo "`date`" >> $TXN2FILE
if [ "$RHOST" != "" ]
then
echo "Starting ACID query on node $RHOST" >> $TXN2FILE
${RSH} -n ${RHOST}  sqlplus $USER @$ACID_DIR/isolation/a_query $OKEY >>
$TXN2FILE
else
sqlplus $USER @$ACID_DIR/isolation/a_query $OKEY >> $TXN2FILE
fi

echo "-------------------------------------------------" >> $TXN2FILE
wait
echo "-------------------------------------------------" >> $TXN1FILE

cat $TXN1FILE $TXN2FILE >> $ISOFILE

/bin/rm -rf $TXN1FILE $TXN2FILE $KEYFILE
```

iso2.sh

```
#!/bin/ksh
#
# $Header: iso2.sh 10-jul-2001.11:17:36 mpoess Exp $
#
# iso2.sh
#
# Copyright (c) 1999, 2001, Oracle Corporation.  All rights reserved.
#
#    NAME
#      iso2.sh - <one-line expansion of the name>
#
#    DESCRIPTION
#      Usage: iso2.sh [-u user/password] [-n remote_node] -h
#      Options: See usage below
#    NOTES
#       For a cross node isolation test, assume the local node is
#       one of the participating nodes.  The other node can be
#       specified by the -n option.
#       You need to set the environment variable TPCD_KIT_DIR
#
#    MODIFIED   (MM/DD/YY)
#    mpoess      07/10/01 - change tpcd/tpcd to DATABASE_USER
#    mpoess      08/04/99 - Creation
#    mpoess      08/04/99 - Creation
#
#
```

```
#
============================================================
=====+
# May need to change the following:

. $KIT_DIR/env

RSH=rsh

OH=$ORACLE_HOME
# ACID_DIR=$TPCD_KIT_DIR/audit is set in env
OUT_DIR=$ACID_OUT

DURA_DIR=$ACID_DIR/dura

TXN1FILE=$OUT_DIR/txn1$$.out
TXN2FILE=$OUT_DIR/txn2$$.out
KEYFILE=$OUT_DIR/key$$.out
ISOFILE=$OUT_DIR/iso2

USER=$DATABASE_USER
PROG=atranspl

/bin/rm -rf $TXN1FILE $TXN2FILE $KEYFILE

trap "/bin/rm -rf $TXN1FILE $TXN2FILE $KEYFILE; exit 1" 1 2 3 15

usage() {

  echo ""
  echo "Usage: $0 [-u user/passwd] [-n remote_node] -h"
  echo ""
  exit 1;
}

set -- `getopt "u:n:h" "$@"` || usage

while :
do
  case "$1" in
  -u) shift; USER=$1;;
  -n) shift; RHOST="$1";;
  -h) usage; exit 0;;
  --) break;;
  esac
  shift;
done


# generate key files

randkey 1 0.1 u"$USER" > $KEYFILE

OKEY=`cat $KEYFILE | awk '{print $1}'`
echo "o_key is "$OKEY

# before the ACID transaction, let's run a ACID query to record the
# initial state of lineitem

echo "Running ACID query BEFORE the start of Isolation Test 1" >> $TXN2FILE
echo "`date`" >> $TXN2FILE
echo "" >> $TXN2FILE
sqlplus $USER @$ACID_DIR/isolation/a_query $OKEY >> $TXN2FILE
echo "" >> $TXN2FILE
echo "-------------------------------------------------" >> $TXN2FILE

sleep 1

# start ACID transaction, Sleep for 30 second before ROLLBACK

$PROG 1 1 0 0 i$KEYFILE u$USER s30 >> $TXN1FILE &

# let's sleep 10 seconds before starting ACID query

sleep 10

# start ACID query with the same OKEY

echo "Running ACID query 10 seconds AFTER the start of ACID transaction" \
>> $TXN2FILE
echo "`date`" >> $TXN2FILE
if [ "$RHOST" != "" ]
then
echo "Starting ACID query on node $RHOST" >> $TXN2FILE
${RSH} -n ${RHOST}  sqlplus $USER @$ACID_DIR/isolation/a_query $OKEY >>
$TXN2FILE
else
sqlplus $USER @$ACID_DIR/isolation/a_query $OKEY >> $TXN2FILE
fi

echo "-------------------------------------------------" >> $TXN2FILE
wait
echo "-------------------------------------------------" >> $TXN1FILE

cat $TXN1FILE $TXN2FILE >> $ISOFILE

/bin/rm -rf $TXN1FILE $TXN2FILE $KEYFILE
```

iso3.sh

```
#!/bin/ksh
#
# $Header: iso3.sh 10-jul-2001.11:17:37 mpoess Exp $
#
# iso3.sh
#
# Copyright (c) 1999, 2001, Oracle Corporation.  All rights reserved.
#
#    NAME
#      iso3.sh - <one-line expansion of the name>
#
#  DESCRIPTION
#      Usage: iso3.sh [-u user/password] [-n remote_node] -h
#      Options: See usage below
#  NOTES
#       For a cross node isolation test, assume the local node is
#       one of the participating nodes.  The other node can be
#       specified by the -n option.
#               We need to make sure the remote node has access to the
#               file system on the local node.  Otherwise, we need to rcp
#               the keyfile to the remote system.
#       You need to set the environment variable TPCD_KIT_DIR
#
#    MODIFIED   (MM/DD/YY)
#    mpoess      07/10/01 - change tpcd/tpcd to DATABASE_USER
#    mpoess      08/04/99 - Creation
#    mpoess      08/04/99 - Creation
#

. $KIT_DIR/env

# May need to change the following:
RSH=rsh

OH=$ORACLE_HOME
#ACID_DIR=$TPCD_KIT_DIR/audit is set in env
OUT_DIR=$ACID_OUT

DURA_DIR=$ACID_DIR/dura

TXN1FILE=$OUT_DIR/txn1$$.out
TXN2FILE=$OUT_DIR/txn2$$.out
KEYFILE=$OUT_DIR/key$$.out
ISOFILE=$OUT_DIR/iso3

USER=$DATABASE_USER
PROG=atranspl

/bin/rm -rf $TXN1FILE $TXN2FILE $KEYFILE

trap "/bin/rm -rf $TXN1FILE $TXN2FILE $KEYFILE; exit 1" 1 2 3 15

usage() {

  echo ""
  echo "Usage: $0 [-u user/passwd] [-n remote_node] -h"
  echo ""
```

```
  exit 1;
}

set -- `getopt "u:n:h" "$@"` || usage

while :
do
  case "$1" in
  -u) shift; USER=$1;;
  -n) shift; RHOST="$1";;
  -h) usage; exit 0;;
  --) break;;
  esac
  shift
done


# generate key files

randkey 1 0.1 u"$USER" > $KEYFILE

sleep 1

# start ACID transaction, Sleep for 30 second before COMMIT

$PROG 1 2 1 0 i$KEYFILE u$USER s30 >> $TXN1FILE &

# let's sleep 10 seconds before starting second ACID transaction

sleep 10

# start another ACID transaction with the same LKEY and OKEY
# but different DELTA

# Do not sleep before COMMIT so that we can see TXN2 has waited.

if [ "$RHOST" != "" ]
then
echo "Starting TXN2 on node $RHOST" >> $TXN2FILE
${RSH} -n ${RHOST} $PROG 2 2 1 1 i$KEYFILE u$USER s1 >> $TXN2FILE &
else
$PROG 2 2 1 1 i$KEYFILE u$USER s1 >> $TXN2FILE &
fi

wait
echo "--------------------------------------------------" >> $TXN2FILE
echo "--------------------------------------------------" >> $TXN1FILE

cat $TXN1FILE $TXN2FILE >> $ISOFILE

/bin/rm -rf $TXN1FILE $TXN2FILE $KEYFILE
```

iso4.sh

```
#!/bin/ksh
#
# $Header: iso4.sh 10-jul-2001.11:17:38 mpoess Exp $
#
# iso4.sh
#
# Copyright (c) 1999, 2001, Oracle Corporation.  All rights reserved.
#
#    NAME
#      iso4.sh - <one-line expansion of the name>
#
#  DESCRIPTION
#      Usage: iso4.sh [-u user/password] [-n remote_node] -h
#      Options: See usage below
#  NOTES
#       For a cross node isolation test, assume the local node is
#       one of the participating nodes.  The other node can be
#       specified by the -n option.
#       We need to make sure the remote node has access to the
#       file system on the local node.  Otherwise, we need to rcp
#       the keyfile to the remote system.
#       You need to set the environment variable TPCD_KIT_DIR
#
#    MODIFIED   (MM/DD/YY)
#    mpoess     07/10/01 - change tpcd/tpcd to DATABASE_USER
#    mpoess     08/04/99 - Creation
#    mpoess     08/04/99 - Creation
#

. $KIT_DIR/env

# May need to change the following:
RSH=rsh

OH=$ORACLE_HOME
# ACID_DIR=$TPCD_KIT_DIR/audit is set in env
OUT_DIR=$ACID_OUT

DURA_DIR=$ACID_DIR/dura

TXN1FILE=$OUT_DIR/txn1$$.out
TXN2FILE=$OUT_DIR/txn2$$.out
KEYFILE=$OUT_DIR/key$$.out
ISOFILE=$OUT_DIR/iso4

USER=$DATABASE_USER
PROG=atranspl

/bin/rm -rf $TXN1FILE $TXN2FILE $KEYFILE

trap "/bin/rm -rf $TXN1FILE $TXN2FILE $KEYFILE; exit 1" 1 2 3 15

usage() {

  echo ""
  echo "Usage: $0 [-u user/passwd] [-n remote_node] -h"
  echo ""
  exit 1;
}

set -- `getopt "u:n:h" "$@"` || usage

while :
do
  case "$1" in
  -u) shift; USER=$1;;
  -n) shift; RHOST="$1";;
  -h) usage; exit 0;;
  --) break;;
  esac
  shift
done


# generate key files

randkey 1 0.1 u"$USER" > $KEYFILE

sleep 1

# start ACID transaction, Sleep for 30 second before ROLLBACK

$PROG 1 2 0 0 i$KEYFILE u$USER s30 >> $TXN1FILE &

# let's sleep 10 seconds before starting second ACID transaction

sleep 10

# start another ACID transaction with the same LKEY and OKEY
# but different DELTA

# Do not sleep before COMMIT so that we can see TXN2 has waited.

if [ "$RHOST" != "" ]
then
echo "Starting TXN2 on node $RHOST" >> $TXN2FILE
${RSH} -n ${RHOST} $PROG 2 2 1 1 i$KEYFILE u$USER s1 >> $TXN2FILE &
else
$PROG 2 2 1 1 i$KEYFILE u$USER s1 >> $TXN2FILE &
fi

wait
echo "--------------------------------------------------" >> $TXN2FILE
```

```
echo "------------------------------------------------" >> $TXN1FILE

cat $TXN1FILE $TXN2FILE >> $ISOFILE

/bin/rm -rf $TXN1FILE $TXN2FILE $KEYFILE
```

iso5.sh

```
#!/bin/ksh
#
# $Header: iso5.sh 10-jul-2001.11:17:39 mpoess Exp $
#
# iso5.sh
#
# Copyright (c) 1999, 2001, Oracle Corporation.  All rights reserved.
#
#    NAME
#      iso5.sh - <one-line expansion of the name>
#
#  DESCRIPTION
#      Usage: iso5.sh [-u user/password] [-n remote_node] -h
#      Options: See usage below
#  NOTES
#       For a cross node isolation test, assume the local node is
#       one of the participating nodes.  The other node can be
#       specified by the -n option.
#       You need to set the environment variable TPCD_KIT_DIR
#
#    MODIFIED   (MM/DD/YY)
#    mpoess      07/10/01 - change tpcd/tpcd to DATABASE_USER
#    mpoess      08/04/99 - Creation
#    mpoess      08/04/99 - Creation
#

. $KIT_DIR/env

# May need to change the following:
RSH=rsh

OH=$ORACLE_HOME
# ACID_DIR=$TPCD_KIT_DIR/audit is set in env
OUT_DIR=$ACID_OUT
DURA_DIR=$ACID_DIR/dura

TXN1FILE=$OUT_DIR/txn1$$.out
TXN2FILE=$OUT_DIR/txn2$$.out
KEYFILE=$OUT_DIR/key$$.out
ISOFILE=$OUT_DIR/iso5

USER=$DATABASE_USER
PROG=atranspl

/bin/rm -rf $TXN1FILE $TXN2FILE $KEYFILE

trap "/bin/rm -rf $TXN1FILE $TXN2FILE $KEYFILE; exit 1" 1 2 3 15

usage() {

   echo ""
   echo "Usage: $0 [-u user/passwd] [-n remote_node] -h"
   echo ""
   exit 1;
}

set -- `getopt "u:n:h" "$@"` || usage

while :
do
   case "$1" in
   -u) shift; USER=$1;;
   -n) shift; RHOST="$1";;
   -h) usage; exit 0;;
   --) break;;
   esac
   shift;
done

# generate key files

randkey 1 0.1 u"$USER" > $KEYFILE

OKEY=`cat $KEYFILE | awk '{print $1}'`
echo "o_key is "$OKEY

# before the ACID transaction, let's run a ACID query to record the
# initial state of lineitem

echo "Running ACID query BEFORE the start of Isolation Test 5" >> $TXN1FILE
echo "`date`" >> $TXN1FILE
echo "" >> $TXN1FILE
sqlplus $USER @$ACID_DIR/isolation/a_query $OKEY >> $TXN1FILE
echo "" >> $TXN1FILE
echo "------------------------------------------------" >> $TXN1FILE

sleep 1

# start ACID transaction, Sleep for 60 second before COMMIT

$PROG 1 1 1 0 i$KEYFILE u$USER s60 >> $TXN1FILE &

# let's sleep 5 seconds before starting PARTSUPP query

sleep 5

# First generate PS_PARTKEY and PS_SUPPKEY

PSKEY=`randpsup 0.1`

echo "Running PARTSUPP query 5 seconds AFTER the start of ACID Transaction" \
>> $TXN2FILE
echo "`date`" >> $TXN2FILE
echo "PS_PARTKEY and PS_SUPPKEY are: $PSKEY" >> $TXN2FILE

if [ "$RHOST" != "" ]
then
echo "Starting PARTSUPP query on node $RHOST" >> $TXN2FILE
${RSH} -n ${RHOST} sqlplus $USER @$ACID_DIR/isolation/a_query2
${PSKEY} >> $TXN2FILE &
else
sqlplus $USER @$ACID_DIR/isolation/a_query2 ${PSKEY} >> $TXN2FILE &
fi

wait

echo "------------------------------------------------" >> $TXN2FILE
echo "------------------------------------------------" >> $TXN1FILE

cat $TXN1FILE $TXN2FILE >> $ISOFILE

/bin/rm -rf $TXN1FILE $TXN2FILE $KEYFILE
```

iso6.sh

```
#!/bin/ksh
#
# $Header: iso6.sh 10-jul-2001.11:17:41 mpoess Exp $
#
# iso6.sh
#
# Copyright (c) 1999, 2001, Oracle Corporation.  All rights reserved.
#
#    NAME
#      iso6.sh - <one-line expansion of the name>
#
#  DESCRIPTION
#      Usage: iso6.sh [-u user/password] [-n remote_node] -h
#      Options: See usage below
#  NOTES
#       For a cross node isolation test, assume the local node is
#       one of the participating nodes.  The other node can be
#       specified by the -n option.
#       We need to make sure the remote node has access to the
#       file system on the local node.  Otherwise, we need to rcp
#       the keyfile to the remote system.
#       You need to set the environment variable TPCD_KIT_DIR
```

```
#
#    MODIFIED   (MM/DD/YY)
#    mpoess      07/10/01 - change tpcd/tpcd to DATABASE_USER
#    mpoess      08/04/99 - Creation
#    mpoess      08/04/99 - Creation
#

. $KIT_DIR/env

# May need to change the following:
RSH=rsh

OH=/private/tpcd
# ACID_DIR=$TPCD_KIT_DIR/audit is set in env
OUT_DIR=$ACID_OUT

DURA_DIR=$ACID_DIR/dura

TXN1FILE=$OUT_DIR/txn1$$.out
TXN2FILE=$OUT_DIR/txn2$$.out
TXN3FILE=$OUT_DIR/txn3$$.out
KEYFILE=$OUT_DIR/key$$.out
ISOFILE=$OUT_DIR/iso6

USER=$DATABASE_USER
PROG=atranspl

/bin/rm -rf $TXN1FILE $TXN2FILE $TXN3FILE $KEYFILE

trap "/bin/rm -rf $TXN1FILE $TXN2FILE $TXN3FILE $KEYFILE; exit 1" 1 2 3 15

usage() {

  echo ""
  echo "Usage: $0 [-u user/passwd] [-n remote_node] -h"
  echo ""
  exit 1;
}

set -- `getopt "u:n:h" "$@"` || usage

while :
do
  case "$1" in
  -u) shift; USER=$1;;
  -n) shift; RHOST="$1";;
  -h) usage; exit 0;;
  --) break;;
  esac
  shift;
done


# generate key files

randkey 1 0.1 u"$USER" > $KEYFILE

OKEY=`cat $KEYFILE | awk '{print $1}'`
echo "o_key is "$OKEY

# before the any transaction, let's run a ACID query to record the
# initial state of lineitem

echo "Running ACID query BEFORE the start of Isolation Test 6" >> $TXN2FILE
echo "`date`" >> $TXN2FILE
echo "" >> $TXN2FILE
sqlplus $USER @$ACID_DIR/isolation/a_query $OKEY >> $TXN2FILE
echo "" >> $TXN2FILE
echo "-------------------------------------------------" >> $TXN2FILE

sleep 1

# start Query 17, use 0 as the delta

echo "Running Query 17b at `date`" >> $TXN1FILE
sqlplus $USER @q1 >> $TXN1FILE &

# sleep 2 seconds before starting ACID transaction

sleep 2

# start ACID transaction, COMMIT after one second

echo "Starting AICD transaction at `date`" >> $TXN2FILE

if [ "$RHOST" != "" ]
then
echo "Starting ACID transaction on node $RHOST" >> $TXN2FILE
${RSH} -n ${RHOST} $PROG 1 1 1 0 i$KEYFILE u$USER s1 >> $TXN2FILE &
else
$PROG 1 1 1 0 i$KEYFILE u$USER s1 >> $TXN2FILE &
fi

# start Query 17

sleep 2

echo "Running 2nd Query 17b at `date`" >> $TXN3FILE
sqlplus $USER @q1 >> $TXN3FILE &
# wait for everyone to finish

wait

echo "-------------------------------------------------" >> $TXN3FILE
echo "-------------------------------------------------" >> $TXN2FILE
echo "-------------------------------------------------" >> $TXN1FILE

cat $TXN1FILE $TXN2FILE $TXN3FILE >> $ISOFILE

/bin/rm -rf $TXN1FILE $TXN2FILE $TXN3FILE $KEYFILE
```

randkey.c

```
/* Copyright (c) Oracle Corporation 2001. All Rights Reserved. */

/*

   NAME
     randkey.c - <one-line expansion of the name>

   DESCRIPTION
     Generate random keys for ACID transactions:
     O_ORDERKEY unique random (1..SF*150000*4) and only
     first 8 keys out of every 32 are populated.
       and
     L_ORDERKEY based on Clause 3.1.6.2
     DELTA random (1..100)
*/

#include <stdio.h>
#include <stdlib.h>
#include <math.h>
#include "atranspl.h"

#define ORDERCNT 150000.0

/* MK_SPARSE adopted from dss.h */

#define  MK_SPARSE(key, seq) \
        (((((key>>3)<<2)|(seq & 0x0003))<<3)|(key & 0x0007))

void sql_error();
void usage();
void ACIDinit();
long atol();
void srand48();
long lrand48();

/* Not really used here, but retained it for future purposes. */

typedef struct aciddef {
  long okey;
  long lkey;
  int delta;
} adef;

long l_key = 0;
```

```
long o_key = 0;
char lname[UNAME_LEN];
char *passwd;

/* OCI handles */

OCIEnv *tpcenv;
OCIServer *tpcsrv;
OCIError *errhp;
OCISvcCtx *tpcsvc;
OCISession *tpcusr;
OCIStmt *curi;

OCIBind *l_key_bp;
OCIBind *o_key_bp;

sword status = OCI_SUCCESS;  /* OCI return value */

char sqlstmt[1024];


void ACIDexit() {
  OCILogoff(tpcsvc,errhp);
  OCIhfree(tpcenv,OCI_HTYPE_STMT);
  OCIhfree(tpcsvc,OCI_HTYPE_SVCCTX);
  OCIhfree(tpcsrv,OCI_HTYPE_SERVER);
  OCIhfree(tpcusr,OCI_HTYPE_SESSION);
}


/* type: 0 if environment handle is passed, 1 if error handle is passwd */

void sql_error(errhp,status,type)
     OCIError *errhp;
     sword status;
     sword type;
{
  char msg[2048];
  sb4 errcode;
  ub4 msglen;
  int i,j;

  switch(status) {
  case OCI_SUCCESS_WITH_INFO:
    fprintf(stderr, "Error: Statement returned with info.\n");
    if (type)
      (void) OCIErrorGet(errhp,1,NULL,(sb4 *) &errcode,(text *)msg,
                         2048,OCI_HTYPE_ERROR);
    else
      (void) OCIErrorGet(errhp,1,NULL,(sb4 *) &errcode,(text *)msg,
                         2048,OCI_HTYPE_ENV);
    fprintf(stderr,"%s\n",msg);
    break;
  case OCI_ERROR:
    fprintf(stderr, "Error: OCI call error.\n");
    if (type)
      (void) OCIErrorGet(errhp,1,NULL,(sb4 *) &errcode,(text *)msg,
                         2048,OCI_HTYPE_ERROR);
    else
      (void) OCIErrorGet(errhp,1,NULL,(sb4 *) &errcode,(text *)msg,
                         2048,OCI_HTYPE_ENV);
    fprintf(stderr,"%s\n",msg);
    break;
  case OCI_INVALID_HANDLE:
    fprintf(stderr, "Error: Invalid Handle.\n");
    if (type)
      (void) OCIErrorGet(errhp,1,NULL,(sb4 *) &errcode,(text *)msg,
                         2048,OCI_HTYPE_ERROR);
    else
      (void) OCIErrorGet(errhp,1,NULL,(sb4 *) &errcode,(text *)msg,
                         2048,OCI_HTYPE_ENV);
    fprintf(stderr,"%s\n",msg);
    break;
  }
  /* Rollback just in case */

  (void) OCITransRollback(tpcsvc,errhp,OCI_DEFAULT);

  fprintf(stderr, "Exiting Oracle...\n");
  fflush(stderr);

  ACIDexit();

  exit(1);
}


main(argc, argv)
     int argc;
     char **argv;
{

  long count;
  long i;
  double sf;        /* need to accomodate sf 0.1 */
  double random;
  double ordcnt;
  adef *res;

  if ((argc < 3) || (argc > 4)) {
    usage();
    exit(-1);
  }

  strcpy((char *) lname, "tpcd/tpcd");

  count = atol(argv[1]);
  sf = atof(argv[2]);

  argc -= 2;
  argv += 2;

  while (--argc) {
    ++argv;
    switch(argv[0][0]) {
    case 'u':
      strncpy((char *) lname, ++(argv[0]), UNAME_LEN);
      if (strchr((char *) lname, '/') == NULL) {
        usage();
        exit(-1);
      }
      break;
    default:
      fprintf(stderr, "Unknown argument %s\n", argv[0]);
      usage();
      break;
    }
  }

  ACIDinit();

  /* initialize array for random numbers */

  res = (adef *) malloc(count*sizeof(adef));
  ordcnt = (double) ORDERCNT * (double) sf;

  for (i=0; i<count; i++) {

    /* The algorithm:                                        */
    /* Assumes drand's output is 'unique', first get a number within */
    /* the range of [0..sf*ORDERCNT) and then maps the different     */
    /* ranges to generate the real output.                   */

    random = floor(drand48() * (double) ordcnt) + 1;
    res[i].okey = o_key = (long) MK_SPARSE((long) random, 0);
    res[i].delta = (long) floor(drand48() * 100) + 1;

    /* Obtain l_key from l_key query */

    OCIsexec(tpcsvc,curi,errhp,1);

    /* l_key is the highest l_linenumber available.  We need to pick */
    /* at random a number between 1..l_key.                  */

    res[i].lkey = (lrand48() % l_key) + 1;

    printf("%ld %ld %d\n", res[i].okey, res[i].lkey, res[i].delta);
  }
```

```
  ACIDexit();
  free(res);

}


void usage() {

  fprintf(stderr, "Usage: randkey <number of random keys to generate> <SF>
u<user/password>\n");
  fprintf(stderr, "\n");
}

void ACIDinit()
{

  /* run random seed */

  srand48(getpid());

  /* Connect to ORACLE.  Program will call sql_error()
     if an error occurs in connecting to the default database. */

  (void) OCIInitialize(OCI_DEFAULT,(dvoid *)0,0,0,0);
  if((status=OCIEnvInit((OCIEnv **)&tpcenv,OCI_DEFAULT,0,(dvoid **)0)) !=
     OCI_SUCCESS)
    sql_error(tpcenv, status, 0);

  OCIhalloc(tpcenv,&errhp,OCI_HTYPE_ERROR);
  OCIhalloc(tpcenv,&curi,OCI_HTYPE_STMT);
  OCIhalloc(tpcenv,&tpcsvc,OCI_HTYPE_SVCCTX);
  OCIhalloc(tpcenv,&tpcsrv,OCI_HTYPE_SERVER);
  OCIhalloc(tpcenv,&tpcusr,OCI_HTYPE_SESSION);

  /* get username and password */

  passwd = strchr(lname, '/');
  *passwd = '\0';
  passwd++;

  if ((status=OCIServerAttach(tpcsrv,errhp,(text
*)0,0,OCI_DEFAULT))!=OCI_SUCCESS)
    sql_error(errhp,status,1);

  OCIaset(tpcsvc,OCI_HTYPE_SVCCTX,tpcsrv,0,OCI_ATTR_SERVER,errhp);

OCIaset(tpcusr,OCI_HTYPE_SESSION,lname,strlen(lname),OCI_ATTR_USERNA
ME,
          errhp);

OCIaset(tpcusr,OCI_HTYPE_SESSION,passwd,strlen(passwd),OCI_ATTR_PASSW
ORD,
          errhp);

  if ((status = OCISessionBegin(tpcsvc, errhp, tpcusr, OCI_CRED_RDBMS,
                        OCI_DEFAULT)) != OCI_SUCCESS)
    sql_error(errhp,status,1);

  OCIaset(tpcsvc,OCI_HTYPE_SVCCTX,tpcusr,0,OCI_ATTR_SESSION,errhp);

  /* Open and Parse cursor for query to choose determine l_key. */
  /* Binds l_key to :l_key.                                     */

  sprintf((char *) sqlstmt,SQLTXT1);
  OCIStmtPrepare(curi,errhp,(text *)sqlstmt,strlen((char *)sqlstmt),
               OCI_NTV_SYNTAX,OCI_DEFAULT);

  OCIbbname(curi,l_key_bp,errhp,":l_key",ADR(l_key),SIZ(l_key),SQLT_INT);
  OCIbbname(curi,o_key_bp,errhp,":o_key",ADR(o_key),SIZ(o_key),SQLT_INT);
}
```

randpsup.c

