TPC Benchmark™ H

Full Disclosure Report for

PRIMEPOWER 2500

Using Oracle Database 10g Enterprise Edition

Jan. 14, 2004

Second Edition

Second Edition Jan. 14, 2004

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

All performance data contained in this report were obtained in a rigorously controlled environment. Results obtained in other operating environments may vary significantly. We do not warrant or represent that a user can or will achieve similar performance. No warranty of system performance or price/performance is expressed or implied in this report.

Preface

The Transaction Processing Performance Council (TPC), of which Fujitsu Limited is a member, is an organization of computer companies, dedicated to the development of objective, industry-wide performance metrics in the area of transaction processing. Fujitsu Limited is involved in this effort, participating on the council and utilizing TPC benchmarks in performance evaluation.

The TPC Benchmark™H (TPC-H) is a decision support benchmark. It consists of a suite of business oriented ad-hoc queries and concurrent data modifications. The queries and the data populating the database have been chosen to have broad industry-wide relevance. This benchmark illustrates decision support systems that

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

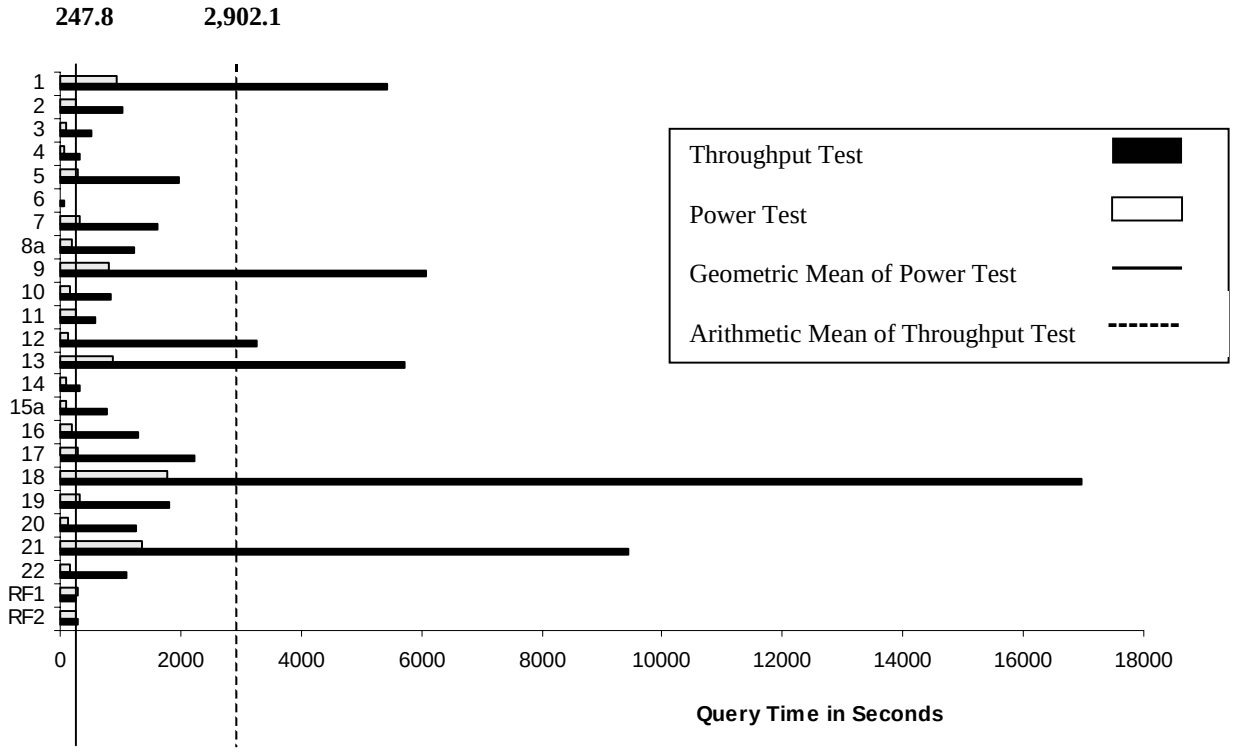
TPC-H evaluates the performance of various decision support systems by the execution of sets of queries against a standard database under controlled conditions. The TPC-H queries:

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

The performance metric reported by TPC-H is called the TPC-H Composite Query-per-Hour Performance Metric (QphH@Size), and reflects multiple aspects of the capability of the system to process queries. These aspects include the selected database size against which the queries are executed, the query processing power when queries are submitted by a single stream, and the query throughput when queries are submitted by multiple concurrent users. The TPC-H Price/Performance metric is expressed as $/QphH@Size.