```
/* Copyright (c) Oracle Corporation 2001. All Rights Reserved. */

/*
   NAME
    randpsup.c - <one-line expansion of the name>

   DESCRIPTION
     Generate random keys for ACID PARTSUPP transactions:
     (Clause 4.2.3)
     PS_PARTKEY random within [SF*200000]
       and
     PS_SUPPKEY = (PS_PARTKEY + (i * ((S/4) + (int)(PS_PARTKEY - 1)
                /S))) % S + 1
     where i random within [0..3] and S = SF * 10000

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   mpoess      01/04/01 - Creation

*/

#include <stdio.h>
#include <stdlib.h>
#include <math.h>

#define PS_PER_SF 200000.0
#define S_PER_SF 10000.0
#define SUPP_PER_PART 4

/* borrowed from build.c in the dbgen distribution */

#define PART_SUPP_BRIDGE(tgt, p, s) \
    { \
    long tot_scnt = (long) (S_PER_SF * sf); \
    tgt = (p + s *  (tot_scnt / SUPP_PER_PART +  \
        (long) ((p - 1) / tot_scnt))) % tot_scnt + 1; \
    }

void usage();
double atof();
void srand48();
long lrand48();


main(argc, argv)
     int argc;
     char **argv;
{

  double sf = 0.1;          /* scale factor      */
  long supp;                /* the i-th supplier */
  long pkey;                /* partkey           */
  long maxpkey;             /* highest partkey   */
  long ps_skey;             /* ps_suppkey        */

  if (argc < 2) {
    usage();
    exit(-1);
  }

  /* seed the random number generator */

  srand48(getpid());

  sf = atof(argv[1]);
  maxpkey = (long) (sf * PS_PER_SF);
  supp = lrand48() % 4;
  pkey = lrand48() % maxpkey + 1;

  PART_SUPP_BRIDGE(ps_skey, pkey, supp);

  fprintf(stdout, "%ld %ld", pkey, ps_skey);

  exit(0);
}


void usage()
{
  fprintf(stderr, "Usage: randpsup <SF>\n\n");
}
```

run_acid.sh

```
#!/bin/ksh
#
# $Header: run_acid.sh 08-aug-99.15:30:10 mpoess Exp $
#
# run_acid.sh
#
#  Copyright (c) Oracle Corporation 1999. All Rights Reserved.
#
#    NAME
#      run_acid.sh - <one-line expansion of the name>
#
#  DESCRIPTION
#      Usage: run_acid.sh [-n iter] [-s stream] [-p prog] [-i infile]
#                         [-o outfile] [-d durafile] [-u usr/pswd]
#                         [-t trigger] [-f scale factor] -h
#
#      Options: See usage below
#
#    MODIFIED   (MM/DD/YY)
#    mpoess      08/08/99 - Creation
#    mpoess      08/08/99 - Creation
#

OH=$ORACLE_HOME
OUT_DIR=$ACID_OUT

usage() {

   echo ""
   echo "Usage: $0 [-n iter] [-s stream] [-p prog] [-i infile] [-o outfile]"
   echo "          [-d durafile] [-u usr/pswd] -h"
   echo ""
   echo "-n iter      : number of iterations, default is 100"
   echo "-s stream    : number of streams, default is 2"
   echo "-p prog      : program to run, default is atranspl.ott"
   echo "-i infile    : input file prefix, suffix by process number within a"
   echo "               stream and run ID, default is ./acid_in"
   echo "-o outfile   : output file prefix, similar to input file"
   echo "               default is ./out/acid_out"
   echo "-d durafile : durability file prefix, used for durability tests"
   echo "               default is ./dura/acid_dura"
   echo "-u usr/pswd : user/password combo for database access, default is tpch/tpch"
   echo "-t trigger  : trigger time between process starts, default is 1 second"
   echo "-h          : print this usage summary"
   exit 1;
}

ITER=400
STEM=6
SF=1
PROG=atranspl
IN=${ACID_DIR}/acid_in
DURA_DIR=$ACID_OUT/dura
OUT=$DURA_DIR/drate
DURA=$DURA_DIR/dura
KEY=${DURA_DIR}/key$$_
USER=tpcd/tpcd
TRIG=1
HCNT=duracntb

set -- `getopt "n:s:p:i:o:d:u:ht:f:" "$@"` || usage

# get all the options

while :
do
   case "$1" in
   -n) shift; ITER=$1;;
   -s) shift; STEM=$1;;
   -p) shift; PROG=$1;;
   -i) shift; IN=$1;;
   -o) shift; OUT=$1;;
   -d) shift; DURA=$1;;
   -u) shift; USER=$1;;
   -h) usage; exit 0;;
   -t) shift; TRIG=$1;;
   -f) shift; SF=$1;;
   --) break;;
   esac
   shift;
done


echo "Starting ACID run..."

i=0
T=`expr $STEM \* $TRIG + 6`

# Get history count before the run

sqlplus $USER @cnt_hist > $DURA_DIR/$HCNT 2>&1

while [ $i -lt $STEM ]
do
   randkey $ITER ${SF} u${USER} > ${KEY}${i} &
   i=`expr $i + 1`
done

wait
# perform the consistency

i=0
while [ $i -lt $STEM ]
do
   for j in `head -10 ${KEY}${i} | awk '{printf "%d ",$1}'`
   do
      sqlplus tpcd/tpcd @consist $j >> $DURA_DIR/duraconsb
   done
   i=`expr $i + 1`
done

echo "Starting Transaction Counting Program"
count_tx.sh $STEM 100 $DURA_DIR &

i=0
while [ $i -lt $STEM ]
do

   $PROG $i $STEM 1 0 i${KEY}${i} o${OUT}${i} d${DURA}${i} u$USER s1 &
   T=`expr $T - $TRIG`
   i=`expr $i + 1`

done

wait

echo "ACID run completed"
```

sample.sh

```
#!/bin/ksh
#
# $Header: sample.sh 08-aug-99.17:10:00 mpoess Exp $
#
# sample.sh
#
#  Copyright (c) Oracle Corporation 1999. All Rights Reserved.
#
#    NAME
#      sample.sh - <one-line expansion of the name>
#
#    DESCRIPTION
#      <short description of component this file declares/defines>
#
#    NOTES
#      <other useful comments, qualifications, etc.>
#
#    MODIFIED   (MM/DD/YY)
#    mpoess      08/08/99 - Creation
#    mpoess      08/08/99 - Creation
#

# $1 durability output file

. $KIT_DIR/env
```

```
cat $1 | grep o_key | awk '{printf "%d \n", $2}' > /tmp/okey$$
cat $1 | grep l_key | awk '{printf "%d \n", $2}' > /tmp/lkey$$

paste /tmp/okey$$ /tmp/lkey$$ > /tmp/keys$$
tail -6 /tmp/keys$$ > /tmp/6keys$$

echo "Keys chosen are:"
cat /tmp/6keys$$

i=1
while [ $i -le 6 ]
do

j=`cat /tmp/6keys$$ | tail -${i} | head -1`
sqlplus tpcd/tpcd @sample $j
i=`expr $i + 1`
done

/bin/rm -f /tmp/*key*
```

sample.sql

```
Rem
Rem $Header: sample.sql 08-aug-99.17:10:34 mpoess Exp $
Rem
Rem sample.sql
Rem
Rem  Copyright (c) Oracle Corporation 1999. All Rights Reserved.
Rem
Rem    NAME
Rem      sample.sql - <one-line expansion of the name>
Rem
Rem    DESCRIPTION
Rem      <short description of component this file declares/defines>
Rem
Rem    NOTES
Rem      <other useful comments, qualifications, etc.>
Rem
Rem    MODIFIED   (MM/DD/YY)
Rem    mpoess      08/08/99 - Creation
Rem    mpoess      08/08/99 - Created
Rem

alter session set nls_date_format = 'YYYY-MM-DD HH:MI:SS';
select * from history where  h_o_key = &&1 and h_l_key = &&2;

exit;
```

Disk Configuration Data

HSG80_storage_array_configuration

HSG80 Configuration/Layout for ORACLE 100GB TPC-H Project

For each of the (12) HSG80 Controller Pair Arrays:

RUN CONFIG

```
ADD MIRRORSET  M1   DISK10000  DISK20100
ADD MIRRORSET  M2   DISK10100  DISK20000
ADD MIRRORSET  M3   DISK30000  DISK40100
ADD MIRRORSET  M4   DISK30100  DISK40000
ADD MIRRORSET  M5   DISK50000  DISK60100
ADD MIRRORSET  M6   DISK50100  DISK60000
ADD MIRRORSET  M7   DISK10200  DISK20300
ADD MIRRORSET  M8   DISK10300  DISK20200
ADD MIRRORSET  M9   DISK30200  DISK40300
ADD MIRRORSET  M10 DISK30300  DISK40200
ADD MIRRORSET  M11 DISK50200  DISK60300
ADD MIRRORSET  M12 DISK50300  DISK60200

ADD STRIPESET  S1  M1  M2  M3  M4  M5  M6
ADD STRIPESET  S2  M7  M8  M9  M10  M11  M12

INIT S1   (Default CHUNKSIZE = 256 blocks or 128K)
INIT S2

ADD UNIT D1      S1  WRITEBACK_CACHE
ADD UNIT D101  S2  WRITEBACK_CACHE
```

Note: Each HSG80 UNIT is recognized as a "dsk" LUN
by the Tru64 UNIX Operating System upon boot.

Logical Storage Manager Scripts

lsm_create.sh

```
./volsetup_disks.sh
./sd_flatfiles.sh
./plex_flatfiles.sh
./sd_orders.sh
./plex_orders.sh
./sd_lineitem_1.sh
./plex_lineitem_1.sh
./sd_files.sh
./plex_files.sh
./sd_temps.sh
./plex_temps.sh
./sd_lineitem_2.sh
./plex_lineitem_2.sh
./sd_system4.sh
./plex_system4.sh
date
```

volsetup_disks.sh

```
#!/bin/sh
set -x
date
#
volsetup -c -o force privlen=32768 dsk2  dsk3 dsk4 dsk5 dsk6 dsk7 dsk8 dsk9 dsk10
dsk11 dsk12 dsk13 dsk19 dsk20 dsk21 dsk22 dsk23 dsk24 dsk25 dsk26 dsk27 dsk28
dsk29 dsk30
date
```

sd_files.sh

```
#!/bin/ksh
set -x
#-------------------------------------------------------------------------
#  sd_files.sh
#-------------------------------------------------------------------------
echo "start of sd_files"
DDISKS="2 3 4 5 6 7 8 9 10 11 12 13 19 20 21 22 23 24 25 26 27 28 29 30"

SD_NUM=54
SD_SIZE=512000

for DISK in $DDISKS
do
  CNT=1
  OFFSET=56934400

  while [ $CNT -le $SD_NUM ]
  do
     volmake sd sd${DISK}_files${CNT} dsk${DISK} offset=${OFFSET}
len=${SD_SIZE}
     CNT=`expr $CNT + 1`
     OFFSET=`expr $OFFSET + $SD_SIZE`
  done
done
```

```
echo "end of sd_files.sh"
```

sd_flatfiles.sh

```
#!/bin/ksh
set -x
#-------------------------------------------------------------------------
#  sd_flatfiles.sh
#-------------------------------------------------------------------------
echo "start of sd_flat"
DDISKS="2 3 4 5 6 7 8 9 10 11 12 13 19 20 21 22 23 24 25 26 27 28 29 30"
SD_NUM=1
SD_SIZE=22528000


for DISK in $DDISKS
do
  CNT=1
  OFFSET=0

  while [ $CNT -le $SD_NUM ]
  do
     volmake sd sd${DISK}_flat${CNT} dsk${DISK} offset=${OFFSET}
len=${SD_SIZE}
     CNT=`expr $CNT + 1`
     OFFSET=`expr $OFFSET + $SD_SIZE`
  done
done

echo "end of sd_flat.sh"
```

sd_lineitem.sh

```
#!/bin/ksh
set -x
#-------------------------------------------------------------------------
#  sd_lineitem.sh
#-------------------------------------------------------------------------
echo "start of sd_lineitem"
DDISKS="2 3 4 5 6 7 8 9 10 11 12 13 19 20 21 22 23 24 25 26 27 28 29 30"

SD_NUM=24
SD_SIZE=1126400

for DISK in $DDISKS
do
  CNT=1
  OFFSET=29900800

  while [ $CNT -le $SD_NUM ]
  do
     volmake sd sd${DISK}_line${CNT} dsk${DISK} offset=${OFFSET}
len=${SD_SIZE}
     CNT=`expr $CNT + 1`
     OFFSET=`expr $OFFSET + $SD_SIZE`
  done
done

echo "end of sd_lineitem.sh"
```

sd_orders.sh

```
#!/bin/ksh
set -x
#-------------------------------------------------------------------------
#  sd_orders.sh
#-------------------------------------------------------------------------
echo "start of sd_orders"
DDISKS="2 3 4 5 6 7 8 9 10 11 12 13 19 20 21 22 23 24 25 26 27 28 29 30"
SD_NUM=24
SD_SIZE=307200

for DISK in $DDISKS
do
  CNT=1
  OFFSET=22528000

  while [ $CNT -le $SD_NUM ]
  do
     volmake sd sd${DISK}_ord${CNT} dsk${DISK} offset=${OFFSET}
len=${SD_SIZE}
     CNT=`expr $CNT + 1`
     OFFSET=`expr $OFFSET + $SD_SIZE`
  done
done

echo "end of sd_orders.sh"
```

sd_temps.sh

```
#!/bin/ksh
set -x
#-------------------------------------------------------------------------
#  sd_temps.sh
#-------------------------------------------------------------------------
echo "start of sd_temps"
DDISKS="2 3 4 5 6 7 8 9 10 11 12 13 19 20 21 22 23 24 25 26 27 28 29 30"
SD_NUM=36
SD_SIZE=921600

for DISK in $DDISKS
do
  CNT=1
  OFFSET=84582400

  while [ $CNT -le $SD_NUM ]
  do
     volmake sd sd${DISK}_temps${CNT} dsk${DISK} offset=${OFFSET}
len=${SD_SIZE}
     CNT=`expr $CNT + 1`
     OFFSET=`expr $OFFSET + $SD_SIZE`
  done
done

echo "end of sd_temps.sh"
```

plex_files.sh

```
#!/bin/sh
#
set -x
#
#
WIDTH=256
#
#-----------------------------------------------------------------
#  plex_files.sh
#  Create plexes & vols  for regular data files of the same size
#-----------------------------------------------------------------
NUM=50
sdNUM=1
while [ $sdNUM -le 54 ]
do

volmake plex pl_$NUM
sd=sd2_files${sdNUM},sd3_files${sdNUM},sd4_files${sdNUM},sd5_files${sdNU
M},sd6_files${sdNUM},sd7_files${sdNUM},sd8_files${sdNUM},sd9_files${sdNU
M},sd10_files${sdNUM},sd11_files${sdNUM},sd12_files${sdNUM},sd13_files${s
dNUM},sd19_files${sdNUM},sd20_files${sdNUM},sd21_files${sdNUM},sd22_file
s${sdNUM},sd23_files${sdNUM},sd24_files${sdNUM},sd25_files${sdNUM},sd26
_files${sdNUM},sd27_files${sdNUM},sd28_files${sdNUM},sd29_files${sdNUM},s
d30_files${sdNUM} layout=STRIPE stwidth=$WIDTH ncol=24
```

```
  volmake -U gen vol vol_$NUM plex=pl_$NUM read_pol=SELECT user=oracle
group=dba mode=0777 log_type=NONE len=0

  volume start vol_$NUM
  volume init active vol_$NUM
  NUM=`expr $NUM + 1`
  sdNUM=`expr $sdNUM + 1`
done

echo "end of plex_files.sh"
```

plex_flatfiles.sh

```
#!/bin/sh
#
set -x
#
#
WIDTH=128
#
#---------------------------------------------------------------
#  plex_flatfiles.sh
#  Create plex & vol for flatfile space
#---------------------------------------------------------------
NUM=1
sdNUM=1
while [ $sdNUM -le 1 ]
do

volmake plex pl_$NUM
sd=sd2_flat${sdNUM},sd3_flat${sdNUM},sd4_flat${sdNUM},sd5_flat${sdNUM},s
d6_flat${sdNUM},sd7_flat${sdNUM},sd8_flat${sdNUM},sd9_flat${sdNUM},sd10_
flat${sdNUM},sd11_flat${sdNUM},sd12_flat${sdNUM},sd13_flat${sdNUM},sd19_
flat${sdNUM},sd20_flat${sdNUM},sd21_flat${sdNUM},sd22_flat${sdNUM},sd23_
flat${sdNUM},sd24_flat${sdNUM},sd25_flat${sdNUM},sd26_flat${sdNUM},sd27_
flat${sdNUM},sd28_flat${sdNUM},sd29_flat${sdNUM},sd30_flat${sdNUM}
layout=STRIPE stwidth=$WIDTH ncol=24

  volmake -U gen vol vol_$NUM plex=pl_$NUM read_pol=SELECT user=oracle
group=dba mode=0777 log_type=NONE len=0

  volume start vol_$NUM
  volume init active vol_$NUM
  NUM=`expr $NUM + 1`
  sdNUM=`expr $sdNUM + 1`
done

echo "end of plex_flatfiles.sh"
```

plex_lineitem.sh

```
#!/bin/sh
#
set -x
#
#
WIDTH=256
#
#---------------------------------------------------------------
#  plex_lineitem.sh
#  Create plexes & vols  for lineitem.
#---------------------------------------------------------------
NUM=26
sdNUM=1
while [ $sdNUM -le 24 ]
do

volmake plex pl_$NUM
sd=sd2_line${sdNUM},sd3_line${sdNUM},sd4_line${sdNUM},sd5_line${sdNUM}
,sd6_line${sdNUM},sd7_line${sdNUM},sd8_line${sdNUM},sd9_line${sdNUM},sd
10_line${sdNUM},sd11_line${sdNUM},sd12_line${sdNUM},sd13_line${sdNUM},
sd19_line${sdNUM},sd20_line${sdNUM},sd21_line${sdNUM},sd22_line${sdNUM
},sd23_line${sdNUM},sd24_line${sdNUM},sd25_line${sdNUM},sd26_line${sdNU
M},sd27_line${sdNUM},sd28_line${sdNUM},sd29_line${sdNUM},sd30_line${sdN
UM} layout=STRIPE stwidth=$WIDTH ncol=24

  volmake -U gen vol vol_$NUM plex=pl_$NUM read_pol=SELECT user=oracle
group=dba mode=0777 log_type=NONE len=0

  volume start vol_$NUM
   volume init active vol_$NUM
  NUM=`expr $NUM + 1`
  sdNUM=`expr $sdNUM + 1`
done

echo "end of plex_lineitem.sh"
```

plex_orders.sh

```
#!/bin/sh
#
set -x
#
#
WIDTH=256
#
#---------------------------------------------------------------
#  plex_orders.sh
#  Create plexes & vols  for orders.
#---------------------------------------------------------------
NUM=2
sdNUM=1
while [ $sdNUM -le 24 ]
do

volmake plex pl_$NUM
sd=sd2_ord${sdNUM},sd3_ord${sdNUM},sd4_ord${sdNUM},sd5_ord${sdNUM},s
d6_ord${sdNUM},sd7_ord${sdNUM},sd8_ord${sdNUM},sd9_ord${sdNUM},sd10_
ord${sdNUM},sd11_ord${sdNUM},sd12_ord${sdNUM},sd13_ord${sdNUM},sd19_
ord${sdNUM},sd20_ord${sdNUM},sd21_ord${sdNUM},sd22_ord${sdNUM},sd23_
ord${sdNUM},sd24_ord${sdNUM},sd25_ord${sdNUM},sd26_ord${sdNUM},sd27_
ord${sdNUM},sd28_ord${sdNUM},sd29_ord${sdNUM},sd30_ord${sdNUM}
layout=STRIPE stwidth=$WIDTH ncol=24

  volmake -U gen vol vol_$NUM plex=pl_$NUM read_pol=SELECT user=oracle
group=dba mode=0777 log_type=NONE len=0

  volume start vol_$NUM
  volume init active vol_$NUM
  NUM=`expr $NUM + 1`
  sdNUM=`expr $sdNUM + 1`
done

echo "end of plex_orders.sh"
```

plex_temps.sh

```
#!/bin/sh
#
set -x
#
#
WIDTH=256
#
#---------------------------------------------------------------
#  plex_temps.sh
#  Create plexes & vols  for temps and ts_i_l1&2 .
#---------------------------------------------------------------
NUM=104
sdNUM=1
while [ $sdNUM -le 36 ]
do

volmake plex pl_$NUM
sd=sd2_temps${sdNUM},sd3_temps${sdNUM},sd4_temps${sdNUM},sd5_temps${
sdNUM},sd6_temps${sdNUM},sd7_temps${sdNUM},sd8_temps${sdNUM},sd9_te
mps${sdNUM},sd10_temps${sdNUM},sd11_temps${sdNUM},sd12_temps${sdNU
M},sd13_temps${sdNUM},sd19_temps${sdNUM},sd20_temps${sdNUM},sd21_tem
ps${sdNUM},sd22_temps${sdNUM},sd23_temps${sdNUM},sd24_temps${sdNUM}
```

```
,sd25_temps${sdNUM},sd26_temps${sdNUM},sd27_temps${sdNUM},sd28_temps$
{sdNUM},sd29_temps${sdNUM},sd30_temps${sdNUM} layout=STRIPE
stwidth=$WIDTH ncol=24

  volmake -U gen vol vol_$NUM plex=pl_$NUM read_pol=SELECT user=oracle
group=dba mode=0777 log_type=NONE len=0

  volume start vol_$NUM
  volume init active vol_$NUM
  NUM=`expr $NUM + 1`
  sdNUM=`expr $sdNUM + 1`
done

echo "end of plex_temps.sh"
```

prepare4acid.sh

```
#!/bin/ksh
#
# $Header: prepare4acid.sh 12-aug-99.17:09:18 mpoess Exp $
#
# prepare4acid.sh
#
#  Copyright (c) Oracle Corporation 1999. All Rights Reserved.
#
#    NAME
#      prepare4acid.sh
#
#    DESCRIPTION
#     Prepares the qualification database for the acid tests.
#
#    NOTES
#
#    MODIFIED   (MM/DD/YY)
#    mpoess      08/12/99 - Creation
#    mpoess      08/12/99 - Creation
#
. $KIT_DIR/env

sqlplus tpcd/tpcd @atrans
sqlplus tpcd/tpcd @d_hist
```

create_100gb_tpch_links.sh

```
#!/bin/ksh
# Establish Links For Oracle 100GB TPC-H Database Tablespace Datafiles...


ln -s /dev/rvol/vol_1       flatfiles
ln -s /dev/rvol/vol_2       ts_o1_1
ln -s /dev/rvol/vol_3       ts_o2_1
ln -s /dev/rvol/vol_4       ts_o3_1
ln -s /dev/rvol/vol_5       ts_o4_1
ln -s /dev/rvol/vol_6       ts_o5_1
ln -s /dev/rvol/vol_7       ts_o6_1
ln -s /dev/rvol/vol_8       ts_o7_1
ln -s /dev/rvol/vol_9       ts_o8_1
ln -s /dev/rvol/vol_10      ts_o9_1
ln -s /dev/rvol/vol_11      ts_o10_1
ln -s /dev/rvol/vol_12      ts_o11_1
ln -s /dev/rvol/vol_13      ts_o12_1
ln -s /dev/rvol/vol_14      ts_o1_2
ln -s /dev/rvol/vol_15      ts_o2_2
ln -s /dev/rvol/vol_16      ts_o3_2
ln -s /dev/rvol/vol_17      ts_o4_2
ln -s /dev/rvol/vol_18      ts_o5_2
ln -s /dev/rvol/vol_19      ts_o6_2
ln -s /dev/rvol/vol_20      ts_o7_2
ln -s /dev/rvol/vol_21      ts_o8_2
ln -s /dev/rvol/vol_22      ts_o9_2
ln -s /dev/rvol/vol_23      ts_o10_2
ln -s /dev/rvol/vol_24      ts_o11_2
ln -s /dev/rvol/vol_25      ts_o12_2
ln -s /dev/rvol/vol_26      ts_l1_1
ln -s /dev/rvol/vol_27      ts_l2_1
ln -s /dev/rvol/vol_28      ts_l3_1
ln -s /dev/rvol/vol_29      ts_l4_1
ln -s /dev/rvol/vol_30      ts_l5_1
ln -s /dev/rvol/vol_31      ts_l6_1
ln -s /dev/rvol/vol_32      ts_l7_1
ln -s /dev/rvol/vol_33      ts_l8_1
ln -s /dev/rvol/vol_34      ts_l9_1
ln -s /dev/rvol/vol_35      ts_l10_1
ln -s /dev/rvol/vol_36      ts_l11_1
ln -s /dev/rvol/vol_37      ts_l12_1
ln -s /dev/rvol/vol_38      ts_l1_2
ln -s /dev/rvol/vol_39      ts_l2_2
ln -s /dev/rvol/vol_40      ts_l3_2
ln -s /dev/rvol/vol_41      ts_l4_2
ln -s /dev/rvol/vol_42      ts_l5_2
ln -s /dev/rvol/vol_43      ts_l6_2
ln -s /dev/rvol/vol_44      ts_l7_2
ln -s /dev/rvol/vol_45      ts_l8_2
ln -s /dev/rvol/vol_46      ts_l9_2
ln -s /dev/rvol/vol_47      ts_l10_2
ln -s /dev/rvol/vol_48      ts_l11_2
ln -s /dev/rvol/vol_49      ts_l12_2
ln -s /dev/rvol/vol_50      ts_s1
ln -s /dev/rvol/vol_51      ts_s2
ln -s /dev/rvol/vol_52      ts_c1
ln -s /dev/rvol/vol_53      ts_c2
ln -s /dev/rvol/vol_54      ts_p1
ln -s /dev/rvol/vol_55      ts_p2
ln -s /dev/rvol/vol_56      ts_p3
ln -s /dev/rvol/vol_57      ts_p4
ln -s /dev/rvol/vol_58      ts_ps1
ln -s /dev/rvol/vol_59      ts_ps2
ln -s /dev/rvol/vol_60      ts_ps3
ln -s /dev/rvol/vol_61      ts_ps4
ln -s /dev/rvol/vol_62      ts_ps5
ln -s /dev/rvol/vol_63      ts_ps6
ln -s /dev/rvol/vol_64      ts_ps7
ln -s /dev/rvol/vol_65      ts_ps8
ln -s /dev/rvol/vol_66      ts_i_l1
ln -s /dev/rvol/vol_67      ts_i_l2
ln -s /dev/rvol/vol_68      ts_i_l3
ln -s /dev/rvol/vol_69      ts_i_l4
ln -s /dev/rvol/vol_70      ts_i_o1
ln -s /dev/rvol/vol_71      ts_i_o2
ln -s /dev/rvol/vol_72      ts_i_o3
ln -s /dev/rvol/vol_73      ts_i_o4
ln -s /dev/rvol/vol_74      ts_i_ps1
ln -s /dev/rvol/vol_75      ts_i_ps2
ln -s /dev/rvol/vol_76      ts_i_ps3
ln -s /dev/rvol/vol_77      ts_i_ps4
ln -s /dev/rvol/vol_78      ts_i_c1
ln -s /dev/rvol/vol_79      ts_i_c2
ln -s /dev/rvol/vol_80      redolog1
ln -s /dev/rvol/vol_81      redolog2
ln -s /dev/rvol/vol_82      redolog3
ln -s /dev/rvol/vol_83      redolog4
ln -s /dev/rvol/vol_84      redolog5
ln -s /dev/rvol/vol_85      redolog6
ln -s /dev/rvol/vol_86      redolog7
ln -s /dev/rvol/vol_87      redolog8
ln -s /dev/rvol/vol_88      redolog9
ln -s /dev/rvol/vol_89      redolog10
ln -s /dev/rvol/vol_90      redolog11
ln -s /dev/rvol/vol_91      redolog12
ln -s /dev/rvol/vol_92      system1
ln -s /dev/rvol/vol_93      system2
ln -s /dev/rvol/vol_94      system3
ln -s /dev/rvol/vol_95      system4
ln -s /dev/rvol/vol_96      ts_undo1
ln -s /dev/rvol/vol_97      ts_undo2
ln -s /dev/rvol/vol_98      ts_undo3
ln -s /dev/rvol/vol_99      ts_undo4
ln -s /dev/rvol/vol_100     ts_undo5
ln -s /dev/rvol/vol_101     ts_undo6
ln -s /dev/rvol/vol_102     ts_undo7
ln -s /dev/rvol/vol_103     ts_undo8
ln -s /dev/rvol/vol_104     ts_temp1
ln -s /dev/rvol/vol_105     ts_temp2
ln -s /dev/rvol/vol_106     ts_temp3
```

```
ln -s /dev/rvol/vol_107    ts_temp4
ln -s /dev/rvol/vol_108    ts_temp5
ln -s /dev/rvol/vol_109    ts_temp6
ln -s /dev/rvol/vol_110    ts_temp7
ln -s /dev/rvol/vol_111    ts_temp8
ln -s /dev/rvol/vol_112    ts_temp9
ln -s /dev/rvol/vol_113    ts_temp10
ln -s /dev/rvol/vol_114    ts_temp11
ln -s /dev/rvol/vol_115    ts_temp12
ln -s /dev/rvol/vol_116    ts_temp13
ln -s /dev/rvol/vol_117    ts_temp14
ln -s /dev/rvol/vol_118    ts_temp15
ln -s /dev/rvol/vol_119    ts_temp16
ln -s /dev/rvol/vol_120    ts_temp17
ln -s /dev/rvol/vol_121    ts_temp18
ln -s /dev/rvol/vol_122    ts_temp19
ln -s /dev/rvol/vol_123    ts_temp20
ln -s /dev/rvol/vol_124    ts_temp21
ln -s /dev/rvol/vol_125    ts_temp22
ln -s /dev/rvol/vol_126    ts_temp23
ln -s /dev/rvol/vol_127    ts_temp24
ln -s /dev/rvol/vol_128    ts_temp25
ln -s /dev/rvol/vol_129    ts_temp26
ln -s /dev/rvol/vol_130    ts_temp27
ln -s /dev/rvol/vol_131    ts_temp28
ln -s /dev/rvol/vol_132    ts_temp29
ln -s /dev/rvol/vol_133    ts_temp30
ln -s /dev/rvol/vol_134    ts_temp31
ln -s /dev/rvol/vol_135    ts_temp32
ln -s /dev/rvol/vol_136    ts_temp33
ln -s /dev/rvol/vol_137    ts_temp34
ln -s /dev/rvol/vol_138    ts_temp35
ln -s /dev/rvol/vol_139    ts_temp36
```

Appendix C: Query Text and Result Output

mqs00q01

Begin Execution at Thu Apr 11 11:02:04 2002

```
-- using default substitutions


select
l_returnflag,
l_linestatus,
sum(l_quantity) as sum_qty,
sum(l_extendedprice) as sum_base_price,
sum(l_extendedprice * (1 - l_discount)) as sum_disc_price,
sum(l_extendedprice * (1 - l_discount) * (1 + l_tax)) as sum_charge,
avg(l_quantity) as avg_qty,
avg(l_extendedprice) as avg_price,
avg(l_discount) as avg_disc,
count(*) as count_order
from
lineitem
where
l_shipdate <= to_date ('1998-12-01','YYYY-MM-DD')  -  90
group by
l_returnflag,
l_linestatus
order by
l_returnflag,
l_linestatus
```

```
L_RETURNFLAG L_LINESTATUS SUM_QTY              SUM_BASE_PRICE
SUM_DISC_PRICE       SUM_CHARGE           AVG_QTY
AVG_PRICE            AVG_DISC             COUNT_ORDER
A            F           37734107.00          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


4 rows processed.
Query Processed in 6.04 seconds.


Ended Executing this Stream at Thu Apr 11 11:02:10 2002


Stream Started at 1018540924.36
Stream Ended at 1018540930.40
Stream Processed in 6.04 seconds


SQL statements processed: 1
```

mqs00q02

Begin Execution at Thu Apr 11 11:02:10 2002

```
-- using default substitutions


select * from (
select
s_acctbal,
s_name,
n_name,
p_partkey,
p_mfgr,
s_address,
s_phone,
s_comment
from
part,
supplier,
partsupp,
nation,
region
where
p_partkey = ps_partkey
and s_suppkey = ps_suppkey
and p_size = 15
and p_type like '%BRASS'
and s_nationkey = n_nationkey
and n_regionkey = r_regionkey
and r_name = 'EUROPE'
and ps_supplycost = (
select
min(ps_supplycost)
from
partsupp,
supplier,
nation,
region
where
p_partkey = ps_partkey
and s_suppkey = ps_suppkey
and s_nationkey = n_nationkey
and n_regionkey = r_regionkey
and r_name = 'EUROPE'
)
order by
s_acctbal desc,
n_name,
s_name,
p_partkey
)
where rownum <= 100
```

```
S_ACCTBAL            S_NAME               N_NAME
P_PARTKEY            P_MFGR
S_ADDRESS                         S_PHONE
S_COMMENT
9938.53              Supplier#000005359       UNITED KINGDOM
185358.00            Manufacturer#4
QKuHYh,vZGiwu2FWEJoLDx04               33-429-790-6131
blithely silent pinto beans are furiously. slyly final deposits acros
9937.84              Supplier#000005969       ROMANIA
108438.00            Manufacturer#1
ANDENSOSmk,miq23Xfb5RWt6dvUcvt6Qa      29-520-692-3537
carefully slow deposits use furiously. slyly ironic platelets above the ironic
9936.22              Supplier#000005250       UNITED KINGDOM
249.00               Manufacturer#4
B3rqp0xbSEim4Mpy2RH J                  33-320-228-2957
blithely special packages are. stealthily express deposits across the closely final
instructi
```

9923.77 Supplier#000002324 GERMANY
29821.00 Manufacturer#4
y3OD9UywSTOk 17-779-299-1839
quickly express packages breach quiet pinto beans. requ
9871.22 Supplier#000006373 GERMANY
43868.00 Manufacturer#5
J8fcXWsTqM 17-813-485-8637
never silent deposits integrate furiously blit
9870.78 Supplier#000001286 GERMANY
81285.00 Manufacturer#2
YKA,E2fjiVd7eUrzp2Ef8j1QxGo2DFnosaTEH 17-516-924-4574
final theodolites cajole slyly special,
9870.78 Supplier#000001286 GERMANY
181285.00 Manufacturer#4
YKA,E2fjiVd7eUrzp2Ef8j1QxGo2DFnosaTEH 17-516-924-4574
final theodolites cajole slyly special,
9852.52 Supplier#000008973 RUSSIA
18972.00 Manufacturer#2
t5L67YdBYYH6o,Vz24jpDyQ9 32-188-594-7038
quickly regular instructions wake-- carefully unusual braids into the expres
9847.83 Supplier#000008097 RUSSIA
130557.00 Manufacturer#2
xMe97bpE69NzdwLoX 32-375-640-3593
slyly regular dependencies sleep slyly furiously express dep
9847.57 Supplier#000006345 FRANCE
86344.00 Manufacturer#1
VSt3rzk3qG698u6ld8HhOByvrTcSTSvQlDQDag 16-886-766-7945
silent pinto beans should have to snooze carefully along the final reques
9847.57 Supplier#000006345 FRANCE
173827.00 Manufacturer#2
VSt3rzk3qG698u6ld8HhOByvrTcSTSvQlDQDag 16-886-766-7945
silent pinto beans should have to snooze carefully along the final reques
9836.93 Supplier#000007342 RUSSIA
4841.00 Manufacturer#4
JOlK7C1,7xrEZSSOw 32-399-414-5385
final accounts haggle. bold accounts are furiously dugouts. furiously silent asymptotes are slyly
9817.10 Supplier#000002352 RUSSIA
124815.00 Manufacturer#2
4LfoHUZjgjEbAKw TgdKcgOc4D4uCYw 32-551-831-1437
blithely pending packages across the ironic accounts grow slyly after the furiously
9817.10 Supplier#000002352 RUSSIA
152351.00 Manufacturer#3
4LfoHUZjgjEbAKw TgdKcgOc4D4uCYw 32-551-831-1437
blithely pending packages across the ironic accounts grow slyly after the furiously
9739.86 Supplier#000003384 FRANCE
138357.00 Manufacturer#2
o,Z3v4POifevE k9U1b 6J1ucX,I 16-494-913-5925
slyly ironic theodolites hag
9721.95 Supplier#000008757 UNITED KINGDOM
156241.00 Manufacturer#3
Atg6GnM4dT2 33-821-407-2995
ironic, even dolphins above the furiously ironic foxes sleep slyly around the caref
9681.33 Supplier#000008406 RUSSIA
78405.00 Manufacturer#1
,qUuXcftUl 32-139-873-8571
furiously even deposits affix thinly special theodolites. furiou
9643.55 Supplier#000005148 ROMANIA
107617.00 Manufacturer#1
kT4ciVFslx9z4s79p Js825 29-252-617-4850
doggedly even ideas boost furiously against the furiously express
9624.82 Supplier#000001816 FRANCE
34306.00 Manufacturer#3
e7vab91vLJPWxxZnewmnDBpDmxYHrb 16-392-237-6726
blithely regular accounts cajole furiously. regular
9624.78 Supplier#000009658 ROMANIA
189657.00 Manufacturer#1
oE9uBgEfSS4opIcepXyAYM,x 29-748-876-2014
regular deposits haggle. furiously express asympto
9612.94 Supplier#000003228 ROMANIA
120715.00 Manufacturer#2
KDdpNKN3cWu7ZSrbdqp7AfSLxx,qWB 29-325-784-8187
carefully pending accounts serve. furiously close deposits boost slyly. q
9612.94 Supplier#000003228 ROMANIA
198189.00 Manufacturer#4
KDdpNKN3cWu7ZSrbdqp7AfSLxx,qWB 29-325-784-8187
carefully pending accounts serve. furiously close deposits boost slyly. q
9571.83 Supplier#000004305 ROMANIA
179270.00 Manufacturer#2
qNHZ7WmCzygwMPRDO9Ps 29-973-481-1831
furiously final deposits
9558.10 Supplier#000003532 UNITED KINGDOM
88515.00 Manufacturer#4
EOeuiiOn21OVpTlGguufFDFsbN1p0lhpxHp 33-152-301-2164
daring, sly accounts breach about th
9492.79 Supplier#000005975 GERMANY
25974.00 Manufacturer#5
S6mIiCTx82z7lV 17-992-579-4839
always pending packages boost slyly.
9461.05 Supplier#000002536 UNITED KINGDOM
20033.00 Manufacturer#1
8mmGbyzaU 7ZS2wJumTibypncu9pNkDc4FYA 33-556-973-5522
even foxes are quickly furiously express requests. packages
9453.01 Supplier#000000802 ROMANIA
175767.00 Manufacturer#1
,6HYXb4uaHITmtMBj4Ak57Pd 29-342-882-6463
final, regular packages across the slowly regular packag
9408.65 Supplier#000007772 UNITED KINGDOM
117771.00 Manufacturer#4
AiC5YAH,gdu0i7 33-152-491-1126
blithely final ideas sleep carefully. requests are
9359.61 Supplier#000004856 ROMANIA
62349.00 Manufacturer#5
HYogcF3Jb yh1 29-334-870-9731
carefully unusual packages sleep carefully even ideas. dogged accoun
9357.45 Supplier#000006188 UNITED KINGDOM
138648.00 Manufacturer#1
g801,ssP8wpTk4Hm 33-583-607-1633
carefully regular deposits wake carefully furiously even i
9352.04 Supplier#000003439 GERMANY
170921.00 Manufacturer#4
qYPDgoiBGhCYxjgC 17-128-996-4650
fluffily regular pinto beans wake. unusual, final ideas c
9312.97 Supplier#000007807 RUSSIA
90279.00 Manufacturer#5
oGYMPCk9XHGB2PBfKRnHA 32-673-872-5854
unusual asymptotes above the
9312.97 Supplier#000007807 RUSSIA
100276.00 Manufacturer#5
oGYMPCk9XHGB2PBfKRnHA 32-673-872-5854
unusual asymptotes above the
9280.27 Supplier#000007194 ROMANIA
47193.00 Manufacturer#3
zhRUQkBSrFYxIAXTfInj vyGRQjeK 29-318-454-2133
slyly ironic requests despite the unusual ins
9274.80 Supplier#000008854 RUSSIA
76346.00 Manufacturer#3
1xhLoOUM7l3mZ1mKnerw OSqdbb4QbGa 32-524-148-5221
ruthlessly ironic instructions along the regular, furious requests integrate car
9249.35 Supplier#000003973 FRANCE
26466.00 Manufacturer#1
d18GiDsL6Wm2IsGXM,RZf1jCsgZAOjNYVThTRP4 16-722-866-1658
quickly ironic sauternes use b
9249.35 Supplier#000003973 FRANCE
33972.00 Manufacturer#1
d18GiDsL6Wm2IsGXM,RZf1jCsgZAOjNYVThTRP4 16-722-866-1658
quickly ironic sauternes use b
9208.70 Supplier#000007769 ROMANIA
40256.00 Manufacturer#5
rsimdze 5o9P Ht7xS 29-964-424-9649
furiously ruthless epitaphs among the furiously regular accounts use slowly fluffily ev
9201.47 Supplier#000009690 UNITED KINGDOM
67183.00 Manufacturer#5
CB BnUTlmi5zdeEl7R7 33-121-267-9529
blithely unusual accounts integrate slyly. platelets
9192.10 Supplier#000000115 UNITED KINGDOM
85098.00 Manufacturer#3
nJ 2t0f7Ve,wL1,6WzGBJLNBUCKlsV 33-597-248-1220
slyly bold pinto beans boost across the furiously regular packages. carefully regu
9189.98 Supplier#000001226 GERMANY
21225.00 Manufacturer#4
qsLCqSvLyZfuXIpjz 17-725-903-1381
final, express instruction
9128.97 Supplier#000004311 RUSSIA
146768.00 Manufacturer#5
I8IjnXd7NSJRs594RxsRR0 32-155-440-7120
regular pinto beans sleep ca
9104.83 Supplier#000008520 GERMANY

150974.00 Manufacturer#4
RqRVDgD0ER J9 b41vR2,3 17-728-804-1793
deposits sleep carefully e
9101.00 Supplier#000005791 ROMANIA
128254.00 Manufacturer#5
zub2zCV,jhHPPQqi,P2INAjE1zI n66cOEoXFG 29-549-251-5384
carefully ironic packages after the
9094.57 Supplier#000004582 RUSSIA
39575.00 Manufacturer#1
WB0XkCSG3r,mnQ n,h9VIxjjr9ARHFvKgMDf 32-587-577-1351
asymptotes above the slyly even requests haggle furiously about the regular accounts
8996.87 Supplier#000004702 FRANCE
102191.00 Manufacturer#5
8XVcQK23akp 16-811-269-8946
stealthy requests haggle c
8996.14 Supplier#000009814 ROMANIA
139813.00 Manufacturer#2
af0O5pg83lPU4IDVmEylXZVqYZQzSDlYLAmR 29-995-571-8781
ironic theodolites are evenly unusual requests-- pending pinto beans across the in
8968.42 Supplier#000010000 ROMANIA
119999.00 Manufacturer#5
aTGLEusCiL4F PDBdv665XBJhPyCOB0i 29-578-432-2146
furiously final ideas believe furiously. furiously final ideas
8936.82 Supplier#000007043 UNITED KINGDOM
109512.00 Manufacturer#1
FVajceZInZdbJE6Z9XsRUxrUEpiwHDrOXi,1Rz 33-784-177-8208
furiously regular excuses wake after the blithely special pinto beans? even instructions sl
8929.42 Supplier#000008770 FRANCE
173735.00 Manufacturer#4
R7cG26TtXrHAP9 HckhfRi 16-242-746-9248
final accounts sleep furiously. blithely ironic foxes wake boldly across the furiously s
8920.59 Supplier#000003967 ROMANIA
26460.00 Manufacturer#1
eHoAXe62SY9 29-194-731-3944
quickly even requests should have to affix blithely-- fur
8920.59 Supplier#000003967 ROMANIA
173966.00 Manufacturer#2
eHoAXe62SY9 29-194-731-3944
quickly even requests should have to affix blithely-- fur
8913.96 Supplier#000004603 UNITED KINGDOM
137063.00 Manufacturer#2
OUzlvMUr7n,utLxmPNeYKSf3T24OXskxB5 33-789-255-7342
slyly ironic packages detect furious accounts. ironic de
8877.82 Supplier#000007967 FRANCE
167966.00 Manufacturer#5
A3pi1BARM4nx6R,qrwFoRPU 16-442-147-9345
final deposits after the silent deposits ha
8862.24 Supplier#000003323 ROMANIA
73322.00 Manufacturer#3
W9 lYcsC9FwBqk3ItL 29-736-951-3710
unusual, pending theodolites integrate furiously slyly even pinto beans. unusual sheaves sleep befor
8841.59 Supplier#000005750 ROMANIA
100729.00 Manufacturer#5
Erx3lAgu0g62iaHF9x50uMH4EgeN9hEG 29-344-502-5481
excuses after the blithely regular packages mold carefully deposits. regular a
8781.71 Supplier#000003121 ROMANIA
13120.00 Manufacturer#5
wNqTogx238ZYCamFb,50v,bj 4IbNFW9Bvw1xP 29-707-291-5144
packages are quickly after the final, even packages. furiously regular
8754.24 Supplier#000009407 UNITED KINGDOM
179406.00 Manufacturer#4
CHRCbkaWcf5B 33-903-970-9604
regular dependencies haggle across the carefully bold
8691.06 Supplier#000004429 UNITED KINGDOM
126892.00 Manufacturer#2
k,BQms5UhoAF1B2Asi,fLib 33-964-337-5038
quickly special foxes against the furiously silent platelets wake quickly after t
8655.99 Supplier#000006330 RUSSIA
193810.00 Manufacturer#2
UozlaENr0ytKe2w6CeIEWFWn iO3S8Rae7Ou 32-561-198-3705
blithely even packages alongside
8638.36 Supplier#000002920 RUSSIA
75398.00 Manufacturer#1
Je2a8bszf3L 32-122-621-7549
express deposits wake. furiously silent requests wake carefully silent instru
8638.36 Supplier#000002920 RUSSIA
170402.00 Manufacturer#3
Je2a8bszf3L 32-122-621-7549
express deposits wake. furiously silent requests wake carefully silent instru
8607.69 Supplier#000006003 UNITED KINGDOM
76002.00 Manufacturer#2
EH9wADcEiuenM0NR08zDwMidw,52Y2RyILEiA 33-416-807-5206
always special foxes wake slyly bold, ironic accounts. ironic instructions affix carefull
8569.52 Supplier#000005936 RUSSIA
5935.00 Manufacturer#5
jXaNZ6vwnEWJ2ksLZJpjtgt0bY2a3AU 32-644-251-7916
packages sleep furiously. special requests about the fluffily even accounts detect
8564.12 Supplier#000000033 GERMANY
110032.00 Manufacturer#1
gfeKpYw3400L0SDywXA6Ya1Qmq1w6YB9f3R 17-138-897-9374
ironic instructions are. special pearls above
8553.82 Supplier#000003979 ROMANIA
143978.00 Manufacturer#4
BfmVhCAnCMY3jzpjUMy4CNWs9 HzpdQR7INJU 29-124-646-4897
express, ironic pinto beans cajole around the express, even packages. qu
8517.23 Supplier#000009529 RUSSIA
37025.00 Manufacturer#5
e44R8o7JAIS9iMcr 32-565-297-8775
furiously silent requests cajole furiously furiously ironic foxes. slyly express p
8517.23 Supplier#000009529 RUSSIA
59528.00 Manufacturer#2
e44R8o7JAIS9iMcr 32-565-297-8775
furiously silent requests cajole furiously furiously ironic foxes. slyly express p
8503.70 Supplier#000006830 RUSSIA
44325.00 Manufacturer#4
BC4WFCYRUZyaIgchU 4S 32-147-878-5069
quickly regular excuses detect evenly around
8457.09 Supplier#000009456 UNITED KINGDOM
19455.00 Manufacturer#1
7SBhZs8gP1cJjT0Qf433YBk 33-858-440-4349
carefully final accounts sleep blithely special foxes. slyly regular pinto beans alon
8441.40 Supplier#000003817 FRANCE
141302.00 Manufacturer#2
hU3fz3xL78 16-339-356-5115
blithely blithe ideas are
8432.89 Supplier#000003990 RUSSIA
191470.00 Manufacturer#1
wehBBp1RQbfxAYDASS75MsywmsKHRVdkrvNe6m 32-839-509-9301
final requests along the blithely ironic packages kindle against the carefully fina
8431.40 Supplier#000002675 ROMANIA
5174.00 Manufacturer#1
HJFStOu9R5NGPOegKhgbzBdyvrG2yh8w 29-474-643-1443
express, final deposits cajole carefully. stealthily unusual requests
8407.04 Supplier#000005406 RUSSIA
162889.00 Manufacturer#4
j7 gYF5RW8DC5UrjKC 32-626-152-4621
quickly final sheaves boost. car
8386.08 Supplier#000008518 FRANCE
36014.00 Manufacturer#3
2jqzqqAVe9crMVGP,n9nTsQXulNLTUYoJjEDcqWV 16-618-780-7481
slyly ironic theodolites are slyly. dogged, pendin
8376.52 Supplier#000005306 UNITED KINGDOM
190267.00 Manufacturer#5
9t8Y8 QqSIsoADPt6NLdk,TP5zyRx41oBUlgoGc9 33-632-514-7931
furiously even instructions integrate during the furiously regular re
8348.74 Supplier#000008851 FRANCE
66344.00 Manufacturer#4
nWxi7GwEbjhw1 16-796-240-2472
ironic instructions nag slyly against the slyly even theodolites. requests alongside of
8338.58 Supplier#000007269 FRANCE
17268.00 Manufacturer#4
ZwhJSwABUoiB04,3 16-267-277-4365
ruthlessly regular asymptotes a
8328.46 Supplier#000001744 ROMANIA
69237.00 Manufacturer#5
oLo3fV64q2,FKHa3p,qHnS7Yzv,ps8 29-330-728-5873
blithely silent excuses are slyly above the furiously even courts
8307.93 Supplier#000003142 GERMANY
18139.00 Manufacturer#1
dqblvV8dCNAorGlJ 17-595-447-6026
theodolites sleep blithely carefully regular warhorses. slyly regular ins
8231.61 Supplier#000009558 RUSSIA
192000.00 Manufacturer#2
mcdgen,yT1iJDHDS5fV 32-762-137-5858
slyly regular theodolites sleep fluffily express depos
8152.61 Supplier#000002731 ROMANIA

```
15227.00        Manufacturer#4
 nluXJCuY1tu                29-805-463-2030
gifts use. slyly silent ideas are carefully beneath the silent instructions. slyly sil
8109.09         Supplier#000009186      FRANCE
99185.00        Manufacturer#1
wgfosrVPexl9pEXWywaqlBMDYYf         16-668-570-1402
quickly pending requests are blithely along the ironic, final requests; instr
8102.62         Supplier#000003347      UNITED KINGDOM
18344.00        Manufacturer#5
m CtXS2S16i                33-454-274-8532
packages grow special orbits. regular theodolites about the carefully pe
8046.07         Supplier#000008780      FRANCE
191222.00       Manufacturer#3
AczzuE0UK9osj ,Lx0Jmh              16-473-215-6395
regular epitaphs integrate slyly.
8042.09         Supplier#000003245      RUSSIA
135705.00       Manufacturer#4
Dh8Ikg39onrbOL4DyTfGw8a9oKUX3d9Y      32-836-132-8872
carefully regular instructions integrate blithely silent foxes. furiously express
instructions haggl
8042.09         Supplier#000003245      RUSSIA
150729.00       Manufacturer#1
Dh8Ikg39onrbOL4DyTfGw8a9oKUX3d9Y      32-836-132-8872
carefully regular instructions integrate blithely silent foxes. furiously express
instructions haggl
7992.40         Supplier#000006108      FRANCE
118574.00       Manufacturer#1
8tBydnTDwUqfBfFV4l3                16-974-998-8937
regular pinto beans are after
7980.65         Supplier#000001288      FRANCE
13784.00        Manufacturer#4
zE,7HgVPrCn                16-646-464-8247
unusual pinto beans cajole furiously according t
7950.37         Supplier#000008101      GERMANY
33094.00        Manufacturer#5
kkYvL6IuvojJgTNG IKkaXQDYgx8ILohj      17-627-663-8014
quickly regular requests are furiously. pending deposits wake
7937.93         Supplier#000009012      ROMANIA
83995.00        Manufacturer#2
iUiTziH,Ek3i4lwSgunXMgrcTzwdb         29-250-925-9690
blithely bold ideas haggle quickly final, regular request
7914.45         Supplier#000001013      RUSSIA
125988.00       Manufacturer#2
riRcntps4KEDtYScjpMIWeYF6mNnR         32-194-698-3365
final, ironic theodolites alongside of the ironic
7912.91         Supplier#000004211      GERMANY
159180.00       Manufacturer#5
2wQRVovHrm3,v03IKzfTd,1PYsFXQFFOG      17-266-947-7315
final requests integrate slyly above the silent, even
7912.91         Supplier#000004211      GERMANY
184210.00       Manufacturer#4
2wQRVovHrm3,v03IKzfTd,1PYsFXQFFOG      17-266-947-7315
final requests integrate slyly above the silent, even
7894.56         Supplier#000007981      GERMANY
85472.00        Manufacturer#4
NSJ96vMROAbeXP                17-963-404-3760
regular, even theodolites integrate carefully. bold, special theodolites are slyly fluffily
iron
7887.08         Supplier#000009792      GERMANY
164759.00       Manufacturer#3
Y28ITVeYriT3kIGdV2K8fSZ V2UqT5H1Otz      17-988-938-4296
pending, ironic packages sleep among the carefully ironic accounts. quickly final
accounts
7871.50         Supplier#000007206      RUSSIA
104695.00       Manufacturer#1
3w fNCnrVmvJjE95sgWZzvW            32-432-452-7731
furiously dogged pinto beans cajole. bold, express notornis until the slyly pending
7852.45         Supplier#000005864      RUSSIA
8363.00         Manufacturer#4
WCNfBPZeSXh3h,c                32-454-883-3821
blithely regular deposits
7850.66         Supplier#000001518      UNITED KINGDOM
86501.00        Manufacturer#1
ONda3YJiHKJOC                33-730-383-3892
furiously final accounts wake carefully idle requests. even dolphins wake acc
7843.52         Supplier#000006683      FRANCE
11680.00        Manufacturer#4
2Z0JGkiv01Y00oCFwUGfviIbhzCdy         16-464-517-8943
carefully bold accounts doub

100 rows processed.
Query Processed in 1.32 seconds.