The extent to which a customer can achieve the results reported by a vendor is highly dependent on how closely TPC-H approximates the customer application. The relative performance of systems derived from this benchmark does not necessarily hold for other workloads or environments. Extrapolations to any other environment are not recommended.

FUJITSU / ORACLE	**PRIMEPOWER 2500** **With Oracle Database 10g**		**TPC-H REV 2.0 EXECUTIVE SUMMARY** **Report Date: Jan. 14, 2004**	
Total System Cost	Composite Query per Hour Metric		Price/Performance	
$ 5,038,936	**34,345.4** QphH@3000GB		**$147** $/QphH@3000GB	
Database Size	Database Manager	Operating System	Other Software	Availability Date
3000GB	**Oracle Database 10g Enterprise Edition**	**Solaris 9**	**Veritas Volume Mgr.3.5.0**	**February 22, 2004**



Database Load time = 06:26	Load Includes Backup: N	Total Data Storage/database Size=18.19
RAID (base tables): N	RAID (Base Tables & auxil. Data structures): N	RAID (A11): Y

System Configuration:	PRIMEPOWER 2500
Processors:	64 SPARC64 V 1.3 GHz with 2 MB L2 Cache
Memory:	256 GB
Disks:	5 internal disks 36 GB, 64 FibreCat S80 arrays with 800 disks 73 GB
Total Storage:	54,559.65 GB (1GB defined as 2^30 bytes)

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

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PRIMEPOWER 2500
With Oracle Database 10g

TPC-H REV 2.0
EXECUTIVE SUMMARY

Report Date: Jan. 14, 2003

Description	Part Number	Source	Unit Price	Qty	Ext. Price	3 Yr. Maint.
Server Hardware						
PRIMEPOWER2500 (1.3GHz/2MB$) (For 8-64CPU) - Solaris 9	PW2K0BP7U	1	504450	1	504450	457776
System Board	PW2K7SB11U	1	37500	8	300000	
CPU Module (SPARC64 V 1.3GHz/2MB x 2)	PW2K1B12U	1	42510	32	1360320	
Additional Memory (8GB)	PW2K2M41U	1	14800	32	473600	
Additional Disk Unit (36.4GB)	PW0R3D24	1	1000	5	5000	
PCI / Disk Box	PW2K7BD1U	1	27500	16	440000	
I/O Rack Unit	PW2K7RK3U	1	24500	2	49000	
I/O Rack Unit Connection Kit	PW2K7RK93U	1	9500	1	9500	
I/O Rack Unit Connection Kit	PW2K7RK94U	1	9500	1	9500	
Fibre Channel Card(2Gb)	PW028FC3	1	2795	64	178880	
System Expansion Kit (w/ Solaris 9 RTU)	PW2K7ER6U	1	4900	1	4900	
Fibre Channel cable	DCL-FCA20U	1	780	64	49920	
PRIMEPOWER 100 for System Console	PW087MC4AU	1	13500	1	13500	
				Subtotal	**3398570**	**457776**
Server Software						
Solaris 9 CD set PRIMEPOWER		1	100	1	100	
Sun ONE Studio 7, Compiler Collection Slim Kits 1 User Slim Kit	D23QBB0H1H	1	987	1	987	
Volume Manager, Solaris, v3.5, License, Tier 4C	A08974F-M0000	2	60195	1	60195	
Volume Manager,Solaris,v3.5 Tier 4C Extended Support, 3 Yr 24x7	W08974F-M00236	2	41535	1		41535
Storage Solution, Solaris v3.5 Maintenance Pack 1, English, Media Kit	N09665F	2	100	1	100	
Volume Manager, Solaris, Administrator's Guide, v3.5 English Manual	N08836F	2	50	1	50	
Oracle Database 10g Enterprise Edition for 3 years, Named User Plus		3	10000	64	640000	
Partitioning for 3 years, Named User Plus		3	2500	64	160000	
Database Server Support Package for 3 years		3	6000	1		6000
Oracle Mandatory E-Business Discount (license and support)		3			-161200	
				Subtotal	**700232**	**47535**
Storage						
FC-S80 Basis Shelf	D:S80-Base	4	3650	64	233600	225000
S80 RAID Controller 2 Gbit/s	D:S80FC-RDM	4	9675	64	619200	80000
S80 Disk, 73GB 10.000rpm	D:S80-HD7310	4	1700	800	1360000	
PRIMECENTER Rack 38 HE	D:GPRAC-BG52	4	2350	6	14100	
				Subtotal	**2226900**	**305000**
Large Configuration Discount and Support Prepayment*					-2022002	-75075
			Total		**$4,303,700**	**$735,236**
			3 Yr. Cost		**$5,038,936**	
			QphH@3000GB		**34,345.4**	
			$/QphH@3000GB		**$147**	