Ended Executing this Stream at Thu Apr 11 11:02:11 2002


Stream Started at 1018540930.57
Stream Ended at 1018540931.89
Stream Processed in 1.32 seconds


SQL statements processed: 1
```

mqs00q03

```
Begin Execution at Thu Apr 11 11:02:12 2002



-- using default substitutions


select * from (
select
l_orderkey,
sum(l_extendedprice * (1 - l_discount)) as revenue,
o_orderdate,
o_shippriority
from
customer,
orders,
lineitem
where
c_mktsegment = 'BUILDING'
and c_custkey = o_custkey
and l_orderkey = o_orderkey
and o_orderdate < to_date( '1995-03-15', 'YYYY-MM-DD')
and l_shipdate > to_date( '1995-03-15', 'YYYY-MM-DD')
group by
l_orderkey,
o_orderdate,
o_shippriority
order by
revenue desc,
o_orderdate)
where rownum <= 10

L_ORDERKEY          REVENUE          O_ORDERDATE O_SHIPPRIORITY
2456423.00          406181.01          1995-03-05  0.00
3459808.00          405838.70          1995-03-04  0.00
492164.00          390324.06          1995-02-19  0.00
1188320.00          384537.94          1995-03-09  0.00
2435712.00          378673.06          1995-02-26  0.00
4878020.00          378376.80          1995-03-12  0.00
5521732.00          375153.92          1995-03-13  0.00
2628192.00          373133.31          1995-02-22  0.00
993600.00          371407.46          1995-03-05  0.00
2300070.00          367371.15          1995-03-13  0.00


10 rows processed.
Query Processed in 2.33 seconds.


Ended Executing this Stream at Thu Apr 11 11:02:14 2002


Stream Started at 1018540932.05
Stream Ended at 1018540934.37
Stream Processed in 2.33 seconds


SQL statements processed: 1
```

mqs00q04

Begin Execution at Thu Apr 11 11:02:14 2002

-- using default substitutions

```
select
o_orderpriority,
count(*) as order_count
from
orders
where
o_orderdate >= to_date( '1993-07-01',  'YYYY-MM-DD')
and o_orderdate < add_months(to_date( '1993-07-01', 'YYYY-MM-DD'),3)
and exists (
select
*
from
lineitem
where
l_orderkey = o_orderkey
and l_commitdate < l_receiptdate
)
group by
o_orderpriority
order by
o_orderpriority
```

```
O_ORDERPRIORITY ORDER_COUNT
1-URGENT        10594.00
2-HIGH          10476.00
3-MEDIUM        10410.00
4-NOT SPECIFIED 10556.00
5-LOW           10487.00
```

5 rows processed.
Query Processed in 2.41 seconds.

Ended Executing this Stream at Thu Apr 11 11:02:16 2002

Stream Started at 1018540934.53
Stream Ended at 1018540936.94
Stream Processed in 2.41 seconds

SQL statements processed: 1

mqs00q05

Begin Execution at Thu Apr 11 11:02:17 2002

-- using default substitutions

```
select
n_name,
sum(l_extendedprice * (1 - l_discount)) as revenue
from
customer,
orders,
lineitem,
supplier,
nation,
region
where
c_custkey = o_custkey
and l_orderkey = o_orderkey
and l_suppkey = s_suppkey
and c_nationkey = s_nationkey
and s_nationkey = n_nationkey
and n_regionkey = r_regionkey
and r_name = 'ASIA'
and o_orderdate >= to_date( '1994-01-01',  'YYYY-MM-DD')
and o_orderdate < add_months(to_date( '1994-01-01',  'YYYY-MM-DD'),  12)
group by
n_name
order by
revenue desc
```

```
N_NAME                REVENUE
INDONESIA              55502041.17
VIETNAM                55295087.00
CHINA                  53724494.26
INDIA                  52035512.00
JAPAN                  45410175.70
```

5 rows processed.
Query Processed in 3.81 seconds.

Ended Executing this Stream at Thu Apr 11 11:02:20 2002

Stream Started at 1018540937.09
Stream Ended at 1018540940.90
Stream Processed in 3.81 seconds

SQL statements processed: 1

mqs00q06

Begin Execution at Thu Apr 11 11:02:21 2002

-- using default substitutions

```
select
sum(l_extendedprice * l_discount) as revenue
from
lineitem
where
l_shipdate >= to_date( '1994-01-01',  'YYYY-MM-DD')
and l_shipdate < add_months(to_date( '1994-01-01',  'YYYY-MM-DD'),  12)
and l_discount between .06 - 0.01 and .06 + 0.01
and l_quantity < 24
```

```
REVENUE
123141078.23
```

1 row_ processed.
Query Processed in 0.80 seconds.

Ended Executing this Stream at Thu Apr 11 11:02:21 2002

Stream Started at 1018540941.06
Stream Ended at 1018540941.86
Stream Processed in 0.80 seconds

SQL statements processed: 1

mqs00q07

Begin Execution at Thu Apr 11 11:02:22 2002

-- using default substitutions

```
select
supp_nation,
cust_nation,
l_year,
sum(volume) as revenue
from
(
select
n1.n_name as supp_nation,
n2.n_name as cust_nation,
                                        to_number (to_char (l_shipdate,'yyyy')) as
l_year,
l_extendedprice * (1 - l_discount) as volume
from
supplier,
lineitem,
orders,
customer,
nation n1,
nation n2
where
s_suppkey = l_suppkey
and o_orderkey = l_orderkey
and c_custkey = o_custkey
and s_nationkey = n1.n_nationkey
and c_nationkey = n2.n_nationkey
and (
(n1.n_name = 'FRANCE' and n2.n_name = 'GERMANY')
or (n1.n_name = 'GERMANY' and n2.n_name = 'FRANCE')
)
and l_shipdate between to_date( '1995-01-01', 'YYYY-MM-DD') and to_date( '1996-
12-31', 'YYYY-MM-DD')
) shipping
group by
supp_nation,
cust_nation,
l_year
order by
supp_nation,
cust_nation,
l_year

SUPP_NATION          CUST_NATION          L_YEAR
REVENUE
FRANCE               GERMANY              1995.00
54639732.73
FRANCE               GERMANY              1996.00
54633083.31
GERMANY                FRANCE             1995.00
52531746.67
GERMANY                FRANCE             1996.00
52520549.02


4 rows processed.
Query Processed in 2.10 seconds.


Ended Executing this Stream at Thu Apr 11 11:02:24 2002


Stream Started at 1018540942.02
Stream Ended at 1018540944.12
Stream Processed in 2.10 seconds


SQL statements processed: 1
```

mqs00q08

```
Begin Execution at Thu Apr 11 11:02:24 2002



-- using default substitutions


select
o_year,
sum(case when nation='BRAZIL' then volume else 0 end )/ sum(volume)
as mkt_share
from
(
select
to_number (to_char (o_orderdate, 'yyyy')) as o_year,
l_extendedprice * (1 - l_discount) as volume,
n2.n_name as nation
from
part,
supplier,
lineitem,
orders,
customer,
nation n1,
nation n2,
region
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 to_date ('1995-01-01', 'YYYY-MM-DD') and to_date
('1996-12-31', 'YYYY-MM-DD')
and p_type = 'ECONOMY ANODIZED STEEL'
) all_nations
group by
o_year
order by
o_year

O_YEAR               MKT_SHARE
1995.00              0.03
1996.00              0.04


2 rows processed.
Query Processed in 6.17 seconds.


Ended Executing this Stream at Thu Apr 11 11:02:30 2002


Stream Started at 1018540944.28
Stream Ended at 1018540950.45
Stream Processed in 6.17 seconds


SQL statements processed: 1
```

mqs00q09

```
Begin Execution at Thu Apr 11 11:02:30 2002



-- using default substitutions


select
nation,
o_year,
sum(amount) as sum_profit
from
(
select
n_name as nation,
to_number (to_char (o_orderdate, 'yyyy')) as o_year,
l_extendedprice * (1 - l_discount) - ps_supplycost * l_quantity as amount
from
part,
supplier,
                                        lineitem,
```

```
partsupp,
orders,
                                nation
where
s_suppkey = l_suppkey
and ps_suppkey = l_suppkey
and ps_partkey = l_partkey
and p_partkey = l_partkey
and o_orderkey = l_orderkey
and s_nationkey = n_nationkey
and p_name like '%green%'
) profit
group by
nation,
o_year
order by
nation,
o_year desc
```

NATION	O_YEAR	SUM_PROFIT
ALGERIA	1998.00	31342867.23
ALGERIA	1997.00	57138193.02
ALGERIA	1996.00	56140140.13
ALGERIA	1995.00	53051469.65
ALGERIA	1994.00	53867582.13
ALGERIA	1993.00	54942718.13
ALGERIA	1992.00	54628034.71
ARGENTINA	1998.00	30211185.71
ARGENTINA	1997.00	50805741.75
ARGENTINA	1996.00	51923746.58
ARGENTINA	1995.00	49298625.77
ARGENTINA	1994.00	50835610.11
ARGENTINA	1993.00	51646079.18
ARGENTINA	1992.00	50410314.99
BRAZIL	1998.00	27217924.38
BRAZIL	1997.00	48378669.20
BRAZIL	1996.00	50482870.36
BRAZIL	1995.00	47623383.63
BRAZIL	1994.00	47840165.73
BRAZIL	1993.00	49054694.04
BRAZIL	1992.00	48667639.08
CANADA	1998.00	30379833.77
CANADA	1997.00	50465052.31
CANADA	1996.00	52560501.39
CANADA	1995.00	52375332.81
CANADA	1994.00	52600364.66
CANADA	1993.00	52644504.07
CANADA	1992.00	53932871.70
CHINA	1998.00	31075466.16
CHINA	1997.00	50551874.45
CHINA	1996.00	51039293.88
CHINA	1995.00	49287534.62
CHINA	1994.00	50851090.07
CHINA	1993.00	54229629.83
CHINA	1992.00	52400529.37
EGYPT	1998.00	29054433.39
EGYPT	1997.00	50627611.45
EGYPT	1996.00	49542212.84
EGYPT	1995.00	48311550.32
EGYPT	1994.00	49790644.74
EGYPT	1993.00	48904292.97
EGYPT	1992.00	49434932.62
ETHIOPIA	1998.00	28040717.27
ETHIOPIA	1997.00	47455009.87
ETHIOPIA	1996.00	46491097.57
ETHIOPIA	1995.00	46804449.30
ETHIOPIA	1994.00	48516143.92
ETHIOPIA	1993.00	46551891.56
ETHIOPIA	1992.00	44934648.64
FRANCE	1998.00	32226407.84
FRANCE	1997.00	47121485.86
FRANCE	1996.00	47263135.50
FRANCE	1995.00	47275997.57
FRANCE	1994.00	47067209.33
FRANCE	1993.00	51163370.11
FRANCE	1992.00	47846235.33
GERMANY	1998.00	28624942.66
GERMANY	1997.00	49309074.88
GERMANY	1996.00	49918683.17
GERMANY	1995.00	52650718.72
GERMANY	1994.00	50346900.42
GERMANY	1993.00	50991895.81
GERMANY	1992.00	48274126.10
INDIA	1998.00	29943144.35
INDIA	1997.00	50665453.23
INDIA	1996.00	50283092.29
INDIA	1995.00	50006774.64
INDIA	1994.00	48995190.76
INDIA	1993.00	50286902.85
INDIA	1992.00	50850329.40
INDONESIA	1998.00	27672340.00
INDONESIA	1997.00	50512145.73
INDONESIA	1996.00	51653060.12
INDONESIA	1995.00	51508779.59
INDONESIA	1994.00	52817950.32
INDONESIA	1993.00	47959994.96
INDONESIA	1992.00	51776605.03
IRAN	1998.00	29065736.24
IRAN	1997.00	50042063.05
IRAN	1996.00	50926653.19
IRAN	1995.00	51249667.65
IRAN	1994.00	50337085.87
IRAN	1993.00	51730763.49
IRAN	1992.00	49955856.56
IRAQ	1998.00	31624551.00
IRAQ	1997.00	55121749.02
IRAQ	1996.00	55897663.79
IRAQ	1995.00	54815472.52
IRAQ	1994.00	54408516.13
IRAQ	1993.00	53633167.98
IRAQ	1992.00	55891939.34
JAPAN	1998.00	27934179.67
JAPAN	1997.00	44517162.55
JAPAN	1996.00	42545606.12
JAPAN	1995.00	43749356.40
JAPAN	1994.00	44840243.07
JAPAN	1993.00	44660015.53
JAPAN	1992.00	45410249.12
JORDAN	1998.00	26901488.58
JORDAN	1997.00	45471878.41
JORDAN	1996.00	46794325.79
JORDAN	1995.00	45178828.58
JORDAN	1994.00	45333636.51
JORDAN	1993.00	47971496.10
JORDAN	1992.00	44717239.18
KENYA	1998.00	28597614.34
KENYA	1997.00	47949733.73
KENYA	1996.00	46886924.62
KENYA	1995.00	46072338.76
KENYA	1994.00	45772061.17
KENYA	1993.00	46308728.23
KENYA	1992.00	47257780.84
MOROCCO	1998.00	26732115.58
MOROCCO	1997.00	45637304.25
MOROCCO	1996.00	45558221.75
MOROCCO	1995.00	47851318.89
MOROCCO	1994.00	46272172.94
MOROCCO	1993.00	46764326.18
MOROCCO	1992.00	48122783.58
MOZAMBIQUE	1998.00	30712392.01
MOZAMBIQUE	1997.00	50316528.76
MOZAMBIQUE	1996.00	51640320.25
MOZAMBIQUE	1995.00	50693774.51
MOZAMBIQUE	1994.00	49253277.63
MOZAMBIQUE	1993.00	49153016.54
MOZAMBIQUE	1992.00	48247551.85
PERU	1998.00	29326102.32
PERU	1997.00	49753780.40
PERU	1996.00	50935170.29
PERU	1995.00	53309883.41
PERU	1994.00	50643531.80
PERU	1993.00	51584622.00
PERU	1992.00	47523899.05
ROMANIA	1998.00	30368667.40
ROMANIA	1997.00	50365683.85
ROMANIA	1996.00	49598999.01
ROMANIA	1995.00	47537642.87
ROMANIA	1994.00	51455283.01

```
ROMANIA          1993.00          50407136.89
ROMANIA          1992.00          48185385.13
RUSSIA           1998.00          28322384.03
RUSSIA           1997.00          50106685.18
RUSSIA           1996.00          51753342.43
RUSSIA           1995.00          49215820.36
RUSSIA           1994.00          52205666.44
RUSSIA           1993.00          51860230.03
RUSSIA           1992.00          53251677.15
SAUDI ARABIA     1998.00          31541259.81
SAUDI ARABIA     1997.00          52438750.81
SAUDI ARABIA     1996.00          52543737.82
SAUDI ARABIA     1995.00          52938696.53
SAUDI ARABIA     1994.00          51389601.97
SAUDI ARABIA     1993.00          52937508.88
SAUDI ARABIA     1992.00          54843459.64
UNITED KINGDOM   1998.00          28494874.00
UNITED KINGDOM   1997.00          49381810.90
UNITED KINGDOM   1996.00          51386853.96
UNITED KINGDOM   1995.00          51509586.79
UNITED KINGDOM   1994.00          48086499.71
UNITED KINGDOM   1993.00          49166827.22
UNITED KINGDOM   1992.00          49349122.08
UNITED STATES    1998.00          25126238.95
UNITED STATES    1997.00          50077306.42
UNITED STATES    1996.00          48048649.47
UNITED STATES    1995.00          48809032.42
UNITED STATES    1994.00          49296747.18
UNITED STATES    1993.00          48029946.80
UNITED STATES    1992.00          48671944.50
VIETNAM          1998.00          30442736.06
VIETNAM          1997.00          50309179.79
VIETNAM          1996.00          50488161.41
VIETNAM          1995.00          49658284.61
VIETNAM          1994.00          50596057.26
VIETNAM          1993.00          50953919.15
VIETNAM          1992.00          49613838.32


175 rows processed.
Query Processed in 5.92 seconds


Ended Executing this Stream at Thu Apr 11 11:02:36 2002


Stream Started at 1018540950.61
Stream Ended at 1018540956.53
Stream Processed in 5.92 seconds


SQL statements processed: 1
```

mqs00q10

```
Begin Execution at Thu Apr 11 11:02:36 2002



-- using default substitutions


select  *  from  (
select
c_custkey,
c_name,
sum(l_extendedprice * (1 - l_discount)) as revenue,
c_acctbal,
n_name,
c_address,
c_phone,
c_comment
from
customer,
orders,
lineitem,
nation
where
c_custkey = o_custkey
and l_orderkey = o_orderkey
and o_orderdate >= to_date ('1993-10-01',  'YYYY-MM-DD')
and o_orderdate < add_months(  to_date( '1993-10-01',  'YYYY-MM-DD'),  3)
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)
where rownum <= 20

C_CUSTKEY          C_NAME                REVENUE
C_ACCTBAL          N_NAME
C_ADDRESS                      C_PHONE
C_COMMENT
57040.00           Customer#000057040       734235.25
632.87             JAPAN
Eioyzjf4pp                     22-895-641-3466
requests sleep blithely about the furiously i
143347.00          Customer#000143347       721002.69
2557.47            EGYPT
1aReFYv,Kw4                    14-742-935-3718
fluffily bold excuses haggle finally after the u
60838.00           Customer#000060838       679127.31
2454.77            BRAZIL
64EaJ5vMAHWJlBOxJklpNc2RJiWE           12-913-494-9813
furiously even pinto beans integrate under the ruthless foxes; ironic, even dolphins
across the slyl
101998.00          Customer#000101998       637029.57
3790.89            UNITED KINGDOM
01c9CILnNtfOQYmZj              33-593-865-6378
accounts doze blithely! enticing, final deposits sleep blithely special accounts. slyly
express accounts pla
125341.00          Customer#000125341       633508.09
4983.51            GERMANY
S29ODD6bceU8QSuuEJznkNaK               17-582-695-5962
quickly express requests wake quickly blithely
25501.00           Customer#000025501       620269.78
7725.04            ETHIOPIA
 W556MXuoiaYCCZamJI,Rn0B4ACUGdkQ8DZ     15-874-808-6793
quickly special requests sleep evenly among the special deposits. special deposi
115831.00          Customer#000115831       596423.87
5098.10            FRANCE
rFeBbEEyk dl ne7zV5fDrmiq1oK09wV7pxqCgIc 16-715-386-3788
carefully bold excuses sleep alongside of the thinly idle
84223.00           Customer#000084223       594998.02
528.65             UNITED KINGDOM
nAVZCs6BaWap rrM27N 2qBnzc5WBauxbA      33-442-824-8191
pending, final ideas haggle final requests. unusual, regular asymptotes affix according
to the even foxes.
54289.00           Customer#000054289       585603.39
5583.02            IRAN
vXCxoCsU0Bad5JQI ,oobkZ                20-834-292-4707
express requests sublate blithely regular requests. regular, even ideas solve.
39922.00           Customer#000039922       584878.11
7321.11            GERMANY
Zgy4s50l2GKN4pLDPBU8m342gIw6R          17-147-757-8036
even pinto beans haggle. slyly bold accounts inte
6226.00            Customer#000006226       576783.76
2230.09            UNITED KINGDOM
8gPu8,NPGkfyQQ0hcIYUGPIBWc,ybP5g,      33-657-701-3391
quickly final requests against the regular instructions wake blithely final instructions.
pa
922.00             Customer#000000922       576767.53
3869.25            GERMANY
Az9RFaut7NkPnc5zSD2PwHgVwr4jRzq        17-945-916-9648
boldly final requests cajole blith
147946.00          Customer#000147946       576455.13
2030.13            ALGERIA
iANyZHjqhyy7Ajah0pTrYyhJ               10-886-956-3143
furiously even accounts are blithely above the furiousl
115640.00          Customer#000115640       569341.19
```

6436.10 ARGENTINA
Vtgfia9qI 7EpHgecU1X 11-411-543-4901
final instructions are slyly according to the
73606.00 Customer#000073606 568656.86
1785.67 JAPAN
xuR0Tro5yChDfOCrjkd2ol 22-437-653-6966
furiously bold orbits about the furiously busy requests wake across the furiously quiet theodolites. d
110246.00 Customer#000110246 566842.98
7763.35 VIETNAM
7KzflgX MDOq7sOkI 31-943-426-9837
dolphins sleep blithely among the slyly final
142549.00 Customer#000142549 563537.24
5085.99 INDONESIA
ChqEoK43OysjdHbtKCp6dKqjNyvvi9 19-955-562-2398
regular, unusual dependencies boost slyly; ironic attainments nag fluffily into the unusual packages?
146149.00 Customer#000146149 557254.99
1791.55 ROMANIA
s87fvzFQpU 29-744-164-6487
silent, unusual requests detect quickly slyly regul
52528.00 Customer#000052528 556397.35
551.79 ARGENTINA
NFztyTOR10UOJ 11-208-192-3205
unusual requests detect. slyly dogged theodolites use slyly. deposit
23431.00 Customer#000023431 554269.54
3381.86 ROMANIA
HgiV0phqhaIa9aydNoIlb 29-915-458-2654
instructions nag quickly. furiously bold accounts cajol

20 rows processed.
Query Processed in 2.88 seconds.

Ended Executing this Stream at Thu Apr 11 11:02:39 2002

Stream Started at 1018540956.69
Stream Ended at 1018540959.57
Stream Processed in 2.88 seconds

SQL statements processed: 1

mqs00q11

Begin Execution at Thu Apr 11 11:02:39 2002

-- using default substitutions

```
select
ps_partkey,
sum(ps_supplycost * ps_availqty) as value
from
partsupp,
supplier,
nation
where
ps_suppkey = s_suppkey
and s_nationkey = n_nationkey
and n_name = 'GERMANY'
group by
ps_partkey having
sum(ps_supplycost * ps_availqty) > (
select
sum(ps_supplycost * ps_availqty) * 0.0001000000
from
partsupp,
supplier,
nation
where
ps_suppkey = s_suppkey
and s_nationkey = n_nationkey
and n_name = 'GERMANY'
)
order by
value desc
```

PS_PARTKEY	VALUE
129760.00	17538456.86
166726.00	16503353.92
191287.00	16474801.97
161758.00	16101755.54
34452.00	15983844.72
139035.00	15907078.34
9403.00	15451755.62
154358.00	15212937.88
38823.00	15064802.86
85606.00	15053957.15
33354.00	14408297.40
154747.00	14407580.68
82865.00	14235489.78
76094.00	14094247.04
222.00	13937777.74
121271.00	13908336.00
55221.00	13716120.47
22819.00	13666434.28
76281.00	13646853.68
85298.00	13581154.93
85158.00	13554904.00
139684.00	13535538.72
31034.00	13498025.25
87305.00	13482847.04
10181.00	13445148.75
62323.00	13411824.30
26489.00	13377256.38
96493.00	13339057.83
56548.00	13329014.97
55576.00	13306843.35
159751.00	13306614.48
92406.00	13287414.50
182636.00	13223726.74
199969.00	13135288.21
62865.00	13001926.94
7284.00	12945298.19
197867.00	12944510.52
11562.00	12931575.51
75165.00	12916918.12
97175.00	12911283.50
140840.00	12896562.23
65241.00	12890600.46
166120.00	12876927.22
9035.00	12863828.70
144616.00	12853549.30
176723.00	12832309.74
170884.00	12792136.58
29790.00	12723300.33
95213.00	12555483.73
183873.00	12550533.05
171235.00	12476538.30
21533.00	12437821.32
17290.00	12432159.50
156397.00	12260623.50
122611.00	12222812.98
139155.00	12220319.25
146316.00	12215800.61
171381.00	12199734.52
198633.00	12078226.95
167417.00	12046637.62
59512.00	12043468.76
31688.00	12034893.64
159586.00	12001505.84
*** Deleted Rows Here ***	
80408.00	7963312.17
37728.00	7961875.68
26624.00	7961772.31
44736.00	7961144.10
29763.00	7960605.03
36147.00	7959463.68
146040.00	7957587.66
115469.00	7957485.14
142276.00	7956790.63
181280.00	7954037.35

```
115096.00          7953047.55
109650.00          7952258.73
93862.00           7951992.24
158325.00          7950728.30
55952.00           7950387.06
122397.00          7947106.27
28114.00           7946945.72
11966.00           7945197.48
47814.00           7944083.00
85096.00           7943691.06
51657.00           7943593.77
196680.00          7943578.89
13141.00           7942730.34
193327.00          7941036.25
152612.00          7940663.71
139680.00          7939242.36
31134.00           7938318.30
45636.00           7937240.85
56694.00           7936015.95
8114.00            7933921.88
71518.00           7932261.69
72922.00           7930400.64
146699.00          7929167.40
92387.00           7928972.67
186289.00          7928786.19
95952.00           7927972.78
196514.00          7927180.70
4403.00            7925729.04
2267.00            7925649.37
45924.00           7925047.68
11493.00           7916722.23
104478.00          7916253.60
166794.00          7913842.00
161995.00          7910874.27
23538.00           7909752.06
41093.00           7909579.92
112073.00          7908617.57
92814.00           7908262.50
88919.00           7907992.50
79753.00           7907933.88
108765.00          7905338.98
146530.00          7905336.60
71475.00           7903367.58
36289.00           7901946.50
61739.00           7900794.00
52338.00           7898638.08
194299.00          7898421.24
105235.00          7897829.94
77207.00           7897752.72
96712.00           7897575.27
10157.00           7897046.25
171154.00          7896814.50
79373.00           7896186.00
113808.00          7893353.88
27901.00           7892952.00
128820.00          7892882.72
25891.00           7890511.20
122819.00          7888881.02
154731.00          7888301.33
101674.00          7879324.60
51968.00           7879102.21
72073.00           7877736.11
5182.00            7874521.73

1048 rows processed.
Query Processed in 2.00 seconds.

Ended Executing this Stream at Thu Apr 11 11:02:41 2002

Stream Started at 1018540959.73
Stream Ended at 1018540961.73
Stream Processed in 2.00 seconds

SQL statements processed: 1
```

mqs00q12

```
Begin Execution at Thu Apr 11 11:02:41 2002

-- using default substitutions

select
        l_shipmode,
        sum(case
                when o_orderpriority = '1-URGENT'
                        or o_orderpriority = '2-HIGH'
                        then 1
                else 0
        end) as high_line_count,
        sum(case
                when o_orderpriority <> '1-URGENT'
                        and o_orderpriority <> '2-HIGH'
                        then 1
                else 0
        end) as low_line_count
from
        orders,
        lineitem
where
        o_orderkey = l_orderkey
        and l_shipmode in ('MAIL', 'SHIP')
        and l_commitdate < l_receiptdate
        and l_shipdate < l_commitdate
and l_receiptdate >= to_date( '1994-01-01',  'YYYY-MM-DD')
and l_receiptdate < add_months(to_date ('1994-01-01',  'YYYY-MM-DD'),  12)
group by
        l_shipmode
order by
        l_shipmode

L_SHIPMODE HIGH_LINE_COUNT       LOW_LINE_COUNT
MAIL       6202.00               9324.00
SHIP       6200.00               9262.00

2 rows processed.
Query Processed in 2.15 seconds.

Ended Executing this Stream at Thu Apr 11 11:02:44 2002

Stream Started at 1018540961.89
Stream Ended at 1018540964.04
Stream Processed in 2.15 seconds

SQL statements processed: 1
```

mqs00q13

```
Begin Execution at Thu Apr 11 11:02:44 2002

-- using default substitutions

select
c_count,
count(*) as custdist
from
(
select
c_custkey,
count(o_orderkey)  as  c_count
from
customer, orders where
```

```
c_custkey = o_custkey(+)
and o_comment(+) not like '%special%requests%'
group by
c_custkey
) c_orders
group by
c_count
order by
custdist desc,
c_count desc
```

C_COUNT	CUSTDIST
0.00	50004.00
9.00	6641.00
10.00	6566.00
11.00	6058.00
8.00	5949.00
12.00	5553.00
13.00	4989.00
19.00	4748.00
7.00	4707.00
18.00	4625.00
15.00	4552.00
17.00	4530.00
14.00	4484.00
20.00	4461.00
16.00	4323.00
21.00	4217.00
22.00	3730.00
6.00	3334.00
23.00	3129.00
24.00	2622.00
25.00	2079.00
5.00	1972.00
26.00	1593.00
27.00	1185.00
4.00	1033.00
28.00	869.00
29.00	559.00
3.00	398.00
30.00	373.00
31.00	235.00
2.00	144.00
32.00	128.00
33.00	71.00
34.00	48.00
35.00	33.00
1.00	23.00
36.00	17.00
37.00	7.00
40.00	4.00
38.00	4.00
39.00	2.00
41.00	1.00

42 rows processed.
Query Processed in 3.95 seconds.

Ended Executing this Stream at Thu Apr 11 11:02:48 2002

Stream Started at 1018540964.19
Stream Ended at 1018540968.14
Stream Processed in 3.95 seconds

SQL statements processed: 1

mqs00q14

Begin Execution at Thu Apr 11 11:02:48 2002

-- using default substitutions

```
select
        100.00 * sum(case
                when p_type like 'PROMO%'
                        then l_extendedprice * (1 - l_discount)
                else 0
        end) / sum(l_extendedprice * (1 - l_discount)) as promo_revenue
from
        lineitem,
        part
where
        l_partkey = p_partkey
        and l_shipdate >= date '1995-09-01'
        and l_shipdate < date '1995-09-01' + interval '1' month
```

PROMO_REVENUE
16.38

1 row_ processed.
Query Processed in 0.32 seconds.

Ended Executing this Stream at Thu Apr 11 11:02:48 2002

Stream Started at 1018540968.30
Stream Ended at 1018540968.62
Stream Processed in 0.32 seconds

SQL statements processed: 1

mqs00q15

Begin Execution at Thu Apr 11 11:02:48 2002

-- using default substitutions

```
create view revenue0 (supplier_no, total_revenue) as
select
l_suppkey,
sum(l_extendedprice * (1 - l_discount))
from
lineitem
where
l_shipdate >= to_date( '1996-01-01', 'YYYY-MM-DD')
and l_shipdate < add_months( to_date ('1996-01-01', 'YYYY-MM-DD'), 3)
group by
l_suppkey
```

Query Processed in 0.07 seconds.

```
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
```

S_SUPPKEY S_NAME
S_ADDRESS S_PHONE TOTAL_REVENUE
8449.00 Supplier#000008449
Wp34zim9qYFbVctdW 20-469-856-8873 1772627.21

1 row_ processed.
Query Processed in 1.94 seconds.

drop view revenue0
Query Processed in 0.03 seconds.

Ended Executing this Stream at Thu Apr 11 11:02:50 2002

Stream Started at 1018540968.77
Stream Ended at 1018540970.81
Stream Processed in 2.04 seconds

SQL statements processed: 3

mqs00q16

Begin Execution at Thu Apr 11 11:02:50 2002

-- using default substitutions

```
select
p_brand,
p_type,
p_size,
count(distinct ps_suppkey) as supplier_cnt
from
partsupp,
part
where
p_partkey = ps_partkey
and p_brand <> 'Brand#45'
and p_type not like 'MEDIUM POLISHED%'
and p_size in (49, 14, 23, 45, 19, 3, 36, 9)
and ps_suppkey not in (
select
s_suppkey
from
supplier
where
s_comment like '%Customer%Complaints%'
)
group by
p_brand,
p_type,
p_size
order by
supplier_cnt desc,
p_brand,
p_type,
p_size
```

P_BRAND	P_TYPE	P_SIZE	SUPPLIER_CNT
Brand#41	MEDIUM BRUSHED TIN	3.00	28.00
Brand#54	STANDARD BRUSHED COPPER	14.00	27.00
Brand#11	STANDARD BRUSHED TIN	23.00	24.00
Brand#11	STANDARD BURNISHED BRASS	36.00	24.00
Brand#15	MEDIUM ANODIZED NICKEL	3.00	24.00
Brand#15	SMALL ANODIZED BRASS	45.00	24.00
Brand#15	SMALL BURNISHED NICKEL	19.00	24.00
Brand#21	MEDIUM ANODIZED COPPER	3.00	24.00
Brand#22	SMALL BRUSHED NICKEL	3.00	24.00
Brand#22	SMALL BURNISHED BRASS	19.00	24.00
Brand#25	MEDIUM BURNISHED COPPER	36.00	24.00
Brand#31	PROMO POLISHED COPPER	36.00	24.00
Brand#33	LARGE POLISHED TIN	23.00	24.00
Brand#33	PROMO POLISHED STEEL	14.00	24.00
Brand#35	PROMO BRUSHED NICKEL	14.00	24.00
Brand#41	ECONOMY BRUSHED STEEL	9.00	24.00
Brand#41	ECONOMY POLISHED TIN	19.00	24.00
Brand#41	LARGE PLATED COPPER	36.00	24.00
Brand#42	ECONOMY PLATED BRASS	3.00	24.00
Brand#42	STANDARD POLISHED TIN	49.00	24.00
Brand#43	PROMO BRUSHED TIN	3.00	24.00
Brand#43	SMALL ANODIZED COPPER	36.00	24.00
Brand#44	STANDARD POLISHED NICKEL	3.00	24.00
Brand#52	ECONOMY PLATED TIN	14.00	24.00
Brand#52	STANDARD BURNISHED NICKEL	3.00	24.00
Brand#53	MEDIUM ANODIZED STEEL	14.00	24.00
Brand#14	PROMO ANODIZED NICKEL	45.00	23.00
Brand#32	ECONOMY PLATED BRASS	9.00	23.00
Brand#52	SMALL ANODIZED COPPER	3.00	23.00
Brand#11	ECONOMY BRUSHED COPPER	45.00	20.00
Brand#11	ECONOMY PLATED BRASS	23.00	20.00

*** Deleted Rows Here ***

Brand#55	STANDARD BRUSHED STEEL	49.00	4.00
Brand#55	STANDARD BRUSHED TIN	19.00	4.00
Brand#55	STANDARD BRUSHED TIN	49.00	4.00
Brand#55	STANDARD BURNISHED BRASS	9.00	4.00
Brand#55	STANDARD BURNISHED BRASS	19.00	4.00
Brand#55	STANDARD BURNISHED BRASS	23.00	4.00
Brand#55	STANDARD BURNISHED BRASS	36.00	4.00
Brand#55	STANDARD BURNISHED COPPER	3.00	4.00
Brand#55	STANDARD BURNISHED NICKEL	9.00	4.00
Brand#55	STANDARD BURNISHED NICKEL	49.00	4.00
Brand#55	STANDARD BURNISHED STEEL	19.00	4.00
Brand#55	STANDARD BURNISHED STEEL	23.00	4.00
Brand#55	STANDARD BURNISHED STEEL	36.00	4.00
Brand#55	STANDARD BURNISHED STEEL	45.00	4.00
Brand#55	STANDARD BURNISHED TIN	9.00	4.00
Brand#55	STANDARD BURNISHED TIN	19.00	4.00
Brand#55	STANDARD BURNISHED TIN	36.00	4.00
Brand#55	STANDARD BURNISHED TIN	49.00	4.00
Brand#55	STANDARD PLATED BRASS	9.00	4.00
Brand#55	STANDARD PLATED BRASS	45.00	4.00
Brand#55	STANDARD PLATED BRASS	49.00	4.00
Brand#55	STANDARD PLATED COPPER	9.00	4.00
Brand#55	STANDARD PLATED COPPER	45.00	4.00
Brand#55	STANDARD PLATED NICKEL	3.00	4.00
Brand#55	STANDARD PLATED NICKEL	19.00	4.00
Brand#55	STANDARD PLATED NICKEL	45.00	4.00
Brand#55	STANDARD PLATED STEEL	14.00	4.00
Brand#55	STANDARD PLATED STEEL	23.00	4.00
Brand#55	STANDARD PLATED STEEL	49.00	4.00
Brand#55	STANDARD PLATED TIN	9.00	4.00
Brand#55	STANDARD PLATED TIN	14.00	4.00
Brand#55	STANDARD PLATED TIN	36.00	4.00
Brand#55	STANDARD POLISHED BRASS	3.00	4.00
Brand#55	STANDARD POLISHED BRASS	9.00	4.00
Brand#55	STANDARD POLISHED BRASS	23.00	4.00
Brand#55	STANDARD POLISHED COPPER	3.00	4.00
Brand#55	STANDARD POLISHED COPPER	23.00	4.00
Brand#55	STANDARD POLISHED COPPER	45.00	4.00
Brand#55	STANDARD POLISHED NICKEL	3.00	4.00
Brand#55	STANDARD POLISHED NICKEL	23.00	4.00
Brand#55	STANDARD POLISHED NICKEL	36.00	4.00
Brand#55	STANDARD POLISHED NICKEL	45.00	4.00
Brand#55	STANDARD POLISHED NICKEL	49.00	4.00
Brand#55	STANDARD POLISHED STEEL	14.00	4.00
Brand#55	STANDARD POLISHED STEEL	23.00	4.00
Brand#55	STANDARD POLISHED TIN	9.00	4.00
Brand#55	STANDARD POLISHED TIN	19.00	4.00
Brand#55	STANDARD POLISHED TIN	36.00	4.00
Brand#11	SMALL BRUSHED TIN	19.00	3.00
Brand#15	LARGE PLATED NICKEL	45.00	3.00
Brand#15	LARGE POLISHED NICKEL	9.00	3.00
Brand#21	PROMO BURNISHED STEEL	45.00	3.00
Brand#22	STANDARD PLATED STEEL	23.00	3.00
Brand#25	LARGE PLATED STEEL	19.00	3.00
Brand#32	STANDARD ANODIZED COPPER	23.00	3.00
Brand#33	SMALL ANODIZED BRASS	9.00	3.00
Brand#35	MEDIUM ANODIZED TIN	19.00	3.00

```
Brand#51   SMALL PLATED BRASS       23.00              3.00
Brand#52   MEDIUM BRUSHED BRASS     45.00              3.00
Brand#53   MEDIUM BRUSHED TIN       45.00              3.00
Brand#54   ECONOMY POLISHED BRASS   9.00               3.00
Brand#55   PROMO PLATED BRASS       19.00              3.00
Brand#55   STANDARD PLATED TIN      49.00              3.00


18314 rows processed.
Query Processed in 4.69 seconds.


Ended Executing this Stream at Thu Apr 11 11:02:55 2002


Stream Started at 1018540970.96
Stream Ended at 1018540975.66
Stream Processed in 4.69 seconds


SQL statements processed: 1
```

mqs00q17

```
Begin Execution at Thu Apr 11 11:02:55 2002



-- using default substitutions


select
sum(l_extendedprice) / 7.0 as avg_yearly
from
lineitem,
part
where
p_partkey = l_partkey
and p_brand = 'Brand#23'
and p_container = 'MED BOX'
and l_quantity < (
select
0.2 * avg(l_quantity)
from
lineitem
where
l_partkey = p_partkey
)

AVG_YEARLY
348406.05


1 row_ processed.
Query Processed in 6.54 seconds.


Ended Executing this Stream at Thu Apr 11 11:03:02 2002


Stream Started at 1018540975.82
Stream Ended at 1018540982.36
Stream Processed in 6.54 seconds


SQL statements processed: 1
```

mqs00q18

```
Begin Execution at Thu Apr 11 11:03:02 2002



-- using default substitutions


select  *  from  (
select
c_name,
c_custkey,
o_orderkey,
o_orderdate,
o_totalprice,
sum(l_quantity)
from
customer,
orders,
lineitem
where
o_orderkey in (
select
l_orderkey
from
lineitem
group by
l_orderkey having
sum(l_quantity) > 300
)
and c_custkey = o_custkey
and o_orderkey = l_orderkey
group by
c_name,
c_custkey,
o_orderkey,
o_orderdate,
o_totalprice
order by
o_totalprice desc,
o_orderdate
)
where rownum <= 100

C_NAME                C_CUSTKEY           O_ORDERKEY
O_ORDERDATE
O_TOTALPRICE          SUM(L_QUANTITY)
Customer#000128120    128120.00           4722021.00          1994-04-07
544089.09             323.00
Customer#000144617    144617.00           3043270.00          1997-02-12
530604.44             317.00
Customer#000013940    13940.00            2232932.00          1997-04-13
522720.61             304.00
Customer#000066790    66790.00            2199712.00          1996-09-30
515531.82             327.00
Customer#000046435    46435.00            4745607.00          1997-07-03
508047.99             309.00
Customer#000015272    15272.00            3883783.00          1993-07-28
500241.33             302.00
Customer#000146608    146608.00           3342468.00          1994-06-12
499794.58             303.00
Customer#000096103    96103.00            5984582.00          1992-03-16
494398.79             312.00
Customer#000024341    24341.00            1474818.00          1992-11-15
491348.26             302.00
Customer#000137446    137446.00           5489475.00          1997-05-23
487763.25             311.00
Customer#000107590    107590.00           4267751.00          1994-11-04
485141.38             301.00
Customer#000050008    50008.00            2366755.00          1996-12-09
483891.26             302.00
Customer#000015619    15619.00            3767271.00          1996-08-07
480083.96             318.00
Customer#000077260    77260.00            1436544.00          1992-09-12
479499.43             307.00
Customer#000109379    109379.00           5746311.00          1996-10-10
478064.11             302.00
Customer#000054602    54602.00            5832321.00          1997-02-09
471220.08             307.00
Customer#000105995    105995.00           2096705.00          1994-07-03
469692.58             307.00
Customer#000148885    148885.00           2942469.00          1992-05-31
469630.44             313.00
Customer#000114586    114586.00           551136.00           1993-05-19
469605.59             308.00
Customer#000105260    105260.00           5296167.00          1996-09-06
469360.57             303.00
Customer#000147197    147197.00           1263015.00          1997-02-02
```

467149.67	320.00			
Customer#000064483	64483.00	2745894.00	1996-07-04	
466991.35	304.00			
Customer#000136573	136573.00	2761378.00	1996-05-31	
461282.73	301.00			
Customer#000016384	16384.00	502886.00	1994-04-12	
458378.92	312.00			
Customer#000117919	117919.00	2869152.00	1996-06-20	
456815.92	317.00			
Customer#000012251	12251.00	735366.00	1993-11-24	
455107.26	309.00			
Customer#000120098	120098.00	1971680.00	1995-06-14	
453451.23	308.00			
Customer#000066098	66098.00	5007490.00	1992-08-07	
453436.16	304.00			
Customer#000117076	117076.00	4290656.00	1997-02-05	
449545.85	301.00			
Customer#000129379	129379.00	4720454.00	1997-06-07	
448665.79	303.00			
Customer#000126865	126865.00	4702759.00	1994-11-07	
447606.65	320.00			
Customer#000088876	88876.00	983201.00	1993-12-30	
446717.46	304.00			
Customer#000036619	36619.00	4806726.00	1995-01-17	
446704.09	328.00			
Customer#000141823	141823.00	2806245.00	1996-12-29	
446269.12	310.00			
Customer#000053029	53029.00	2662214.00	1993-08-13	
446144.49	302.00			
Customer#000018188	18188.00	3037414.00	1995-01-25	
443807.22	308.00			
Customer#000066533	66533.00	29158.00	1995-10-21	
443576.50	305.00			
Customer#000037729	37729.00	4134341.00	1995-06-29	
441082.97	309.00			
Customer#000003566	3566.00	2329187.00	1998-01-04	
439803.36	304.00			
Customer#000045538	45538.00	4527553.00	1994-05-22	
436275.31	305.00			
Customer#000081581	81581.00	4739650.00	1995-11-04	
435405.90	305.00			
Customer#000119989	119989.00	1544643.00	1997-09-20	
434568.25	320.00			
Customer#000003680	3680.00	3861123.00	1998-07-03	
433525.97	301.00			
Customer#000113131	113131.00	967334.00	1995-12-15	
432957.75	301.00			
Customer#000141098	141098.00	565574.00	1995-09-24	
430986.69	301.00			
Customer#000093392	93392.00	5200102.00	1997-01-22	
425487.51	304.00			
Customer#000015631	15631.00	1845057.00	1994-05-12	
419879.59	302.00			
Customer#000112987	112987.00	4439686.00	1996-09-17	
418161.49	305.00			
Customer#000012599	12599.00	4259524.00	1998-02-12	
415200.61	304.00			
Customer#000105410	105410.00	4478371.00	1996-03-05	
412754.51	302.00			
Customer#000149842	149842.00	5156581.00	1994-05-30	
411329.35	302.00			
Customer#000010129	10129.00	5849444.00	1994-03-21	
409129.85	309.00			
Customer#000069904	69904.00	1742403.00	1996-10-19	
408513.00	305.00			
Customer#000017746	17746.00	6882.00	1997-04-09	
408446.93	303.00			
Customer#000013072	13072.00	1481925.00	1998-03-15	
399195.47	301.00			
Customer#000082441	82441.00	857959.00	1994-02-07	
382579.74	305.00			
Customer#000088703	88703.00	2995076.00	1994-01-30	
363812.12	302.00			

57 rows processed.
Query Processed in 5.39 seconds.

Ended Executing this Stream at Thu Apr 11 11:03:07 2002

Stream Started at 1018540982.52
Stream Ended at 1018540987.91
Stream Processed in 5.39 seconds

SQL statements processed: 1

mqs00q19

Begin Execution at Thu Apr 11 11:03:08 2002

-- using default substitutions

```
select
sum(l_extendedprice* (1 - l_discount)) as revenue
from
lineitem,
part
where
(
p_partkey = l_partkey
and p_brand = 'Brand#12'
and p_container in ('SM CASE', 'SM BOX', 'SM PACK', 'SM PKG')
and l_quantity >= 1 and l_quantity <= 1 + 10
and p_size between 1 and 5
and l_shipmode in ('AIR', 'AIR REG')
and l_shipinstruct = 'DELIVER IN PERSON'
)
or
(
p_partkey = l_partkey
and p_brand = 'Brand#23'
and p_container in ('MED BAG', 'MED BOX', 'MED PKG', 'MED PACK')
and l_quantity >= 10 and l_quantity <= 10 + 10
and p_size between 1 and 10
and l_shipmode in ('AIR', 'AIR REG')
and l_shipinstruct = 'DELIVER IN PERSON'
)
or
(
p_partkey = l_partkey
and p_brand = 'Brand#34'
and p_container in ('LG CASE', 'LG BOX', 'LG PACK', 'LG PKG')
and l_quantity >= 20 and l_quantity <= 20 + 10
and p_size between 1 and 15
and l_shipmode in ('AIR', 'AIR REG')
and l_shipinstruct = 'DELIVER IN PERSON'
)
```

REVENUE
3083843.06

1 row_ processed.
Query Processed in 2.43 seconds.

Ended Executing this Stream at Thu Apr 11 11:03:10 2002

Stream Started at 1018540988.07
Stream Ended at 1018540990.50
Stream Processed in 2.43 seconds

SQL statements processed: 1

mqs00q20

Begin Execution at Thu Apr 11 11:03:10 2002

```
-- using default substitutions


select
s_name,
s_address
from
supplier,
nation
where
s_suppkey in (
select
ps_suppkey
from
partsupp
where
ps_partkey in (
select
p_partkey
from
part
where
p_name like 'forest%'
)
and ps_availqty > (
select
0.5 * sum(l_quantity)
from
lineitem
where
l_partkey = ps_partkey
and l_suppkey = ps_suppkey
and l_shipdate >= to_date ('1994-01-01', 'YYYY-MM-DD')
and l_shipdate < add_months( to_date ('1994-01-01', 'YYYY-MM-DD'), 12)
)
)
and s_nationkey = n_nationkey
and n_name = 'CANADA'
order by
s_name
```

S_NAME	S_ADDRESS
Supplier#000000020	iybAE,RmTymrZVYaFZva2SH,j
Supplier#000000091	YV45D7TkfdQanOOZ7q9QxkyGUapU1oOWU6q3
Supplier#000000197	YC2Acon6kjY3zj3Fbxs2k4Vdf7X0cd2F
Supplier#000000226	83qOdU2EYRdPQAQhEtn GRZEd
Supplier#000000285	Br7e1nnt1yxrw6ImgpJ7YdhFDjuBf
Supplier#000000378	FfbhyCxWvcPrO8ltp9
Supplier#000000402	i9Sw4DoyMhzhKXCH9By,AYSgmD
Supplier#000000530	0qwCMwobKY OcmLyfRXlagA8ukENJv,
Supplier#000000688	D 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
*** Deleted Rows Here ***	
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	yhhpWiJi7EJ6Q5VCaQ
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
Supplier#000009868	ROjGgx5gvtkmnUUoeyy7v
Supplier#000009869	ucLqxzrpBTRMewGSM29t0rNTM30g1Tu3Xgg3mKag
Supplier#000009899	7XdpAHrzr1t,UQFZE
Supplier#000009974	7wJ,J5DKcxSU4Kp1cQLpbcAvB5AsvKT

204 rows processed.
Query Processed in 1.44 seconds.

Ended Executing this Stream at Thu Apr 11 11:03:12 2002

Stream Started at 1018540990.65
Stream Ended at 1018540992.09
Stream Processed in 1.44 seconds

SQL statements processed: 1

mqs00q21

Begin Execution at Thu Apr 11 11:03:12 2002

-- using default substitutions

```
select * from (
select
s_name,
count(*)  numwait
from
supplier,
lineitem l1,
orders,
nation
where
s_suppkey = l1.l_suppkey
and o_orderkey = l1.l_orderkey
and o_orderstatus = 'F'
and l1.l_receiptdate > l1.l_commitdate
and exists (
select
*
from
lineitem l2
where
l2.l_orderkey = l1.l_orderkey
and l2.l_suppkey <> l1.l_suppkey
)
and not exists (
select
*
from
lineitem l3
where
l3.l_orderkey = l1.l_orderkey
and l3.l_suppkey <> l1.l_suppkey
and l3.l_receiptdate > l3.l_commitdate
)
and s_nationkey = n_nationkey
and n_name = 'SAUDI ARABIA'
group by
s_name
order by
numwait desc,
s_name)
where rownum <= 100
```

S_NAME	NUMWAIT
Supplier#000002829	20.00
Supplier#000005808	18.00
Supplier#000000262	17.00
Supplier#000000496	17.00
Supplier#000002160	17.00
Supplier#000002301	17.00
Supplier#000002540	17.00
Supplier#000003063	17.00
Supplier#000005178	17.00
Supplier#000008331	17.00
Supplier#000002005	16.00
Supplier#000002095	16.00
Supplier#000005799	16.00
Supplier#000005842	16.00
Supplier#000006450	16.00
Supplier#000006939	16.00
Supplier#000009200	16.00
Supplier#000009727	16.00
Supplier#000000486	15.00
Supplier#000000565	15.00
Supplier#000001046	15.00
Supplier#000001047	15.00
Supplier#000001161	15.00
Supplier#000001336	15.00
Supplier#000001435	15.00
Supplier#000003075	15.00
Supplier#000003335	15.00
Supplier#000005649	15.00
Supplier#000006027	15.00
Supplier#000006795	15.00
Supplier#000006800	15.00
Supplier#000006824	15.00
Supplier#000007131	15.00
Supplier#000007382	15.00
Supplier#000008913	15.00
Supplier#000009787	15.00
Supplier#000000633	14.00
Supplier#000001960	14.00
Supplier#000002323	14.00
Supplier#000002490	14.00
Supplier#000002993	14.00
Supplier#000003101	14.00
Supplier#000004489	14.00
Supplier#000005435	14.00
Supplier#000005583	14.00
Supplier#000005774	14.00
Supplier#000007579	14.00
Supplier#000008180	14.00
Supplier#000008695	14.00
Supplier#000009224	14.00
Supplier#000000357	13.00
Supplier#000000436	13.00
Supplier#000000610	13.00
Supplier#000000788	13.00
Supplier#000000889	13.00
Supplier#000001062	13.00
Supplier#000001498	13.00
Supplier#000002056	13.00
Supplier#000002312	13.00
Supplier#000002344	13.00
Supplier#000002596	13.00
Supplier#000002615	13.00
Supplier#000002978	13.00
Supplier#000003048	13.00
Supplier#000003234	13.00
Supplier#000003727	13.00
Supplier#000003806	13.00
Supplier#000004472	13.00
Supplier#000005236	13.00
Supplier#000005906	13.00
Supplier#000006241	13.00
Supplier#000006326	13.00
Supplier#000006384	13.00
Supplier#000006394	13.00
Supplier#000006624	13.00
Supplier#000006629	13.00
Supplier#000006682	13.00
Supplier#000006737	13.00
Supplier#000006825	13.00
Supplier#000007021	13.00
Supplier#000007417	13.00
Supplier#000007497	13.00
Supplier#000007602	13.00
Supplier#000008134	13.00
Supplier#000008234	13.00
Supplier#000009435	13.00
Supplier#000009436	13.00
Supplier#000009564	13.00
Supplier#000009896	13.00
Supplier#000000379	12.00
Supplier#000000673	12.00
Supplier#000000762	12.00
Supplier#000000811	12.00
Supplier#000000821	12.00
Supplier#000001337	12.00
Supplier#000001916	12.00
Supplier#000001925	12.00
Supplier#000002039	12.00
Supplier#000002357	12.00
Supplier#000002483	12.00

100 rows processed.
Query Processed in 6.75 seconds.

Ended Executing this Stream at Thu Apr 11 11:03:19 2002

Stream Started at 1018540992.30
Stream Ended at 1018540999.05
Stream Processed in 6.75 seconds

SQL statements processed: 1

mqs00q22

Begin Execution at Thu Apr 11 11:03:19 2002

-- using default substitutions