Notes:
Source: 1=Fujitsu
2=Veritas, contact: Nicole K. Zakhari (see Appendix G)
3=Oracle, contact: MaryBeth Pierantoni (see Appendix G)
4=Fujitsu Siemens, contact: Jürgen Binder (see Appendix G)
*All discounts are based on US list prices and for similar quantities and configurations

Audited by: Bradley J. Askins, InfoSizing, Inc. (www.sizing.com)

Prices used in TPC benchmarks reflect the actual prices a customer would pay for a one-time purchase of the standard components.Individually negotiated discounts are not permitted. Special prices based on assumptionsabout past or future purchase 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 availableaccording to these terms, please inform the TPC at pricing@tpc.org. Thank you.

FUJITSU ORACLE	**PRIMEPOWER 2500** **With Oracle Database 10g**	**TPC-H REV 2.0** **EXECUTIVE SUMMARY** **Report Date: Jan. 14, 2004**

Numerical Quantities

Measurement Results:

Database Scale Factor	3000 GB	
Total Data Storage / Database Size	18.19	
Start of Database Load Time	16.08.2003	10:28:37
End of Database Load Time	16.08.2003	16:54:05
Database Load Time	6:26	
Query Streams for Throughput Test	8	
TPC-H Power	43,574.8	
TPC-H Throughput	27,070.8	
TPC-H Composite Query-per-Hour-Rating (QphH@3000GB)	34,345.4	
Total System Price over 3 Years (US$)	5,038,936	

Measurements Intervals:

Measurement Interval in Throughput Test	70,216	seconds

Duration of Stream Execution:

Stream ID	Seed	Start Date	Start Time	End Date	End Time	Duration
Stream 00	816165405	17. Aug	16:37:40	17. Aug	19:14:40	02:37:00
Stream 01	816165406	17. Aug	19:15:06	18. Aug	12:29:45	17:14:39
Stream 02	816165407	17. Aug	19:15:06	18. Aug	12:56:22	17:41:16
Stream 03	816165408	17. Aug	19:15:06	18. Aug	12:34:33	17:19:27
Stream 04	816165409	17. Aug	19:15:06	18. Aug	13:05:14	17:50:08
Stream 05	816165410	17. Aug	19:15:06	18. Aug	13:31:26	18:16:20
Stream 06	816165411	17. Aug	19:15:06	18. Aug	13:18:20	18:03:14
Stream 07	816165412	17. Aug	19:15:07	18. Aug	13:05:46	17:50:39
Stream 08	816165413	17. Aug	19:15:07	18. Aug	13:52:11	18:37:04
Refresh		18. Aug	13:31:26	18. Aug	14:45:22	01:13:56

TPC-H Price/Performance Metric (US$/QphH@3000GB)	147

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PRIMEPOWER 2500
With Oracle Database 10g

TPC-H REV 2.0
EXECUTIVE SUMMARY

Report Date: Jan. 14, 2004

TPC-H Timing Intervals (in seconds)

	1	2	3	4	5	6	7	8a	9	10	11	12
Stream 00	923.2	274.5	109.6	68.7	296.8	36.2	336.1	181.6	816.0	163.1	251.6	130.8
Stream 01	5329.3	1018.1	588.2	400.0	2170.8	57.0	1638.5	1024.3	6110.7	1058.1	624.1	799.4
Stream 02	5408.3	1146.2	456.2	368.2	1766.8	95.4	1604.1	1046.2	6567.3	828.8	592.8	1993.7
Stream 03	5416.3	935.4	524.5	365.5	2257.8	62.4	1731.2	1322.0	6076.2	796.6	605.0	3161.0
Stream 04	5287.3	1045.4	216.8	239.0	1192.5	45.5	1724.7	1347.7	6075.7	816.4	668.3	4682.6
Stream 05	5745.4	966.0	515.5	310.4	1948.0	55.4	1698.3	1428.4	4424.9	854.5	582.2	6457.5
Stream 06	5104.4	1359.0	857.9	289.0	2148.8	58.4	1352.9	1449.1	6818.1	494.8	562.1	6149.1
Stream 07	5482.4	932.0	533.9	366.2	2282.2	53.3	1640.0	1150.7	6616.9	953.9	641.4	541.0
Stream 08	5640.1	986.6	478.2	355.6	2100.4	58.4	1558.1	1181.7	5840.9	854.6	415.9	2289.9
Minimum	5104.4	932.0	216.8	239.0	1192.5	45.5	1352.9	1024.3	4424.9	494.8	415.9	541.0
Average	5426.7	1048.6	521.4	336.7	1983.4	60.7	1618.5	1243.8	6066.3	832.2	586.5	3259.3
Maximum	5745.4	1359.0	857.9	400.0	2282.2	95.4	1731.2	1449.1	6818.1	1058.1	668.3	6457.5

	13	14	15a	16	17	18	19	20	21	22	RF1	RF2
Stream 00	885.6	83.5	112.0	187.4	278.2	1767.1	318.4	145.2	1368.9	156.5	276.5	252.3
Stream 01	5768.8	318.9	813.6	1201.9	2202.4	15984.6	1809.6	2069.8	9753.7	1337.0	252.7	501.3
Stream 02	6467.6	350.6	848.1	1566.4	2868.2	17025.5	1748.3	829.5	9137.0	960.5	265.7	273.4
Stream 03	5707.1	376.5	768.9	1493.2	2433.3	15145.8	1620.0	796.6	9499.5	1271.7	272.4	259.8
Stream 04	5731.8	284.9	820.2	1385.0	2103.6	17794.3	1685.9	314.8	10104.2	640.7	257.3	260.7
Stream 05	5297.5	303.1	738.4	1164.4	2026.7	14714.8	1647.5	2780.2	10969.7	1150.5	262.5	260.9
Stream 06	5640.4	304.2	1013.8	1323.7	2160.4	15476.4	1724.5	1869.2	7797.4	1039.9	264.7	262.4
Stream 07	5743.1	228.1	200.9	717.1	1917.3	21958.9	1606.5	718.0	8815.7	1139.1	258.4	258.0
Stream 08	5415.7	289.8	946.7	1391.4	2069.9	17589.8	2688.2	754.9	9343.8	1173.9	259.4	263.4
Minimum	5297.5	228.1	200.9	717.1	1917.3	14714.8	1606.5	314.8	7797.4	640.7	252.7	258.0
Average	5721.5	307.0	768.8	1280.4	2222.7	16961.3	1816.3	1266.6	9427.6	1089.2	261.6	292.5
Maximum	6467.6	376.5	1013.8	1566.4	2868.2	21958.9	2688.2	2780.2	10969.7	1337.0	272.4	501.3