```
select
cntrycode,
count(*) as numcust,
sum(c_acctbal) as totacctbal
from
(
select
substr(c_phone, 1, 2) as cntrycode,
c_acctbal
from
customer
where
substr(c_phone,1, 2) in
('13', '31', '23', '29', '30', '18', '17')
and c_acctbal > (
select
avg(c_acctbal)
from
customer
where
c_acctbal > 0.00
and substr(c_phone, 1, 2) in
('13', '31', '23', '29', '30', '18', '17')
)
and not exists (
select
*
from
orders
where
o_custkey = c_custkey
)
) custsale
group by
cntrycode
order by
cntrycode
```

CNTRYCODE	NUMCUST	TOTACCTBAL
13	888.00	6737713.99
17	861.00	6460573.72
18	964.00	7236687.40
23	892.00	6701457.95
29	948.00	7158866.63
30	909.00	6808436.13
31	922.00	6806670.18

7 rows processed.
Query Processed in 2.11 seconds.

Ended Executing this Stream at Thu Apr 11 11:03:21 2002

Stream Started at 1018540999.20
Stream Ended at 1018541001.31
Stream Processed in 2.11 seconds

SQL statements processed: 1

Appendix D: Seed Values and Query Substitution Parameters

seed_values

Stream 00: 624180406
Stream 01: 624180407
Stream 02: 624180408
Stream 03: 624180409
Stream 04: 624180410
Stream 05: 624180411

m2param.0

14 1993-06-01
2 40 STEEL ASIA
9 drab
20 asure 1995-01-01 ARGENTINA
6 1996-01-01 0.06 24
17 Brand#53 WRAP CAN
18 314
8 INDONESIA ASIA SMALL POLISHED NICKEL
21 IRAN
13 express packages
3 FURNITURE 1995-03-18
22 10 11 16 22 31 25
21
16 Brand#15 LARGE BURNISHED 47 27 14
3 1 13 16 17
4 1995-09-01
11 ALGERIA 0.0000010000
15 1996-08-01
1 60
10 1993-12-01
19 Brand#51 Brand#31 Brand#12 4 19 24
5 MIDDLE EAST 1996-01-01
7 KENYA INDONESIA
12 REG AIR SHIP 1993-01-01

m2param.1

21 BRAZIL
3 AUTOMOBILE 1995-03-03
18 315
5 AFRICA 1996-01-01
11 JAPAN 0.0000010000
7 FRANCE ARGENTINA
6 1996-01-01 0.04 24
20 lavender 1993-01-01 MOZAMBIQUE
17 Brand#15 SM CASE
12 SHIP REG AIR 1993-01-01
16 Brand#41 PROMO POLISHED 35 8 45
44 48 2 36 37
15 1994-05-01
13 special packages
10 1994-09-01
2 27 BRASS AFRICA
8 ARGENTINA AMERICA SMALL BURNISHED NICKEL
14 1993-09-01
19 Brand#13 Brand#14 Brand#51 9 20 20
9 cream
22 14 30 12 32 27 26
13
1 68
4 1993-06-01

m2param.2

6 1996-01-01 0.09 25
17 Brand#12 SM JAR
14 1993-12-01
16 Brand#21 SMALL BRUSHED 4 45 20
22 44 5 19 43
19 Brand#15 Brand#52 Brand#55 4 10 27
10 1993-06-01
9 chartreuse
2 15 TIN EUROPE
15 1996-12-01
8 CHINA ASIA STANDARD BRUSHED NICKEL
5 AMERICA 1996-01-01
22 14 34 33 19 21 27
17
12 FOB REG AIR 1993-01-01
7 UNITED KINGDOM CHINA
13 special packages
18 313
1 76
4 1996-01-01
20 smoke 1997-01-01 FRANCE
3 FURNITURE 1995-03-20
11 ALGERIA 0.0000010000
21 SAUDI ARABIA

m1param.3

8 IRAN MIDDLE EAST STANDARD PLATED NICKEL
5 ASIA 1996-01-01
4 1993-10-01
6 1996-01-01 0.07 24
17 Brand#14 SM CAN
7 MOROCCO IRAN
1 84
18 314
22 17 21 29 20 32 31
27
14 1994-03-01
9 blanched
10 1994-03-01
15 1994-08-01
11 JORDAN 0.0000010000
20 firebrick 1995-01-01 SAUDI ARABIA
2 3 COPPER AFRICA
21 JAPAN
19 Brand#12 Brand#35 Brand#54 10 11 23
13 special packages
16 Brand#11 ECONOMY BURNISHED 20 43
8 41 15 37 0 23
12 MAIL REG AIR 1994-01-01
3 MACHINERY 1995-03-05

m2param.4

5 EUROPE 1997-01-01
21 EGYPT
14 1994-06-01
19 Brand#24 Brand#13 Brand#44 5 12 30
15 1997-03-01
17 Brand#11 LG CASE
12 TRUCK REG AIR 1994-01-01
6 1997-01-01 0.04 24
4 1996-05-01
9 antique
8 BRAZIL AMERICA STANDARD ANODIZED NICKEL
16 Brand#41 STANDARD PLATED 6 35 8
20 41 30 2 0
11 ARGENTINA 0.0000010000
2 41 STEEL EUROPE
10 1995-01-01
18 312
1 92

```
13          special      requests
7           GERMANY                  BRAZIL
22          20           28          17          10          13          23
            30
3           BUILDING     1995-03-22
20          pink         1993-01-01  IRAN
```

m2param.5

```
21          VIETNAM
15          1994-12-01
4           1995-02-01
6           1997-01-01   0.09        25
7           UNITED STATES            ROMANIA
16          Brand#21     MEDIUM BRUSHED          18          6           43
            45           37          11          29          10
19          Brand#21     Brand#51    Brand#43    10          13          27
18          313
14          1994-10-01
22          25           27          18          28          16          26
            12
11          KENYA        0.0000010000
13          special      requests
3           MACHINERY                1995-03-07
1           100
2           29           BRASS       AMERICA
5           MIDDLE EAST              1997-01-01
8           ROMANIA      EUROPE      PROMO POLISHED BRASS
20          burlywood    1997-01-01  ALGERIA
12          AIR          RAIL        1994-01-01
17          Brand#13     LG JAR
10          1993-10-01
9           turquoise
```

Appendix E: Implementation-Specific Layer/Driver Code

runTPCHall

```
#!/bin/ksh

ECHO=echo

sqlplus=$ORACLE_HOME/bin/sqlplus
GTIME=${KIT_DIR}/utils/gtime

RUN_ID_FILE=${KIT_DIR}/audit/r_id

if [ ! -f $RUN_ID_FILE ]
then
  echo "0" > $RUN_ID_FILE
fi

RUN_ID=`cat $RUN_ID_FILE`
RUN_ID=`expr $RUN_ID + 1`
echo $RUN_ID > $RUN_ID_FILE

OUT_DIR=${KIT_DIR}/audit/tests/${RUN_ID}
if [ ! -d $OUT_DIR ]
then
  mkdir $OUT_DIR
fi

SCRIPT_LOG_FILE=${OUT_DIR}/main.out
RDB_TABLES=${OUT_DIR}/rdbtablest.log
FIRST_TEN=${OUT_DIR}/firstten.log
CHECK_IDX=${OUT_DIR}/checkidx.log

echo Start TPC-H Benchmark SEQUENCE NUMBER: $RUN_ID >
$SCRIPT_LOG_FILE
echo >> $SCRIPT_LOG_FILE
echo "Starting a new Oracle log file: $ORACLE_HOME/rdbms/log/alert_TPCH1.log"
>> $SCRIPT_LOG_FILE
echo >> $SCRIPT_LOG_FILE
mv $ORACLE_HOME/rdbms/log/alert_TPCH1.log
$ORACLE_HOME/rdbms/log/alert_TPCH1.log.preAudit.$RUN_ID
touch $ORACLE_HOME/rdbms/log/alert_TPCH1.log

echo >> $SCRIPT_LOG_FILE
echo "Starting a new Oracle log file: $ORACLE_HOME/rdbms/log/alert_TPCH2.log"
>> $SCRIPT_LOG_FILE
echo >> $SCRIPT_LOG_FILE
mv $ORACLE_HOME/rdbms/log/alert_TPCH2.log
$ORACLE_HOME/rdbms/log/alert_TPCH2.log.preAudit.$RUN_ID
touch $ORACLE_HOME/rdbms/log/alert_TPCH2.log

echo >> $SCRIPT_LOG_FILE
echo "Starting a new Oracle log file: $ORACLE_HOME/rdbms/log/alert_TPCH3.log"
>> $SCRIPT_LOG_FILE
echo >> $SCRIPT_LOG_FILE
mv $ORACLE_HOME/rdbms/log/alert_TPCH3.log
$ORACLE_HOME/rdbms/log/alert_TPCH3.log.preAudit.$RUN_ID
touch $ORACLE_HOME/rdbms/log/alert_TPCH3.log

echo >> $SCRIPT_LOG_FILE
echo "Starting a new Oracle log file: $ORACLE_HOME/rdbms/log/alert_TPCH4.log"
>> $SCRIPT_LOG_FILE
echo >> $SCRIPT_LOG_FILE
mv $ORACLE_HOME/rdbms/log/alert_TPCH4.log
$ORACLE_HOME/rdbms/log/alert_TPCH4.log.preAudit.$RUN_ID
touch $ORACLE_HOME/rdbms/log/alert_TPCH4.log


echo "Start: load database `date`" >> $SCRIPT_LOG_FILE

$SF/schema_load/create_database_4node.sh >
${OUT_DIR}/create_database_4node.log

$SF/scripts/shutdown_instance.sh
$SF/scripts/startup_4_instances.sh

STIME=`$GTIME`
echo "Start: timed load portion `date`" >> $SCRIPT_LOG_FILE

$SF/schema_load/database_load_tables_et.sh >
${OUT_DIR}/database_load_tables_et.log
$SF/schema_load/create_indexes_all.sh > ${OUT_DIR}/create_indexes_all.log
$SF/schema_load/analyze_ops.sh > ${OUT_DIR}/analyze_ops.log

echo "End: timed load portion `date`" >> $SCRIPT_LOG_FILE

$KIT_DIR/audit/gen_seed.sh $KIT_DIR/audit/seed
echo Generated seed: `cat $KIT_DIR/audit/seed` >> $SCRIPT_LOG_FILE

echo "Start: dbtables.sql, firstten.sql, checkidx.sql (BEFORE) `date`" >>
$SCRIPT_LOG_FILE
$sqlplus ${DATABASE_USER} @$KIT_DIR/audit/dbtables >
${RDB_TABLES}.before_run 2>&1
$sqlplus ${DATABASE_USER} @$KIT_DIR/audit/firstten >
${FIRST_TEN}.before_run 2>&1
$sqlplus ${DATABASE_USER} @$KIT_DIR/audit/checkidx >
${CHECK_IDX}.before_run 2>&1
echo "End: dbtables.sql, firstten.sql, checkidx.sql (BEFORE) `date`" >>
$SCRIPT_LOG_FILE

runTPCHpt ${SCALE_FACTOR} 1 ${RUN_ID}

runTPCHpt ${SCALE_FACTOR} 2 ${RUN_ID}

echo "Start: dbtables.sql and checkidx.sql (AFTER) `date`" >> $SCRIPT_LOG_FILE
$sqlplus ${DATABASE_USER} @$KIT_DIR/audit/dbtables >
${RDB_TABLES}.after_run 2>&1
$sqlplus ${DATABASE_USER} @$KIT_DIR/audit/checkidx >
${CHECK_IDX}.after_run 2>&1
echo "End: dbtables.sql and checkidx.sql (AFTER) `date`" >> $SCRIPT_LOG_FILE

${SF}/scripts/kill.sh scnt

cp $ORACLE_HOME/rdbms/log/alert_TPCH1.log $OUT_DIR
cp $ORACLE_HOME/rdbms/log/alert_TPCH2.log $OUT_DIR
cp $ORACLE_HOME/rdbms/log/alert_TPCH3.log $OUT_DIR
cp $ORACLE_HOME/rdbms/log/alert_TPCH4.log $OUT_DIR

echo "End TPC-H Benchmark SEQUENCE NUMBER: $RUN_ID `date`" >>
$SCRIPT_LOG_FILE
```

runTPCHpt

```
#!/bin/ksh
#set -x
#ECHO=/bin/echo
SCRIPT_DIR=${KIT_DIR}/scripts
SQL_DIR=${KIT_DIR}/sql
UPD_DIR=${KIT_DIR}/update
SRC_DIR=${KIT_DIR}/utils
QRY_DIR=${KIT_DIR}/queries # this is the location of the query template file
QGEN_DIR=${KIT_DIR}/dbgen
QGEN=${QGEN_DIR}/qgen
QEXEC=${SRC_DIR}

DSS_QUERY=${KIT_DIR}/queries
export DSS_QUERY

UPD_SQL=${UPD_DIR}/sql
UPD_SPT=${UPD_DIR}/scripts
UPD_SRC=${UPD_DIR}/source
UPD_DAT=${UPD_DIR}/data

TPCH_BIN=${KIT_DIR}/audit/bin

GTIME=${SRC_DIR}/gtime
SEED_FILE=${KIT_DIR}/audit/seed
```

```
DF=/dev/null
HID=1
INTERVAL=60
COUNT=1200

# The defaults

QPROG=${QEXEC}/qexec

usage () {

echo " "
echo "Usage: $0 [-p <program for query stream>] [-u1 <program for UF1>]"
echo "         [-u2 <program for UF2>] [-o] [-s] [-h] [-u <user/password>]"
echo "         <scale factor> <run_number>"
echo ""
echo "scale factor     : The scale factor of the run."
echo "update ||ism     : The parallelism to use for the UFs."
echo ""
echo "-p <program>     : Program for Query Stream."
echo "                   Default is $QPROG."
echo "-u1 <program>    : Program for UF1."
echo "                   Default is $U1PROG."
echo "-u2 <program>    : Program for UF2."
echo "                   Default is $U2PROG."
echo "-o               : Collect Oracle statistics."
echo "-s               : Collect System statistics."
echo "-u <user/passwd> : User/Password. Default is tpch/tpch."
echo "-h               : Displays this message."
}
set -- `getopt "p:u1:u2:osu:h" "$@"` || usage

while :
do
  case "$1" in
  -u1) shift; U1PROG=$1;;
  -u2) shift; U2PROG=$1;;
  -p) shift; QPROG=$1;;
  -o) OSTAT=1;;
  -s) SSTAT=1;;
  -h) usage; exit 0;;
  --) shift; break;;
  esac
  shift;
done


if [ "$#" -ne "3" ]
then
  usage
  exit 1
fi

SF=$1
PARA=$2
RUN_ID=$3

OUT_DIR=${KIT_DIR}/audit/tests/${RUN_ID}
#OUT_DIR=/flatfiles/results/${RUN_ID}
if [ ! -d $OUT_DIR ]
then
        mkdir $OUT_DIR
fi

TPCH_LOG=${OUT_DIR}
TPCH_RPT=${OUT_DIR}
OUT=${OUT_DIR}

let UF_SET="($PARA-1)*($NUM_STREAMS+1)+1"
START_SET=1
let STOP_SET=$NUM_STREAMS
let START_SET_UPDATE="($PARA-1)*($NUM_STREAMS+1)+2"
let STOP_SET_UPDATE="$START_SET_UPDATE+$NUM_STREAMS-1"

TPCH_LOG_FILE=${TPCH_LOG}/m${PARA}s0
TPCH_RPT_FILE=${TPCH_RPT}/m${PARA}s0inter
QRY_FILE=${TPCH_RPT}/qtemp.${PARA}s0
QUERY_PARAMETER=${TPCH_LOG}/qp${PARA}.0
SCRIPT_LOG_FILE=${TPCH_LOG}/m${PARA}timing
UF1_LOG=${TPCH_LOG}/m${PARA}s0rf1
UF2_LOG=${TPCH_LOG}/m${PARA}s0rf2
STREAM_COUNT_LOG=${TPCH_LOG}/m${PARA}tstrcnt

echo "TPC-H Test - RUN:${PARA} SEQUENCE:${RUN_ID} `date`" >
$SCRIPT_LOG_FILE
echo "TPC-H Test - RUN:${PARA} SEQUENCE:${RUN_ID} `date`" >
$TPCH_RPT_FILE
echo "Generates query template file with seed: `cat $SEED_FILE` for stream 0" >>
$SCRIPT_LOG_FILE
echo >> $SCRIPT_LOG_FILE

${QGEN} -c -r `cat $SEED_FILE` -p 0 -s ${SF} -l $QUERY_PARAMETER >
${QRY_FILE}

START=`$GTIME`
echo "Start Power Test - RUN:${PARA} SEQUENCE:${RUN_ID} Execution Starts
$START, `date`" >>  $SCRIPT_LOG_FILE
echo "" >> $SCRIPT_LOG_FILE

# Execute UF1

SDATE=`date`
UF1_START=`$GTIME`
echo "Start UF1  $UF1_START, `date`" >> $SCRIPT_LOG_FILE

${ECHO} ${UPD_SPT}/runuf1.sh ${UF_SET} >> $UF1_LOG 2>&1
# Execute Query Stream

UF1_END=`${GTIME}`
E1DATE=`date`

UF1_TIME=`echo $UF1_END - $UF1_START | bc`
echo UF1: Execution Time: $UF1_TIME >> ${TPCH_RPT_FILE}
echo Start Time: $UF1_START, $SDATE >> ${TPCH_RPT_FILE}
echo End Time: $UF1_END, $E1DATE >> ${TPCH_RPT_FILE}
echo "" >> ${TPCH_RPT_FILE}

echo "End UF1 $UF1_END, ${E1DATE}" >> $SCRIPT_LOG_FILE
echo >> $SCRIPT_LOG_FILE

echo "Start Query Part `$GTIME`, `date` " >> $SCRIPT_LOG_FILE

${QPROG} ${DATABASE_USER} q${QRY_FILE} l${TPCH_LOG_FILE}
r${TPCH_RPT_FILE}  > $DF  2>&1

# Execute UF2

UF2_START=`${GTIME}`
E2DATE=`date`

echo "End Query Part `$GTIME`, ${E2DATE}" >> $SCRIPT_LOG_FILE
echo "" >> $SCRIPT_LOG_FILE

echo "Start UF2  $UF1_START, `date`" >> $SCRIPT_LOG_FILE
${ECHO} ${UPD_SPT}/runuf2.sh ${UF_SET} >> $UF2_LOG 2>&1
UF2_END=`${GTIME}`
END=`${GTIME}`
EDATE=`date`

echo "End UF2 $UF2_END, $EDATE" >>  $SCRIPT_LOG_FILE
echo >>  $SCRIPT_LOG_FILE

echo "End TPC-H Power Test - RUN:${PARA} SEQUENCE:${RUN_ID}, $END,
$EDATE" >> $SCRIPT_LOG_FILE
MEA_INT=`echo $END - $START | bc`
echo "Elapsed Time for TPC-H Power Test - RUN:${PARA}
SEQUENCE:${RUN_ID} is $MEA_INT" >> $SCRIPT_LOG_FILE
echo >> $SCRIPT_LOG_FILE

UF2_TIME=`echo $UF2_END - $UF2_START | bc`
echo UF2: Execution Time: $UF2_TIME >> ${TPCH_RPT_FILE}
echo Start Time: $UF2_START, E2DATE >> ${TPCH_RPT_FILE}
echo End Time: $UF2_END, $EDATE >> ${TPCH_RPT_FILE}

${KIT_DIR}/audit/abridge.pl ${TPCH_LOG_FILE}

i=$START_SET
PSEED=`cat $SEED_FILE`
```

```
while [ $i -le $STOP_SET ]; do
  TPCH_LOG_FILE=${TPCH_LOG}/mt${RUN_ID}_${i}.log
  TPCH_RPT_FILE=${TPCH_RPT}/mt${RUN_ID}_${i}.rpt
                QUERY_PARAMETER=${TPCH_LOG}/qp${PARA}.${i}
  QRY_FILE=${TPCH_RPT}/qtemp.${PARA}s${i}

  PSEED=`expr $PSEED + 1`
  ${QGEN} -c -r ${PSEED} -p ${i} -s ${SF} -l $QUERY_PARAMETER >
${QRY_FILE}

  i=`expr $i + 1`
done

TH_START_D=`date`
TH_START_T=`${GTIME}`
echo >> $SCRIPT_LOG_FILE

rm -f /tmp/th_pipe1
mknod /tmp/th_pipe1 p
rm -f /tmp/th_pipe2
mknod /tmp/th_pipe2 p
i=$START_SET

echo "Start Throughput Test - RUN:${PARA} SEQUENCE:${RUN_ID}
$TH_START_T, $TH_START_D"  >> $SCRIPT_LOG_FILE

# starts a script to count the streams during the throughput run
(scnt.sh $PARA $RUN_ID > $STREAM_COUNT_LOG &)

while [ $i -le $STOP_SET ]; do
  M_SDATE=`date`
  M_STIME=`${GTIME}`
                TPCH_LOG_FILE=${TPCH_LOG}/m${PARA}s${i}
                TPCH_RPT_FILE=${TPCH_RPT}/m${PARA}s${i}inter
  echo "Start Query Stream $i $M_STIME, ${M_SDATE}" >> $SCRIPT_LOG_FILE
                QRY_FILE=${TPCH_RPT}/qtemp.${PARA}s${i}
  ${QPROG} ${DATABASE_USER} q${QRY_FILE} l${TPCH_LOG_FILE}
r${TPCH_RPT_FILE} | grep -v "Connected to ORACLE" >> $SCRIPT_LOG_FILE
&
  i=`expr $i + 1`
done

(${KIT_DIR}/audit/runTPCHus $RUN_ID $START_SET_UPDATE
$STOP_SET_UPDATE ${SF} $PARA >> $SCRIPT_LOG_FILE 2>&1 &)

wait
THQ_END_T=`$GTIME`
THQ_END_D=`date`
echo End all Query Streams $THQ_END_T, $THQ_END_D >>
$SCRIPT_LOG_FILE
print > /tmp/th_pipe1
read < /tmp/th_pipe2

TH_END_D=`date`
TH_END_T=`$GTIME`
echo End Update Stream ${TH_END_T}, ${TH_END_D} >> $SCRIPT_LOG_FILE
echo >> $SCRIPT_LOG_FILE
echo "End Throughput Test ${TH_END_T}, ${TH_END_D}" >>
$SCRIPT_LOG_FILE
echo Execution Time Throughput Test: `echo ${TH_END_T} - ${TH_START_T} |
bc` >> $SCRIPT_LOG_FILE

i=$START_SET
while [ $i -le $STOP_SET ]; do
                TPCH_LOG_FILE=${TPCH_LOG}/m${PARA}s${i}
  ${KIT_DIR}/audit/abridge.pl ${TPCH_LOG_FILE}
                i=`expr $i + 1`
done
#kill -9 `ps -ef | grep scnt.sh | grep -v grep | awk '{print $2}'`
#${SF}/scripts/kill.sh scnt.sh
#calculate the metric
#analyze_streams.pl -f p -n $RUN_ID >
${TPCH_RPT}/tpch_metric.${RUN_ID}.${HID}.rpt
```

runTPCHus

```
#!/bin/ksh

SCRIPT_DIR=${KIT_DIR}/scripts
SQL_DIR=${KIT_DIR}/sql
UPD_DIR=${KIT_DIR}/update
UPD_SPT=${UPD_DIR}/scripts
SRC_DIR=${KIT_DIR}/utils
QRY_DIR=${KIT_DIR}/queries # this is the location of the query template file
QGEN_DIR=${KIT_DIR}/dbgen
QGEN=${QGEN_DIR}/qgen

DSS_QUERY=${KIT_DIR}/queries
export DSS_QUERY

RUN_ID=$1
START_SET_UPDATE=$2
STOP_SET_UPDATE=$3
SF=$4
PARA=$5

OUT_DIR=${KIT_DIR}/audit/tests/${RUN_ID}
#OUT_DIR=/flatfiles/results/${RUN_ID}
if [ ! -d $OUT_DIR ]
then
                mkdir $OUT_DIR
fi


TPCD_RPT=$OUT_DIR
SCRIPT_LOG_FILE=${OUT_DIR}/m${PARA}timing
OUT=$OUT_DIR

GTIME=${SRC_DIR}/gtime
HID=1

START=`$GTIME`
echo "Start Update Stream $START, `date`" >> $SCRIPT_LOG_FILE
echo "" >> $SCRIPT_LOG_FILE


#waiting for all the query streams to finish first
read < /tmp/th_pipe1

i=$START_SET_UPDATE
j=1
while [ $i -le $STOP_SET_UPDATE ]; do

  # Execute UF1

  UF1_LOG=${OUT_DIR}/m${PARA}s${j}rf1
  UF2_LOG=${OUT_DIR}/m${PARA}s${j}rf2
  RPT_FILE=${OUT_DIR}/m${PARA}s${j}inter

  SDATE=`date`
  UF1_START=`$GTIME`
                echo "Start UF1-${j} at ${UF1_START}, ${SDATE}" >>
${RPT_FILE}

  ${UPD_SPT}/runuf1.sh ${i} >> ${UF1_LOG} 2>&1
  UF1_END=`${GTIME}`
                EDATE=`date`
  echo "End UF1-${j} at ${UF1_END}, ${EDATE}" >> ${RPT_FILE}
                echo UF1-${j} Execution Time: `echo ${UF1_END} - ${UF1_START}
| bc` >> ${RPT_FILE}

  # Execute UF2

  SDATE=`date`
  UF2_START=`${GTIME}`
  echo "Start UF2-${j} ${UF2_START}, ${SDATE}" >> ${RPT_FILE}

  ${UPD_SPT}/runuf2.sh ${i} >> ${UF2_LOG} 2>&1
  UF2_END=`${GTIME}`
  EDATE=`date`
  echo "End UF2-${j} at $UF2_END, ${EDATE}" >> ${RPT_FILE}
                echo UF2-${j} Execution Time: `echo ${UF2_END} - ${UF2_START}
| bc` >> ${RPT_FILE}

  i=`expr $i + 1`
                j=`expr $j + 1`
```

```
done

print > /tmp/th_pipe2
```

runuf1.sh

```
#!/bin/ksh
#
# $Header: runuf1.sh 25-oct-2001.15:56:04 mpoess Exp $
#
# runuf1.sh
#
# Copyright (c) 1999, 2001, Oracle Corporation.  All rights reserved.
#
#    NAME
#      runuf1.sh - <one-line expansion of the name>
#
# DESCRIPTION
#    runuf1.sh -l [<path name for reports>] -u [<uid/passwd>]
#              -p [<program>] <run_id> <scale factor> <pair number>
#              <parallelism>
# USAGE
#    To execute UF1.
#
#    NOTES
#      <other useful comments, qualifications, etc.>
#
#
. $KIT_DIR/env
O=${ORACLE_HOME}
UPDATE_DIR=${KIT_DIR}/update
SCRIPT_DIR=${UPDATE_DIR}/scripts
LOG_DIR=${UPDATE_DIR}/log
GTIME=gtime
#SF=${SCALE_FACTOR}
#PAR_HINT=${UPDATE_DOP}
PAR_HINT=16

LOGPATH=.
#PASSWD=${DATABASE_USER}
PASSWD="tpcd/tpcd"

if [ $# -lt 1 ];
then
   echo runuf1.sh setnum
   exit 1
fi
SETNUM=$1
i=1
PID=""

# perform the update function 1

START=`$GTIME`
echo "Update Function 1 Set $SETNUM Begin Time = " `date`

# first create the temp tables

sqlplus /NOLOG << !

connect $PASSWD;
set timing  on
set serveroutput on
set echo on
drop directory data_dir;
create directory data_dir as '/flatfiles/update_sets';

drop table temp_l_et;
create table temp_l_et(
   l_shipdate           date ,
   l_orderkey           number ,
   l_discount           number ,
   l_extendedprice      number ,
   l_suppkey            number ,
   l_quantity           number ,
   l_returnflag         char(1) ,
   l_partkey            number ,
   l_linestatus         char(1) ,
   l_tax                number ,
   l_commitdate         date ,
   l_receiptdate        date ,
   l_shipmode           char(10) ,
   l_linenumber         number ,
   l_shipinstruct       char(25) ,
   l_comment            varchar(44)
)
organization external (
type ORACLE_LOADER
default directory data_dir
access parameters
(
        records delimited by newline
        badfile 'l_et.${SETNUM}.bad'
        logfile 'l_et.${SETNUM}.log'
        fields terminated by '|'
        missing field values are null
    )
    location (
    'lineitem.tbl.u${SETNUM}'))
reject limit unlimited;

drop table temp_o_et;
create table temp_o_et(
   o_orderdate          date ,
   o_orderkey           number ,
   o_custkey            number ,
   o_orderpriority      char(15) ,
   o_shippriority       number ,
   o_clerk              char(15) ,
   o_orderstatus        char(1) ,
   o_totalprice         number ,
   o_comment            varchar(79)
)
organization external (
type ORACLE_LOADER
default directory data_dir
access parameters
(
        records delimited by newline
        badfile 'o_et.${SETNUM}.bad'
        logfile 'o_et.${SETNUM}.log'
        fields terminated by '|'
        missing field values are null
    )
    location (
    'orders.tbl.u${SETNUM}'))
reject limit unlimited;

alter table temp_l_et parallel  ${PAR_HINT};
alter table temp_o_et parallel  ${PAR_HINT};


alter session force parallel dml parallel (degree ${PAR_HINT});
alter session set isolation_level = serializable;
alter session set optimizer_index_cost_adj = 25;

commit;

insert into orders (select * from temp_o_et);

insert into lineitem (select * from temp_l_et);


commit;

drop table temp_l_et;
drop table temp_o_et;

exit;
!

END=`$GTIME`

# Done

echo ""
echo "Update Function 1 Set $SETNUM End Time = " `date`
```

```
echo "Elapsed Time is `echo $END - $START | bc`"
echo ""
```

runuf2.sh

```
#!/bin/ksh
#
# $Header: runuf2.sh 25-oct-2001.15:56:05 mpoess Exp $
#
# runuf2.sh
#
# Copyright (c) 1999, 2001, Oracle Corporation.  All rights reserved.
#
#    NAME
#      runuf2.sh - <one-line expansion of the name>
#
# DESCRIPTION
#    runuf2.sh [-u <uid/passwd to login>] [-p <program>] <run_id>
#              <scale factor> <pair number> <parallelism>
# USAGE
#    To execute UF2.
#
#    NOTES
#      <other useful comments, qualifications, etc.>
#
. $KIT_DIR/env
UPDATE_DIR=${KIT_DIR}/update
SCRIPT_DIR=${UPDATE_DIR}/scripts
GTIME=gtime
LOG_DIR=${UPDATE_DIR}/log
PAR_HINT=16
PASSWD="tpcd/tpcd"

if [ $# -lt 1 ]
then
   usage
   exit 1
fi

SETNUM=$1

i=1
PID=""

START=`$GTIME`
echo "Update Function 2 Set $SETNUM Begin Time = " `date`
# first create the temp tables

sqlplus /NOLOG << !

connect $PASSWD;
set timing  on
set serveroutput on
set echo on

drop directory data_dir;
create directory data_dir as '/flatfiles/update_sets';

drop table temp_okey_et;
drop table temp_okey;

create table temp_okey_et(
   t_orderkey          number
)
organization external (
type ORACLE_LOADER
default directory data_dir
access parameters
(
            records delimited by newline
            badfile 'okey.${SETNUM}.bad'
            logfile 'okey.${SETNUM}.log'
            fields terminated by '|'
            missing field values are null
      )
      location (
      'delete.${SETNUM}'))
reject limit unlimited;

alter table temp_okey_et parallel ${PAR_HINT};

create table temp_okey parallel  ${PAR_HINT} nologging as select * from
temp_okey_et;

create unique index i_temp_okey on temp_okey (t_orderkey) parallel ${PAR_HINT}
nologging compute statistics;
alter index i_temp_okey parallel;
analyze table temp_okey estimate statistics sample 2 percent;
alter session  force parallel dml parallel ${PAR_HINT};
alter session set isolation_level = serializable;
alter session set optimizer_index_cost_adj = 25;

delete from (select /*+ ordered index(o) use_nl(o) */ o.rowid from orders o,
temp_okey t where o.o_orderkey = t.t_orderkey order by 1);

delete from (select /*+ ordered index(l) use_nl(l) */ l.rowid from lineitem l,temp_okey
t where l.l_orderkey = t.t_orderkey order by 1);

commit;

drop table temp_okey;
drop table temp_okey_et;
exit;
!

END=`$GTIME`

# Done

echo ""
echo "Update Function 2 Set $SETNUM End Time = " `date`
echo "Elapsed Time is `echo $END - $START | bc`"
echo ""
```

shutdown_instance.sh

```
#!/bin/ksh

sqlplus <<EOF
/ as sysdba
shutdown
exit
EOF
```

startup_4_instances.sh

```
#!/bin/ksh

echo "Starting Up Oracle on tpchorc1 Now..."

$SF/scripts/startup_tpchorc1.sh

echo "...Oracle Startup Complete on tpchorc1"

sleep 3

echo "Starting Up Oracle on tpchorc2 Now..."

rsh tpchorc2 $SF/scripts/startup_tpchorc2.sh

echo "...Oracle Startup Complete on tpchorc2"

sleep 3

echo "Starting Up Oracle on tpchorc3 Now..."

rsh tpchorc3 $SF/scripts/startup_tpchorc3.sh

echo "...Oracle Startup Complete on tpchorc3"

sleep 3

echo "Starting Up Oracle on tpchorc4 Now..."

rsh tpchorc4 $SF/scripts/startup_tpchorc4.sh
```

```
echo "...Oracle Startup Complete on tpchorc4"
```

startup_tpchorc1.sh

```
#!/bin/ksh

sqlplus <<EOF
/ as sysdba
startup parallel pfile=$SF/control_files/tpchorc1.ora
exit
EOF
```

startup_tpchorc2.sh

```
#!/bin/ksh

sqlplus <<EOF
/ as sysdba
startup parallel pfile=$SF/control_files/tpchorc2.ora
exit
EOF
```

startup_tpchorc3.sh

```
#!/bin/ksh

sqlplus <<EOF
/ as sysdba
startup parallel pfile=$SF/control_files/tpchorc3.ora
exit
EOF
```

startup_tpchorc4.sh

```
#!/bin/ksh

sqlplus <<EOF
/ as sysdba
startup parallel pfile=$SF/control_files/tpchorc4.ora
exit
EOF
```

env

EMPTY - All Oracle Environment Variables set at oracle user login

gtime.c

```
/* Copyright (c) Oracle Corporation 2001. All Rights Reserved. */

/*

   NAME
     gtime.c - <one-line expansion of the name>

   DESCRIPTION
     <short description of facility this file declares/defines>

   EXPORT FUNCTION(S)
     <external functions defined for use outside package - one-line descriptions>

   INTERNAL FUNCTION(S)
     <other external functions defined - one-line descriptions>

   STATIC FUNCTION(S)
     <static functions defined - one-line descriptions>

   NOTES
     <other useful comments, qualifications, etc.>

   MODIFIED   (MM/DD/YY)
   mpoess      08/29/01 - Creation
   elspeed     01/16/02 - Modify for Compaq Tru64

*/
#include<stdio.h>
#include<stdlib.h>

# include <sys/time.h>

main ()
{

struct timeval tp;

  gettimeofday(&tp, NULL);

 printf ("%lld\n", tp.tv_sec) ;
/*
 printf ("usec = %ld\n", tp.tv_usec) ;
*/
}

/* end of file gtime.c */
```

qexecpl.c

```
#ifdef RCSID
static char *RCSid =
  "$Header: qexecpl.c 17-oct-2001.09:29:47 mpoess Exp $ ";
#endif /* RCSID */

/* Copyright (c) 1999, 2001, Oracle Corporation.  All rights reserved.  */

/*

   NAME
     qexecpl.c - <one-line expansion of the name>

   DESCRIPTION
     SQL Execution Engine, Oracle v8,  OCI version

   PRIVATE FUNCTION(S)
     <list of static functions defined in .c file - with one-line descriptions>

   MODIFIED   (MM/DD/YY)
     mpoess    10/17/01 - add serialization level in SQLinit
     mpoess    02/22/01 - add linux changes
     mpoess    08/05/99 - make compile
     mpoess    11/13/98 - fix pddl statement
     pswong    02/19/97 - migrating to version 8
     pswong    04/02/96 - more polishing
     pswong    03/25/96 - polish up
     pswong    03/06/96 - created

*/

#include <stdio.h>
#include <string.h>
#include <setjmp.h>
#include <sys/param.h>
#include <errno.h>
#include <math.h>
#include <string.h>
#include <sys/types.h>
#include <time.h>
#include <stdlib.h>

#include "qexecpl.h"

/* Function Prototypes */

extern double gettime();
```

```
/* function prototypes from gen.c */

int get_statement();

/* Declare error handling functions */

void sql_error();

/* Other prototypes */

int define_output_variables();
void process_select_list();
void usage();
void SQLinit();
void SQLexec();
void SQLexit();
void *memalloc();
void print_header();
void print_rows();
int OFEN();
void remove_newline();

char logname[UNAME_LEN];  /* username/passwd combo */
char *passwd;

double tr_start = 0.0;    /* query start time                */
double tr_end = 0.0;      /* query end time                  */

double s_tr_start = 0.0;  /* statement start time            */
double s_tr_end = 0.0;    /* statement end time              */

/* For our purpose of timing, we will treat comments as delimiters */
/* for queries.   Thus, we will collect query timings whenever we  */
/* encounter a comment (of course not for the first comment in a   */
/* file).                                                          */

int end_flag = 0;         /* flag to indicate that we have reached */
                          /* the end of a query                    */

int stmt_cnt = 0;         /* Number of statements processed.     */
int qry_cnt = 0;          /* Number of query processed.          */

double product = 1.0;     /* cumulative product of query times   */
int rows_ret = 0;         /* the number of rows fetched          */
int num_sel_list = 0;     /* the number of select list item      */

long num_to_fetch = -1;   /* Number of rows to fetch. -1 means fetch all */

sltype slist[MAX_SEL_LIST];  /* Array for describing Select List         */
dltype *dlist[MAX_SEL_LIST]; /* Array of ptrs for Defining Select List   */

char stmt[SQL_LEN];       /* The SQL statement or comment line.  */
char qn[3];               /* Number of the query being executed  */
char qnp[3];              /* Number of the previous query executed  */
char cmnt[5000];          /* Buffer to save the comment.         */
#ifdef LINUX
FILE *qtemp;      /* fd for query template               */
FILE *logfile;    /* log and report files                */
FILE *rep;
#else
FILE *qtemp = stdin;      /* fd for query template               */
FILE *logfile = stdout;   /* log and report files                */
FILE *rep = stdout;
#endif
void *defbuf;             /* Buffer pointer for ODEFIN           */
int deflen = 0;           /* Size of data type for ODEFIN        */
int deftype = 1;          /* Oracle type number for ODEFIN       */

int pfmem = PFMEMSIZE;    /* Memory to prefetch rows             */

time_t tim;               /* To get wall clock time              */

/* OCI handles */

OCIEnv *tpcenv = NULL;
OCIServer *tpcsrv = NULL;
OCIError *errhp = NULL;
OCISvcCtx *tpcsvc = NULL;
OCISession *tpcusr = NULL;
OCIStmt *curq = NULL;
OCIStmt *cur_dml = NULL;
OCIStmt *cur_ddl = NULL;
OCIParam *tpcpar = NULL;

sword status = OCI_SUCCESS;  /* OCI return value */

/* usage: prints the usage of the program */

void usage() {

  fprintf(stderr,"\nUsage: qexec username/password [q<path name for query template
file>]\n");
  fprintf(stderr,"               [l<path name for log>] [r<path name for reports>]\n\n");
  fprintf(stderr,"Options:\n");
  fprintf(stderr,"q<path for query>         : full path name for the query template
file.\n");
  fprintf(stderr,"                          (default is stdin)\n");
  fprintf(stderr,"l<path name for log>      : full path name for log files\n");
  fprintf(stderr,"                          (default is stdout)\n");
  fprintf(stderr,"r<path name for reports>  : full path name for reports\n");
  fprintf(stderr,"                          (default is stdout)\n");
  exit(-1);
}



/* type: 0 if environment handle is passed, 1 if error handle is passwd */

void sql_error(errhp,status,type)
     OCIError *errhp;
     sword status;
     sword type;
{
  char msg[2048];
  ub4 errcode;
  ub4 msglen;
  int i,j;

  switch(status) {
  case OCI_SUCCESS_WITH_INFO:
    fprintf(stderr, "Error: Statement returned with info.\n");
    if (type)
      (void) OCIErrorGet(errhp,1,NULL,(sb4*)&errcode,(text*)msg,
                                              2048,OCI_HTYPE_ERROR);
    else
      (void) OCIErrorGet(errhp,1,NULL,(sb4*)&errcode,(text*)msg,
                                              2048,OCI_HTYPE_ENV);
    fprintf(stderr,"%s\n",msg);
    break;
  case OCI_ERROR:
    fprintf(stderr, "Error: OCI call error.\n");
    if (type)
      (void) OCIErrorGet(errhp,1,NULL,(sb4*)&errcode,(text*)msg,
                                              2048,OCI_HTYPE_ERROR);
    else
      (void) OCIErrorGet(errhp,1,NULL,(sb4*)&errcode,(text*)msg,
                                              2048,OCI_HTYPE_ENV);
    fprintf(stderr,"%s\n",msg);
    break;
  case OCI_INVALID_HANDLE:
    fprintf(stderr, "Error: Invalid Handle.\n");
    if (type)
      (void) OCIErrorGet(errhp,1,NULL,(sb4*)&errcode,(text*)msg,
                                              2048,OCI_HTYPE_ERROR);
    else
      (void) OCIErrorGet(errhp,1,NULL,(sb4*)&errcode,(text*)msg,
                                              2048,OCI_HTYPE_ENV);
    fprintf(stderr,"%s\n",msg);
    break;
  }

  /* Rollback just in case */

  (void) OCITransRollback(tpcsvc,errhp,OCI_DEFAULT);

  fprintf(stderr, "Exiting Oracle...\n");
  fflush(stderr);
```

```
  SQLexit();

  exit(1);
}

#ifdef LINUX
int main(argc,argv)
#else
void main(argc,argv)
#endif
     int argc;
     char *argv[];
{

  int i,pos,pos2;
  int retcode;      /* Return code for get_statement */
#ifdef LINUX
  logfile=fopen("/dev/stdout","w");
  qtemp=fopen("/dev/stdin","rw");
  rep=fopen("/dev/stdout","w");
#endif
  /* Initialize some variables */

  if ((argc > 5) || (argc < 2)) {
    usage();
  }

  /* argv[1] -- User and Password for Database */

  strcpy(logname, argv[1]);

  /* Process  optional parameters */

  argc -= 1;
  argv += 1;

  while(--argc) {
    ++argv;
    switch(argv[0][0]) {
    case 'q':
      if ((qtemp = fopen(++(argv[0]),"r")) == NULL) {
                fprintf(stderr,"Unable to open file '%s'\n", argv[0]);
                fprintf(stderr,"%s: %s\n", argv[0], strerror(errno));
                exit(-1);
      }
      break;
    case 'r':
      if ((rep = fopen(++(argv[0]),"a")) == NULL) {
                fprintf(stderr,"Unable to open file '%s'\n", argv[0]);
                fprintf(stderr,"%s: %s\n", argv[0], strerror(errno));
                exit(-1);
      }
      break;
    case 'l':
      if ((logfile = fopen(++(argv[0]),"a")) == NULL) {
                fprintf(stderr,"Unable to open file '%s'\n", argv[0]);
                fprintf(stderr,"%s: %s\n", argv[0], strerror(errno));
                exit(-1);
      }
      break;
    default:
      fprintf(stderr,"Invalid Option: %c\n", argv[0][0]);
      usage();
      break;
    }
  }

  /* Do some initialization and establish connection with the database */

  SQLinit();

  /* May want to add some triggering mechanism here */

  time(&tim);
  fprintf(logfile, "Begin Execution at %s\n\n", ctime(&tim));
  fprintf(rep, "Begin Executing this Stream at %s\n\n", ctime(&tim));
  /* Get the next statement and start processing it */

  while ((retcode = get_statement()) > 0) {

    switch (retcode) {

      /* If this is a comment, skips it */
    case COMMENT:
      /*if (end_flag) {
                end_flag = 0;  */    /* reset query end flag */
                /* save the comment so that we can print it out later on  */
                /* strcpy(cmnt, stmt);
                break;
      } */
      if (stmt[3]== '@') {
        pos=4;
        strcpy(qnp,qn);
        while (stmt[pos] != ')') {
          pos++;
        }
        pos2=0;
        pos++;
        while (stmt[pos] != '.') {
          /*printf ("qn %d %c \n",pos2,stmt[pos]);*/
          qn[pos2]=stmt[pos];
          pos2++;
          pos++;
        }
        qn[pos2] = 0;
        /* printf("found a new query: %s\n",qn); */
      }
      /* save the comment so that we can print it out later on  */
      strcat(cmnt, stmt);
      break;

      /* if this is a set_row_fetch command */
    case SET_FETCHROW:
      fprintf(logfile,"Setting the number of rows to fetch to: %ld\n\n",
                        num_to_fetch);
      break;

      /* if this is a SQL statement */
    case SQL_STMT:

      /* Executes the query */
      SQLexec();

      stmt_cnt++;
      qry_cnt++;
      fflush(rep);
      fflush(logfile);
      /*
      fprintf(logfile,"\nStatement Started at %.2f\n", s_tr_start);
      fprintf(logfile,"Statement Ended at %.2f\n", s_tr_end);

      fprintf(logfile,"Statement Processed in %.2f seconds.\n",
                        (s_tr_end - s_tr_start));
      fprintf(rep, "Query %s: Execution Time: %.2f started %.2f ended %.2f\n",
                qn,(s_tr_end - s_tr_start)s_tr_start,s_tr_end);
      fflush(rep);
      fflush(logfile);*/
      break;

      /* Should never reach here */
    default:
      fprintf(stderr, "Invalid statement type!!\n");
      SQLexit();
      break;
    }
  }

  /* Get Timing for the last query */

  tr_end = gettime();

  fprintf(logfile,"Query Processed in %.2f seconds.\n\n",(tr_end - s_tr_start));

  /* print comments for this query that we have saved */

  /* fprintf(logfile, "%s\n", cmnt); */

  /* fprintf(rep, "Query %s : Execution time %.2f\n", qn,(tr_end - s_tr_start));*/
```

```
  fprintf(rep, "Query %s: Execution Time: %.2f started %.2f ended %.2f\n",
                qn,(tr_end - s_tr_start),s_tr_start,tr_end);

  time(&tim);
  fprintf(logfile,"\nEnded Executing this Stream at %s\n", ctime(&tim));
  fprintf(logfile,"\nStream Started at %.2f\n", tr_start);
  fprintf(logfile,"Stream Ended at %.2f\n", tr_end);
  fprintf(logfile,"Stream Processed in %.2f seconds\n\n",(tr_end - tr_start));

  fprintf(rep,"\nEnded Executing this Stream at %s\n", ctime(&tim));
  fprintf(rep,"\nStream Started at %.2f\n", tr_start);
  fprintf(rep,"Stream Ended at %.2f\n", tr_end);
  fprintf(rep,"Stream Processed in %.2f seconds\n\n",
                  (tr_end - tr_start));

  fprintf(logfile, "\nSQL statements processed: %d\n", stmt_cnt);
  /*fprintf(logfile, "Queries processed: %d\n", qry_cnt);*/

  fflush(rep);
  fflush(logfile);

  /* Close the query template file */

  fclose(qtemp);

  /*  Disconnect from ORACLE. */

  SQLexit();
  exit(0);
}


/* SQLinit(): Perform initialization tasks.                    */
/*          Logs on to Oracle, opens some files and open a cursor for */
/*          later use.                                         */

void SQLinit() {

  int i;

  /* preallocate MAX_PREALLOC members of the dlist array          */
  /* initializes others to NULL so that we can determine who to free later */

  for (i=0; i<MAX_SEL_LIST; i++) {
    if (i < MAX_PREALLOC) {
      dlist[i] = (dltype *) memalloc (sizeof(dltype));
      dlist[i]->defhdl = NULL;
/*      OCIhalloc(curq,&(dlist[i]->defhdl),OCI_HTYPE_DEFINE); */
    }
    else
      dlist[i] = NULL;
  }

  /* Connect to ORACLE.  Program will call sql_error()        */
  /* if an error occurs in connecting to the default database. */

  (void) OCIInitialize(OCI_DEFAULT,(dvoid *)0,0,0,0);

  if((status=OCIEnvInit((OCIEnv **)&tpcenv,OCI_DEFAULT,0,(dvoid **)0)) !=
    OCI_SUCCESS)
    sql_error(tpcenv, status, 0);

  OCIhalloc(tpcenv,&errhp,OCI_HTYPE_ERROR);
  OCIhalloc(tpcenv,&curq,OCI_HTYPE_STMT);
  OCIhalloc(tpcenv,&cur_dml,OCI_HTYPE_STMT);
  OCIhalloc(tpcenv,&cur_ddl,OCI_HTYPE_STMT);
  OCIhalloc(tpcenv,&tpcsvc,OCI_HTYPE_SVCCTX);
  OCIhalloc(tpcenv,&tpcsrv,OCI_HTYPE_SERVER);
  OCIhalloc(tpcenv,&tpcusr,OCI_HTYPE_SESSION);

  /* get username and password */

  passwd = strchr(logname, '/');
  *passwd = '\0';
  passwd++;

  if ((status = OCIServerAttach(tpcsrv,errhp,(text *)0,0,OCI_DEFAULT)) !=
OCI_SUCCESS)
    sql_error(errhp,status,1);

  OCIaset(tpcsvc,OCI_HTYPE_SVCCTX,tpcsrv,0,OCI_ATTR_SERVER,errhp);

OCIaset(tpcusr,OCI_HTYPE_SESSION,logname,strlen(logname),OCI_ATTR_USE
RNAME,
                errhp);

OCIaset(tpcusr,OCI_HTYPE_SESSION,passwd,strlen(passwd),OCI_ATTR_PASSW
ORD,
                errhp);

  if ((status = OCISessionBegin(tpcsvc, errhp, tpcusr, OCI_CRED_RDBMS,
                                                OCI_DEFAULT)) !=
OCI_SUCCESS)
    sql_error(errhp,status,1);

  OCIaset(tpcsvc,OCI_HTYPE_SVCCTX,tpcusr,0,OCI_ATTR_SESSION,errhp);

/*
  if ((status=OCILogon((OCIEnv *)tpcenv,(OCIError *)errhp,(OCISvcCtx *)tpcsvc,
                        (text *)logname, strlen(logname), (text *)passwd,
                        strlen(passwd), (text *) 0, 0)) != OCI_SUCCESS)
    sql_error(errhp, status, 1);
*/
  printf("\nConnected to ORACLE as user: %s\n\n", logname);

}



/* SQLexec()  Executes the SQL statement.                       */
/*          Parse the SQL statement.                            */
/*          If DDL or DML statements, execute right away.       */
/*          Else describe and define select list outputs,       */
/*              execute and fetch results.                      */

void SQLexec()
{
  int i;
  ub2 stmttyp = OCI_STMT_SELECT;     /* default is a SELECT statement */

  /* Clause 5.3.6.2: QI(i,s) is the time between the first character */
  /*              of this query text is submitted and the first   */
  /*              character of the next query text is submitted.  */

  if (qry_cnt) {
    time(&tim);
    s_tr_end = gettime();
    fprintf(logfile,"Query Processed in %.2f seconds.\n\n",
     (s_tr_end - s_tr_start));

    /* print comments for this query that we have saved */

    /* fprintf(logfile, "%s\n", cmnt); */

    /*fprintf(rep, "Query %s : Execution time %.2f\n", qnp,(s_tr_end - s_tr_start));*/
    fprintf(rep, "Query %s: Execution Time: %.2f started %.2f ended %.2f\n",
                qnp,(s_tr_end - s_tr_start),s_tr_start,s_tr_end);

    /* Let's fflush stuff so that we can see what's going on */

    fflush(logfile);
    fflush(rep);
  }
  else
    tr_start = gettime();

  s_tr_start = gettime();

  /* prepare the statement */

  if ((status = OCIStmtPrepare(curq, errhp, (text*) stmt, (ub4) strlen(stmt),
                                                OCI_NTV_SYNTAX, OCI_DEFAULT))
!= OCI_SUCCESS)
    sql_error(errhp,status,1);

  /* Prints the query text and comment to the logfile */
```

```
  fprintf(logfile, "\n%s\n", cmnt);
  cmnt[0]=0;
  fprintf(logfile, "\n%s\n", stmt);

  /* if this is a DDL or DML statement, execute it right away */
  /* only worries about SELECT statements right now, cannot   */
  /* execute a stored PL/SQL procedure in thie version        */


OCIaget(curq,OCI_HTYPE_STMT,&stmttyp,NULL,OCI_ATTR_STMT_TYPE,errh
p);

  if (stmttyp != OCI_STMT_SELECT) {
    OCIsexec(tpcsvc,curq,errhp,1);
    return;
  }

  /* otherwise, this is a select statement */
  /* Describe and define output variables  */

  /* first let's execute it to get the select-list definition */

  OCIaset(curq, OCI_HTYPE_STMT, &pfmem, 0,
OCI_ATTR_PREFETCH_MEMORY, errhp);

  OCIsexec(tpcsvc,curq,errhp,0);

  num_sel_list = define_output_variables();

  /* Executes the query and fetches the rows */

  (void) process_select_list(num_sel_list);

  /* Need to get the number of rows fetched first   */
  /* since the following statments will screw it up */


OCIaget(curq,OCI_HTYPE_STMT,&rows_ret,NULL,OCI_ATTR_ROW_COUNT,er
rhp);

  /* To control memory usage, let's free up the extra dlist entries */
  /* that we have allocated.                                        */

  i=MAX_PREALLOC;
  while(dlist[i] != NULL) {
    free(dlist[i]);
    dlist[i++] = NULL;
  }

  /* reset set_fetchrows */

  num_to_fetch = -1;

}


void SQLexit() {

  int i;

  OCILogoff(tpcsvc,errhp);
  OCIhfree(tpcenv,OCI_HTYPE_STMT);
  OCIhfree(tpcsvc,OCI_HTYPE_SVCCTX);
  OCIhfree(tpcsrv,OCI_HTYPE_SERVER);
  OCIhfree(tpcusr,OCI_HTYPE_SESSION);