INFO SIZING

TPC TRANSACTION PROCESSING PERFORMANCE COUNCIL CERTIFIED AUDITOR

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August 25, 2003

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

Platform: **Fujitsu PRIMEPOWER 2500**

Database Manager: **Oracle Database 10g Enterprise Edition**

Operating System: **Solaris 9**

The results were:

CPU (Speed)	Memory	Disks	**QphH@3000GB**
Fujitsu PRIMEPOWER 2500			
64 x SPARC64 V (1.3 GHz)	2MB L2 cache/CPU 256 GB Main	800 x 73 GB 5 x 36 GB	**34,345.4**

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:

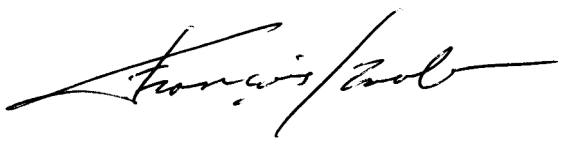
- The database records were defined with the proper layout and size
- The database population was generated using DBGEN
- The database was properly scaled to 3000GB and populated accordingly
- The compliance of the database auxiliary data structures was verified

- The database load time was correctly measured and reported
- The required ACID properties were verified and met
- The query input variables were generated by QGEN
- The query text was produced using minor modifications and two variants
- The execution of the queries against the SF1 database produced compliant answers
- A compliant implementation specific layer was used to drive the tests
- The throughput tests involved 8 query streams
- The ratio between the longest and the shortest query was such that no query timing was adjusted
- The execution times for queries and refresh functions were correctly measured and reported
- The repeatability of the measured results was verified
- The required amount of database log was configured
- The system pricing was verified for major components and maintenance
- The major pages from the FDR were verified for accuracy

Additional Audit Notes:

None

Respectfully Yours,



François Raab, President

Bradley J. Askins, Auditor

Contents

1 General Items

1.1 Benchmark Sponsor

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

This TPC-H benchmark is sponsored by Fujitsu Limited and Oracle Corp.

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 Solaris and Oracle parameters used in this benchmark.

1.3 Configuration Diagram

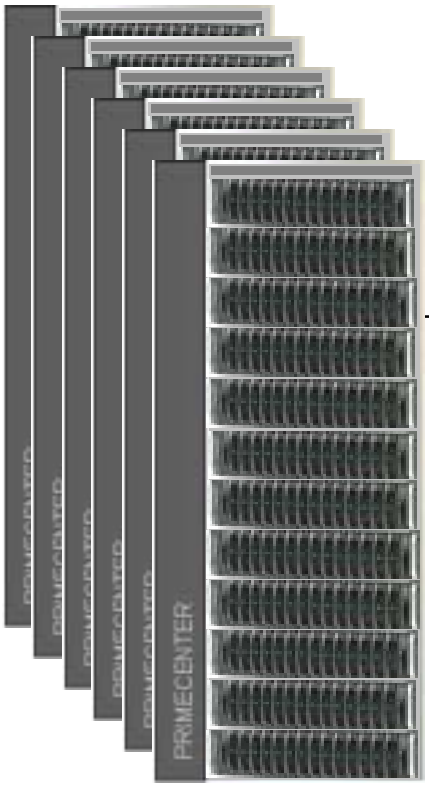
Provide diagrams of both the measured and priced configurations, accompanied by a description of the differences.

PRIMEPOWER 2500, configured with:

- 64 SPARC64 V 1.3 GHz processors
- 256 GB memory
- 5 * 36 GB internal disks
- 800 * 73 GB disks
- 16 I/O boxes in 2 cabinets
- 64 * FibreCAT S80 Storage array
- 64 * LP9802 Fibre Channel controllers

PRIMEPOWER 2500

- 64 SPARC64 V 1.3 GHz, 2MB
- 256 GB Mem
- 5 * 36 GB int. Disk
- 64 * LP9802 Fibre contrl.
- 16 I/O-boxes in 2 cabinets



64 * FibreCAT S80
- 800 x 73 GB

The previous description is for the priced configuration. There were additional 5 internal disks of 36 GB each and 96 S80 disks of 73 GB each in the measured configuration that were unused in this benchmark. Sufficient proof that the additional disks were unused was given to the auditor. The diagram is the same for both the priced and measured configurations.

2 Clause 1 Logical Database Design

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 programs and scripts that create and analyze the tables and indexes for the TPC-H database.

2.1 Physical Organization

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

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

2.2 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 all tables except NATION and REGION. Refer to the table/index create statements in Appendix B for more details.

2.3 Replication

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

No replication was used.

3 Clause 2 Queries and Refresh 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 Verifying Method for Random Number Generation

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

TPC supplied versions 1.3.0 of DBGEN and QGEN were used for this TPC-H benchmark.

3.3 Generating Values for Substitution Parameters

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

The supplied QGEN version 2.1.8 was used to generate the substitution parameters.

3.4 Query Text and Output Data from Qualification Database

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

Appendix C contains the qualification query text and query output.

3.5 Query Substitution Parameters and Seeds Used

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

Appendix D contains the seed and query substitution parameters.

3.6 Query Isolation Level

The isolation level used to run the queries must be disclosed. If the isolation level does not map closely to the 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 Source Code of Refresh Functions

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 part of the driver code included in 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 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 price from the ORDERS table and the extended price from the LINEITEM table were retrieved for a randomly selected order key.
2. The ACID Transaction was performed using the order key from step 1.
3. The ACID Transaction committed.
4. The total price from the ORDERS 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 ORDERS 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 ORDERS table and the extended price from the LINEITEM table were retrieved for the same order key. It was verified that the appropriate rows had 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 ORDERS and LINEITEM tables was verified based on a sample of order keys.
2. 100 ACID Transactions were submitted by each of nine execution streams.
3. The consistency of the ORDERS and LINEITEM tables was re-verified.

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 the proper 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 resumed and 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 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. Another ACID 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_KEY and 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 Progress of Read and Write Transactions

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

1. A Transaction, T1, executing Q1 against the qualification database, was started using a randomly selected DELTA.

2. An ACID Transaction T2, was started for a randomly selected O_KEY, L_KEY and DELTA.

3. T2 completed and appropriate rows in the ORDERS, LINEITEM and HISTORY tables had been 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 insure database consistency after recovery from any one of the failures listed in Clause 3.5.3.

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 LUNs containing TPC-H data files and redo log files were pairs of physical disks mirrored by hardware (RAID1). Each TPC-H data file and redo log file was striped across all available LUNs by software (RAID0), i.e. each LUN contained pieces from all TPC-H data files and redo log files. During the durability test, a LUN (i.e. a mirrored pair of physical disks) was randomly chosen and one of its disks removed from the cabinet. The test continued uninterupted, 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.

The system crash and memory failure tests were combined. Power to the server was turned off by the "Partition forced Power-Off Instruction" to the System Control Facility processor (SCF). 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

5.1 Ending Cardinality of Tables

The cardinality (i.e., 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	4,500,000,000
Lineitem	18,000,048,306
Customer	450,000,000
Part	600,000,000
Supplier	30,000,000
Partsupp	2,400,000,000
Nation	25
Region	5

5.2 Distribution of Tables and Logs Across Media

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

There were 48 FibreCAT S80 storage arrays with 12 physical disks each. For each of these S80, 6 LUNs were created from pairs of mirrored physical disks and shown to Solaris. In addition, there were 16 FibreCAT S80 arrays with 14 physical disks each. For these 7 LUNs each were created from pairs of mirrored physical disks and shown to Solaris. Each S80 array was attached to the server by one Emulex LP9802 Fibre Channel Controller. The write caches of the S80 were disabled.

In all 400 LUNs were available and used for 2 Veritas Volume Manager disk groups. The first group consisted of 64 = 16*4 LUNs, taking 4 LUNs each from the 16 S80 that were configured with 7 LUNs. This disk group was used for the dbgen flat files exclusively, not for the TPC-H database.