  /* free all memory */

  for (i=0; i<MAX_SEL_LIST; i++) {
    if (dlist[i] != NULL) {
      free(dlist[i]);
    }
  }

  /* Flush all output */

  fflush(rep);
  fflush(logfile);
}


/* define_output_variables(): Describe and define select-list items for */
/*                            a query statement.                         */
/*                            Returns the number of select-list items    */
/*                            for this query.                            */

int define_output_variables()
{

  int i;
  int retflag = 0;

  for (i=0; i<MAX_SEL_LIST; i++) {

    slist[i].buflen = MAX_COLNAME_SIZE;

    if (OCIParamGet(curq, OCI_HTYPE_STMT, errhp, (dvoid **) &tpcpar,
                                                 POS(i)) != OCI_SUCCESS)
      break;


    /* dsize and nullok fields of dlist not used */

    OCIaget(tpcpar, OCI_DTYPE_PARAM, &(slist[i].dbsize),
                 NULL, OCI_ATTR_DATA_SIZE, errhp);
    OCIaget(tpcpar, OCI_DTYPE_PARAM, &(slist[i].dbtype),
                 NULL, OCI_ATTR_DATA_TYPE, errhp);
    OCIaget(tpcpar, OCI_DTYPE_PARAM, &(slist[i].buf),
                 &(slist[i].buflen), OCI_ATTR_NAME, errhp);
    OCIaget(tpcpar, OCI_DTYPE_PARAM, &(slist[i].precision),
                 NULL, OCI_ATTR_PRECISION, errhp);
    OCIaget(tpcpar, OCI_DTYPE_PARAM, &(slist[i].scale),
                 NULL, OCI_ATTR_SCALE, errhp);

    /* For formatting purpose, remove trailing blanks in select-list name. */

/*
    if (slist[i].buflen < MAX_COLNAME_SIZE)
      (slist[i].buf)[slist[i].buflen] = '\0';
*/
    /* Well, we need to allocate for entries for dlist */

    if (i >= MAX_PREALLOC) {
      dlist[i] = (dltype *) memalloc(sizeof(dltype));
      dlist[i]->defhdl = NULL;
    }

    /* Let's check the sizes and types for this select list item */

    switch (slist[i].dbtype) {

    case OCI_TYPECODE_NUMBER:

      /* The odescr will not give a good estimate to the scale if */
      /* no scale was given in the Oracle table definition.       */

#ifdef HAVE_SCALE
      if (slist[i].scale != 0) {
                defbuf = (double *) dlist[i]->fbuf;
                deflen = FLT;
                deftype = OCI_TYPECODE_DOUBLE;
                slist[i].dbtype = OCI_TYPECODE_DOUBLE;
      } else {
                defbuf = (int *) dlist[i]->ibuf;
                deflen = INT;
                deftype = OCI_TYPECODE_INTEGER;
                slist[i].dbtype = OCI_TYPECODE_INTEGER;
      }
#else
      defbuf = (double *) dlist[i]->fbuf;
      deflen = FLT;
      deftype = OCI_TYPECODE_FLOAT;
      slist[i].dbtype = OCI_TYPECODE_FLOAT;
#endif /* HAVE_SCALE */

      break;
```

```
   default:

     /* default is character string */

     defbuf = (char **) dlist[i]->sbuf;
     deflen = MAX_STR_LEN;
     deftype = SQLT_STR;
/*     deftype = OCI_TYPECODE_CHAR; */
     break;
   }

   /* Define the column */

   if ((status=OCIDefineByPos(curq,&(dlist[i]->defhdl),errhp,POS(i),
                                          defbuf,deflen,deftype,NULL,
                                          dlist[i]-
>rlen,NULL,OCI_DEFAULT))!=OCI_SUCCESS)
     sql_error(errhp,status,1);
  }
  return i;
}


/* process_select_list(): Fetch rows from a query.                */

void process_select_list(num)
    int num;       /* number of select list items */
{

  int i,j;
  int ntf;
  int num_so_far;
  sword stats = OCI_SUCCESS;

  /* Print the headers for the query execution result */

  print_header(num);

  /* See if we need to limit the rows to fetch */

  ntf = (num_to_fetch >= 0) ? num_to_fetch : MAX_ARRAY;

  /* Fetch the rows and print them out */

  if ((ntf > MAX_ARRAY) || (num_to_fetch == -1)) {

   stats = OCIStmtFetch(curq, errhp, MAX_ARRAY, OCI_FETCH_NEXT,
OCI_DEFAULT);


OCIaget(curq,OCI_HTYPE_STMT,&rows_ret,NULL,OCI_ATTR_ROW_COUNT,er
rhp);

   print_rows(num,rows_ret);

   /* To avoid 1022 from OFEN */
   /* More rows to fetch...   */

   if (stats != OCI_NO_DATA) {
    if (num_to_fetch == -1) {
                while ((stats =
OCIStmtFetch(curq,errhp,MAX_ARRAY,OCI_FETCH_NEXT,
                                                        OCI_DEFAULT)) ==
OCI_SUCCESS) {
                  OCIaget(curq,OCI_HTYPE_STMT,&num_so_far,NULL,
                                OCI_ATTR_ROW_COUNT,errhp);
                  print_rows(num,(num_so_far-rows_ret));
                  rows_ret = num_so_far;
                }
                /* Print the final rows */
                OCIaget(curq,OCI_HTYPE_STMT,&num_so_far,NULL,
                              OCI_ATTR_ROW_COUNT,errhp);
                print_rows(num,(num_so_far-rows_ret));
                rows_ret = num_so_far;
    } else {
                ntf -= MAX_ARRAY;

                while ((stats = OCIStmtFetch(curq,errhp,
                                                        ((ntf>MAX_ARRAY) ?
MAX_ARRAY:ntf),
                                                        OCI_FETCH_NEXT,
OCI_DEFAULT)) ==
                        OCI_SUCCESS) {
                  ntf -= MAX_ARRAY;
                  OCIaget(curq,OCI_HTYPE_STMT,&num_so_far,NULL,
                                OCI_ATTR_ROW_COUNT,errhp);
                  print_rows(num,(num_so_far-rows_ret));
                  rows_ret = num_so_far;
                  if (ntf <= 0) break;
                }
                OCIaget(curq,OCI_HTYPE_STMT,&num_so_far,NULL,
                              OCI_ATTR_ROW_COUNT,errhp);
                print_rows(num,(num_so_far-rows_ret));
                rows_ret = num_so_far;
    }
   }
  } else {
   OCIStmtFetch(curq, errhp, ntf, OCI_FETCH_NEXT, OCI_DEFAULT);

OCIaget(curq,OCI_HTYPE_STMT,&rows_ret,NULL,OCI_ATTR_ROW_COUNT,er
rhp);
   print_rows(num,rows_ret);
  }

  fprintf(logfile,"\n\n%d row%c processed.\n", rows_ret,
                rows_ret == 1 ? '\0' : 's');

}


int get_statement()
{

  char line[128];
  char *pos, *str;

  /* Reset statement buffer */

  stmt[0] = '\0';

  while (fgets(line, 127, qtemp) != NULL) {

   /* skip blank lines */
   if (line[0] == '\n')
     continue;

   /* remove blanks */

   str = line;

   while (*str == ' ') str++;

   /* Let's get the line together first */

   strcat(stmt, str);

   /* if this is a comment line */
   if ((str[0] == '-') && (str[1] == '-'))
     return COMMENT;

   /* see if this is a set_fetchrows line */
   if (strncmp(str, "set_fetchrows", 13) == 0) {
     pos = strchr(str, ';');
     *pos = '\0';
     pos = strchr(str, '=');
     num_to_fetch = atol(++pos);
     return SET_FETCHROW;
   }

   /* if this is the end of the current statement */
   if ((pos = strchr(stmt, ';')) != NULL) {
     *pos = '\0';
     return SQL_STMT;
   }
  }
  return END_OF_FILE;
}
```

```
/* memalloc(): Allocates memory, exit program if we have a problem. */

void *memalloc(size)
     int size;
{

  void *tmp;

  if ((tmp = (void *) malloc(size)) == NULL) {
    fprintf(stderr, "Error in malloc\n");
    SQLexit();
    return NULL;       /* should never reach here */
  } else {
    return tmp;
  }
}



void print_header(nsel)
     int nsel;          /* Number of select list items */
{

  int i, diff;
  char colname[MAX_COLNAME_SIZE];
  int len = 0;          /* Running column length */
  int cwid = 0;

  fprintf(logfile, "\n");

  for (i=0; i<nsel; i++) {

    /* extract the column name */

    strncpy((char *)colname, (char *)slist[i].buf, slist[i].buflen);
    colname[slist[i].buflen] = '\0';

    /* format the output a little */

    cwid = MAX(slist[i].dbsize, slist[i].buflen);

    /* do a little bit of formatting */

    if (cwid > 80) {
      fprintf(logfile,"\n");
      len = 0;
    } else if ((len += cwid) > 80) {
      fprintf(logfile,"\n");
      len = cwid;
    }
#ifdef FORMAT1
    if ((slist[i].dbtype == INT_TYPE) || (slist[i].dbtype == FLT_TYPE))
      fprintf(logfile, "%*s ", cwid, slist[i].buf);
    else  /* string type */
      fprintf(logfile, "%*s ", -cwid, slist[i].buf);
#else
      fprintf(logfile, "%*s ", -cwid, colname);
#endif /* FORMAT1 */
  }

  fprintf(logfile,"\n");
}


void print_rows(ncol, nrow)
     int ncol;
     int nrow;
{

  int i,j;
  int len;
  int diff;
  int cwid;

  for (i=0;i<nrow;i++) {

    len = 0;

    for (j=0;j<ncol;j++) {

      cwid = MAX(slist[j].dbsize, slist[j].buflen);

      /* do a little bit of formatting */

      if (cwid > 80) {
                fprintf(logfile,"\n");
                len = 0;
      } else if ((len += cwid) > 80) {
                fprintf(logfile,"\n");
                len = cwid;
      }

      switch(slist[j].dbtype) {
      case INT_TYPE:
#ifdef HAVE_SCALE
                fprintf(logfile, "%*ld|", cwid,             (dlist[j]->ibuf)[i]);
                break;
#endif /* HAVE_SCALE */
      case FLT_TYPE:
#ifdef FORMAT1
                fprintf(logfile,"%*.2f ", cwid, (dlist[j]->fbuf)[i]);
#else
                fprintf(logfile,"%*.2f ", -cwid, (dlist[j]->fbuf)[i]);
#endif /* FORMAT1 */
                break;
      default:
                fprintf(logfile, "%*s ", -(cwid), (dlist[j]->sbuf)[i]);
                break;
      }
    }
    fprintf(logfile, "\n");
  }
}


/* remove_newline(): Remove newline character from str. */

void remove_newline(str)
     char *str;
{

  char *p;

  while ((p = strchr(str,'\n')) != NULL)
    *p = ' ';
}
```

qexecpl.h

```
/*
 * $Header: qexecpl.h 13-nov-2001.17:52:35 mpoess Exp $
 */

/* Copyright (c) 1999, 2001, Oracle Corporation.  All rights reserved.  */

/* NOTE:  See 'header_template.doc' in the 'doc' dve under the 'forms'
      directory for the header file template that includes instructions.
*/

/*
   NAME
     qexecpl.h

   DESCRIPTION
     SQL statement execution front-end header file.

   PUBLIC FUNCTION(S)
     <list of external functions declared/defined - with one-line descriptions>

   PRIVATE FUNCTION(S)
     <list of static functions defined in .c file - with one-line descriptions>

   EXAMPLES

   NOTES
```

```
    <other useful comments, qualifications, etc.>

   MODIFIED   (MM/DD/YY)
   mpoess      11/13/01 - change DOP to 84 for DML and DDL
   mpoess      02/22/01 - add linux changes
   mpoess      08/05/99 - make compile
   mpoess      07/15/99 - Creation
   mpoess      07/15/99 - Creation

*/

/*
# ifndef S_ORACLE
#  include <s.h>
# endif
*/
#ifndef QSTREAMPL_H

#define QSTREAMPL_H

#include <stdio.h>
#include <string.h>
#include <sys/param.h>
#include <sys/types.h>
#include <time.h>
#include <errno.h>
#include <math.h>

#include <oratypes.h>

#include <oratypes.h>

#ifndef OCIDFN
#include <ocidfn.h>
#endif /* OCIDFN */

#ifndef OCI_ORACLE
#include <oci.h>
#endif /* OCI_ORACLE */
/*
#ifdef __STDC__
#include <ociapr.h>
#else
#include <ocikpr.h>
#endif *//* __STDC__ */

/* some basic definitions */

#define UNAME_LEN 64
#define MAX_FILE_PATH_LEN 128

#ifndef TRUE
#define TRUE 1
#endif /* TRUE */

#ifndef FALSE
#define FALSE 1
#endif /* FALSE */
#ifndef LINUX
#define MAX(x,y) ((x >= y) ? x : y)
#define MIN(x,y) ((x <= y) ? x : y)
#endif
/* defines and typedefs for parsing */

#define CRT_TBL  1
#define INS_STMT 3
#define SEL_STMT 4
#define UPD_STMT 5
#define DRP_VIEW 7
#define DRP_TBL  8
#define DEL_STMT 9
#define CRT_VIEW 10

/* defines and typedefs for query description */

#define MAX_COLNAME_SIZE 32   /* Maximum length of Column name  */
#define MAX_SEL_LIST 16       /* Maximum items on a select list */

#define END_OF_LIST 1007      /* Error code when we reach the end of the */
                              /* select list.                    */

/* types for describe */

#define CHAR_TYPE 1
#define NUM_TYPE  2
#define INT_TYPE  3
#define FLT_TYPE  4
#define STR_TYPE  5
#define DATE_TYPE 12

#define NUMWIDTH 16           /* Width of the numeric fields    */

#define POS(i) (i+1)          /* The position is 1...n instead  */
#define IND(i) (i-1)          /* of 0..n-1 as in an array.      */

typedef struct des
{
  ub2 dbsize;
  ub4 buflen;
/*  sb2 dsize;  */
  sb4 scale;
/*  sb2 nullok; */
  OCITypeCode dbtype;
/*  text buf[MAX_COLNAME_SIZE]; */
  text *buf;
  ub1 precision;
} sltype;


/* defines and typedefs for query select list definition */

#define MAX_ARRAY 50       /* Maximum array size for array fetch */
#define PFMEMSIZE 65536    /* Memory size of prefetch buffer     */

#define MAX_STR_LEN 256    /* Maximum size for string variables          */
#define MAX_PREALLOC 8     /* Maximum number of preallocated select list */
                           /* definitions.                               */

#define INT sizeof(long)
#define STR sizeof(char)
#define FLT sizeof(double)

#define FLTP (double *)
#define INTP (long *)
#define STRP (char **)

typedef struct def
{
  long ibuf[MAX_ARRAY];
  double fbuf[MAX_ARRAY];
  char sbuf[MAX_ARRAY][MAX_STR_LEN];
  ub2 rlen[MAX_ARRAY];        /* return length     */
  OCIDefine *defhdl;
} dltype;

extern int errno;

#define SQL_LEN 2048

#ifndef NULL
#define NULL 0
#endif

#ifndef NULLP
# define NULLP (void *)NULL
#endif /* NULLP */

#ifndef DISCARD
# define DISCARD (void)
#endif

#ifndef sword
# define sword int
#endif

#ifndef ub1
#define ub1 unsigned char
#endif
```

```
#define NA              -1      /* ANSI SQL NULL */
#define VER7            2
#define NOT_SERIALIZABLE  8177  /* ORA-08177: transaction not serializable */

#define ADR(object) ((ub1 *)&(object))
#define SIZ(object) ((sword)sizeof(object))
#define SID(sid) ((sid == -1) ? 0 : sid)

/* For get_statement */

#define END_OF_FILE -1
#define COMMENT 1
#define SQL_STMT   2
#define SET_FETCHROW 3


#define OCIhalloc(envh,hndl,htyp) \
   if((status=OCIHandleAlloc((dvoid *)envh,(dvoid **)hndl,htyp,0,(dvoid
**)0))!=OCI_SUCCESS) \
      sql_error(envh,status,0); \
   else \
      DISCARD 0

#define OCIhfree(hndl,htyp) \
   if((status=OCIHandleFree((dvoid *)hndl,htyp)) == OCI_SUCCESS) \
      fprintf(stderr, "Error freeing handle of type %d\n", htyp)

#define OCIaget(hndl,htyp,attp,size,atyp,errh) \
   if((status=OCIAttrGet((dvoid *)hndl,htyp,(dvoid *)attp,(dvoid *)size,atyp,errh)) !=
OCI_SUCCESS) \
      sql_error(errh,status,1); \
   else \
      DISCARD 0

#define OCIaset(hndl,htyp,attp,size,atyp,errh) \
   if((status=OCIAttrSet((dvoid *)hndl,htyp,(dvoid *)attp,size,atyp,errh)) !=
OCI_SUCCESS) \
      sql_error(errh,status,1); \
   else \
      DISCARD 0

#define OCIsexec(svch,stmh,errh,iter) \
   if((status=OCIStmtExecute(svch,stmh,errh,iter,0,NULL,NULL,OCI_DEFAULT))
!= OCI_SUCCESS) \
      sql_error(errh,status,1); \
   else \
      DISCARD 0


#define ISOTXT "alter session set isolation_level = serializable"
#define PDMLTXT "alter session force parallel dml parallel (degree 84)"
#define PDDLTXT "alter session force parallel ddl parallel (degree 84)"

#endif /* QSTREAMPL_H */
```

Appendix F

Activity occuring between the Database Load and the commencement of Run1...consists of SQL scripts executed primarily for the auditor.

checkidx.sql

```
set echo on
spool checkidx.out
select index_name from user_indexes;
spool off
exit;
```

dbtables.sql

```
set echo on
set numwidth 25
spool rdbtablest
SELECT COUNT(*) FROM LINEITEM;

SELECT * FROM LINEITEM
WHERE L_ORDERKEY IN
 ( 4, 26598,  148577,  387431, 56704, 517442, 600000)
AND L_LINENUMBER = 1
ORDER BY L_ORDERKEY;



SELECT * FROM REGION;

SELECT COUNT(*) FROM NATION;

SELECT * FROM NATION
WHERE N_NATIONKEY IN (3,10,14,20)
ORDER BY N_NATIONKEY;



SELECT COUNT(*) FROM ORDERS;

SELECT * FROM ORDERS
WHERE O_ORDERKEY IN ( 7, 44065, 287590, 411111, 483876, 599942 )
ORDER BY O_ORDERKEY;



SELECT COUNT(*) FROM PART;

SELECT * FROM PART
WHERE P_PARTKEY IN (1,984,8743,9028,13876,17899,20000)
ORDER BY P_PARTKEY;



SELECT COUNT(*) FROM PARTSUPP;

SELECT* FROM PARTSUPP
  WHERE PS_PARTKEY = 3398
  AND PS_SUPPKEY = (SELECT MIN(PS_SUPPKEY)
    FROM PARTSUPP WHERE PS_PARTKEY = 3398);

SELECT* FROM PARTSUPP
  WHERE PS_PARTKEY =15873
  AND PS_SUPPKEY = (SELECT MIN(PS_SUPPKEY)
    FROM PARTSUPP WHERE PS_PARTKEY = 15873);

SELECT* FROM PARTSUPP
  WHERE PS_PARTKEY = 11394
  AND PS_SUPPKEY = (SELECT MIN(PS_SUPPKEY)
    FROM PARTSUPP WHERE PS_PARTKEY = 11394);

SELECT* FROM PARTSUPP
  WHERE PS_PARTKEY = 6743
  AND PS_SUPPKEY = (SELECT MIN(PS_SUPPKEY)
    FROM PARTSUPP WHERE PS_PARTKEY = 6743);

SELECT* FROM PARTSUPP
  WHERE PS_PARTKEY = 19763
  AND PS_SUPPKEY = (SELECT MIN(PS_SUPPKEY)
    FROM PARTSUPP WHERE PS_PARTKEY =19763);



SELECT COUNT(*) FROM SUPPLIER;

SELECT * FROM SUPPLIER
WHERE  S_SUPPKEY IN (83,265,492,784,901,1000)
ORDER BY S_SUPPKEY;



DROP TABLE MINMAX;

CREATE TABLE MINMAX
(TNAME CHAR(15),
KEYMIN INTEGER,
KEYMAX INTEGER);

INSERT INTO MINMAX
SELECT 'LINEITEM_ORD',MIN(L_ORDERKEY),MAX(L_ORDERKEY)
FROM LINEITEM ;

INSERT INTO MINMAX
SELECT 'LINEITEM_NBR',MIN(L_LINENUMBER),MAX(L_LINENUMBER)
FROM LINEITEM;

INSERT INTO MINMAX
SELECT 'ORDERTBL',MIN(O_ORDERKEY),MAX(O_ORDERKEY)
FROM ORDERS;

INSERT INTO MINMAX
SELECT 'CUSTOMER',MIN(C_CUSTKEY),MAX(C_CUSTKEY)
FROM CUSTOMER;

INSERT INTO MINMAX
SELECT 'PART',MIN(P_PARTKEY),MAX(P_PARTKEY)
FROM PART;

INSERT INTO MINMAX
SELECT 'SUPPLIER',MIN(S_SUPPKEY),MAX(S_SUPPKEY)
FROM SUPPLIER;

INSERT INTO MINMAX
SELECT 'PARTSUPP_PART',MIN(PS_PARTKEY),MAX(PS_PARTKEY)
FROM PARTSUPP;

INSERT INTO MINMAX
SELECT 'PARTSUPP_SUPP',MIN(PS_SUPPKEY),MAX(PS_SUPPKEY)
FROM PARTSUPP ;

INSERT INTO MINMAX
SELECT 'NATION',MIN(N_NATIONKEY),MAX(N_NATIONKEY)
FROM NATION;

INSERT INTO MINMAX
SELECT 'REGION',MIN(R_REGIONKEY),MAX(R_REGIONKEY)
FROM REGION;

SELECT * FROM MINMAX;
spool off
exit;
```

firstten.sql

```
set echo on
set numwidth 25
spool count.out
select * from lineitem where rownum < 11;
select * from orders where rownum < 11;
select * from part where rownum < 11;
select * from partsupp where rownum < 11;
select * from supplier where rownum < 11;
select * from customer where rownum < 11;
select * from nation where rownum < 11;
select * from region where rownum < 11;
spool off
exit;
```

Appendix G - Pricing

15-Jul-02

Hewlett-Packard Company
Atten: Maria Lopez

No: 062602/ES45

Description	Part Number	Qty	Unit Cost	Ext. HW Cost	Ext. SW Cost
Server Hardware					
Compaq AS ES45 68/1000 M2 4GB Unix	DA-68DAA-DA	4	$50,809	$203,236	
5YR 24x7/4HR ES45 M2	*FM-4V724-60*	*4*	*$32,554*		*$130,216*
ES45 Tower Enclosure	BA61M-CT	4	$325	$1,300	
ES45 68/1000 SMP CPU Unix	KN610-DB	12	$10,400	$124,800	
ES45 4GB Memory Option	MS620-DA	28	$17,306	$484,568	
Optional Power Supply, Self Sensing	H7906-A9	4	$813	$3,252	
18.2GB 10K RPM Ultra3 SCSI	3R-A0585-AA	13	$207	$2,691	
Power Cord	BN18J-1K	8	$8	$64	
SCSI Drive Cage, 6 Slot	BA610-6D	4	$488	$1,952	
1 CH Wide Ultra-2 (LVD) Adapter	3X-KZPCA-AA	4	$246	$984	
PCI to Dual-Prt FE TX NIC	3X-DE602-AA	4	$246	$984	
Memory Channel Hub (w/4 line cards)	CCMHB-AA	1	$6,365	$6,365	
PCI MC2 Controller	CCMAB-AA	4	$1,944	$7,776	
10 Meter Cable for MC2	BN39B-10	4	$273	$1,092	
64 Bit FC HBA T64/VMS	DS-KGPSA-CA	16	$2,209	$35,344	
D Shelf 180W 1Doc BLW Metric Blue	DS-BA356-JD	2	$919	$1,838	
PCI to UltraSCSI Adapter UWSE	KZPBA-CA	2	$299	$598	
Ultra 68VHD 3M Cable Assembly	BN37A-03	2	$91	$182	
VT510;White; North Amer; No key	VT510-AA	4	$397	$1,588	
US/CANADA W95 KYBD WHIT	PCXLA-NA	4	$16	$64	
		Subtotal		**$878,678**	***$130,216***
STORAGE:					
USA Model 914 Storage Shelf	DS-SWXEB-AA	4	$46,406	$185,624	
Controller w/o ECB Cable Kit	DS-HSG80-BK	24	$8,793	$211,032	
16-Port SAN Switch	DS-DSGGB-AB	4	$18,525	$74,100	
Short-Wave Optical GBICs	DS-DXGGA-SA	40	$241	$9,640	
Model 2200 ECB	DS-SE2CS-CB	24	$369	$8,856	
5YR 7X24/4HR EMPTY 4214 NO DRIVES	*FM-4E724-60*	*36*	*$231*		*$8,316*
5YR 7X24/4HR M2 CNTLR SHELF W/CACHE	*FM-CK724-60*	*24*	*$768*		*$18,432*
5YR 7X24/4HR, HSG80 W/CACHE	*FM-C9724-60*	*24*	*$4,155*		*$99,720*
Fibre Channel Cables	BNGBX-30	40	$246	$9,840	
12/24gb 4MM Dat 5.25 Tape Drive	TLZ10-LB	4	$444	$1,776	
5YR 7X24/4HR,4MM DAT TAPE DRV	*FM-4M724-60*	*4*	*$1,557*		*$6,228*
9.1GB 7200RPM Disk**	DS-RZ1DA-VW	6	$423	$2,538	
18.2GB 10K RPM Ultra3 SCSI	3R-A0585-AA	317	$206	$65,302	
		Subtotal		**$568,708**	***$132,696***
Software					
5YR, AS ES40/45 UNIX BRNZ24X7	*FM-E4WUS-60*	*4*	*$3,058*		*$12,232*
5YR Digital Unix O/S & LP	*FM-CDDST-60*	*4*	*$10,899*		*$43,596*
TRU64 UNIX AlphaCDROM	QA-MT4AA-H8	4	$293	$1,172	
5YR AS ES45 UNIX SMP	*FM-62USM-60*	*12*	*$1,080*		*$12,960*
*5YR 7X24 HS*80 Platform SW*	*FM-PLAT2-60*	*24*	*$670*		*$16,080*
HSG80 ACSsf All Lic/PCRM Pkg	QB-6BUAA-SB	24	$4,550	$109,200	
		Subtotal		**$110,372**	***$84,868***
GRAND TOTAL:				**$1,557,758**	**$347,780**

The Compaq AlphaServer ES45 carries a five (5) year, 7x24HR response warranty. The storage products have a five (5) year on-site, 4-hour, 7-day per week response wth a five (5)

Valid: This quote is valid for 60days from date
Terms: TBD
Delivery: 15 Days ARO
Shipping: FOB Origin
Warranty: Manufactures New Equipment
Installation: Included

Sincerely,

Philip K. Nolan