The second disk group consisted of the remaining 336 LUNs. For each of the Oracle data files and redo log files as listed in the database schema specification of Appendix B, a Veritas volume striped across all 336 LUNs was created. Appendix B shows the Veritas description (vxprint -th) for a volume as a sample.

5.3 Database partition/replication mapping

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 to ensure high availability. If used for data, auxiliary storage (e.g. indexes) or temporary space, the level of RAID must be disclosed for each device.

Table/Index	RAID type
tables	RAID 1+0
indexes	RAID 1+0
temp tablespace	RAID 1+0
log	RAID 1+0
System tablespace	RAID 1+0

5.5 Modifications to the DBGEN

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

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

5.6 Database Load Time

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

The database load time was 6 hours 26 minutes.

5.7 Data Storage Ratio

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

The data storage ratio is computed from the following information:

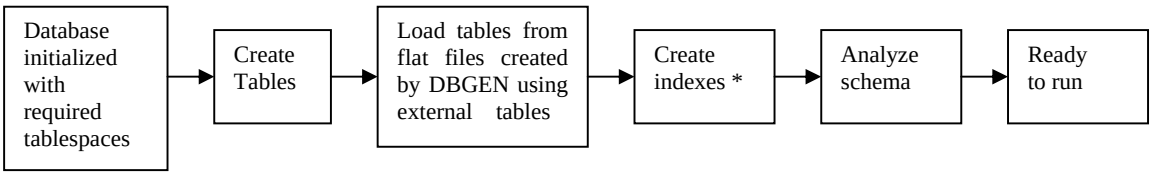
Disk Type	# Of Disks	Space Per Disk*	Sub-Total Disk Space**
internal	5	36.0 GB	167.65 GB
S80	800	73.0 GB	54392.00 GB
		Total Space	**54559.65 GB**
		Data Storage Ratio	**18.19**

Disk manufacturer definition of one GB is 10^9 byte ****In this calculation one GB is defined as 2^30 bytes***

5.8 Database Load Mechanism Details and Illustration

The details of the database load must be described, including a block diagram illustrating the overall process.

The database was loaded using data generation stored on flat files all on the tested and priced configurations. Oracle created external tables using the files that were created by the DBGEN program.



*Analyze index performed during index creation

5.9 Qualification Database Configuration

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

The qualification database used identical scripts 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.

Auditor requested queries were run against the database to verify the correctness of the load. All scripts and queries used are included 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.

The following steps were used to implement the power test:

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

6.3 Timing Intervals for Each Query and Refresh Functions

The timing intervals for each query and for both refresh functions must be reported for the power test.

The timing intervals for each query and both update functions are given in the Numerical Quantities Summary earlier in this document.

6.4 Number of Streams for the Throughput Test

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

Eight streams were used for the throughput test.

6.5 Start and End Date/Times for Each Query Stream

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

The throughput test start time and finish time for each stream are given in the Numerical Quantity Summary earlier in this document.

6.6 Total Elapsed Time of the Measurement Interval

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

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

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

Start 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 are given in the Numerical Quantity Summary earlier in this document.

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

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

The timing intervals for each query and each refresh function for the throughput test are given in the Numerical Quantity Summary earlier in this document.

6.9 Performance Metrics

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

The performance metrics, and the numbers on which they are based, are given in the Numerical Quantity Summary earlier in this document.

6.10 The Performance Metric and Numerical Quantities from Both Runs

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

Performance results from the first two executions of the TPC-H benchmark indicated the following percent difference for the metric points:

Run ID	QppH@3000GB	QthH@3000GB	QphH@3000GB
Run 1	44,197.4	27,641.2	34,952.4
Run 2	43,574.8	27,070.8	34,345.4
Difference	-1.43%	-2.11%	-1.77%

6.11 System Activity Between Performance Tests

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

There was no activity on the SUT between run1 and run2

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 runTPCpt. 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.

Following the Power Test, QGEN is again called with the subsequent 8 stream ids to generate new QET for each Throughput Test. qexecpl.c is called simultaneously for all 8 streams to execute the queries as above.Then the update_stream.sh script is called to run all 8 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 be supplied, including any related source code or scripts. This description should allow an independent reconstruction of the implementation-specific layer.

The source code for the "qexec" Utility can be found in Appendix E.

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.

Profile-directed optimization subject to the requirements of *5.2.9* and *5.2.10* 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 included in the pricing sheet in the Executive Summary.

8.2 Total Three Year Price

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

A detailed pricing sheet of all hardware and software used in this configuration and the 3-year maintenance costs, demonstrating the computation of the total 3-year price of the configuration, is included in the Executive Summary.

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 reported availability date for the priced system must be the date at which all components are committed to be available.

All hardware and software components will be available February 22, 2004.

9 Auditor's Information and Attestation Letter

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

The auditor's attestation letter is included at the front of this report.

Appendix A. Solaris 9 and Oracle Database 10g Parameters

This Appendix contains Oracle initialization parameters, environment variables and Solaris kernel parameters.

```
========================================
```

Oracle 10g Parameters: init.ora

```
========================================
audit_trail                              = FALSE
compatible                               =
10.0.0.0.0
control_files                    =
(/tpch_df/dbs/ctl01.ctl /tpch_df/dbs/ctl02.ctl)
cpu_count                                = 64
db_cache_size                            = 18g
db_block_checksum                        = FALSE
db_block_size                            = 8192
db_file_multiblock_read_count            = 128
db_files                                 = 1024
db_name                                  = tpch
db_writer_processes                      = 20
dml_locks                                = 120000
enqueue_resources                        = 50000

global_names                             = FALSE
java_pool_size                           = 0
large_pool_size                  = 8g
log_buffer                               =
67108864
log_checkpoints_to_alert         = TRUE
max_dump_file_size                       = 50000
nls_date_format                  = YYYY-MM-DD
open_cursors                             = 1024
optimizer_features_enable        = 10.0.0.1
optimizer_index_cost_adj         = 30
optimizer_mode                           =
CHOOSE
parallel_execution_message_size = 16384
parallel_max_servers                     = 1400 #96
parallel_min_servers                     = 1400 #96
pga_aggregate_target                     = 70g
processes                                = 2000
query_rewrite_enabled                    = TRUE
replication_dependency_tracking = FALSE
sessions                                 = 3000
shared_pool_size                 = 8g
statistics_level                 = BASIC
transactions                             = 512
undo_management                          = auto

========================================
```

Oracle Environment Variables

```
========================================
export KIT_DIR=$HOME/tpch
export SCHEMA_DIR=$KIT_DIR/bmc/schema
export PERL=/usr/bin/perl
export BUMPX_DIR=$KIT_DIR/bumpx
export BUMPX_OUT=$KIT_DIR/bumpx
export UTILS=$KIT_DIR/utils
export TEST_DB=/tmp
export QUAL_DB=$TEST_DB
export DBGEN=$KIT_DIR/dbgen
export ACID_DIR=$KIT_DIR/acid
export QEXEC=$KIT_DIR/utils
export QUERIES=$KIT_DIR/queries
export ANSWERS=$KIT_DIR/answers
export ANS2VAL=/tmp
export ACID_OUT=$QUAL_DB/acid_out
export DSS_CONFIG=$DBGEN
export DSS_QUERY=$KIT_DIR/queries
export DSS_PATH=$HOME
export MAINT=$KIT_DIR/maintenance
export CC=/usr/bin/cc
export FRAME=$KIT_DIR/frame
export
REGR_TEST=$KIT_DIR/internal/regression_test
export UPDATE_DOP_INS=96
export UPDATE_DOP_DEL=128
export SCALE_FACTOR=3000
############ FRAME STUFF
export FRAME_PATH=$KIT_DIR/frame
export
ORACORE3INCL=$ORACLE_HOME/rdbms/demo
export
ORACORE3PUBL=$ORACLE_HOME/rdbms//public
export RDBMSPUBL=$ORACLE_HOME/rdbms/public
export
NETWORKPUBL=$ORACLE_HOME/network/public
export RDBMSDEMO=$ORACLE_HOME/rdbms/demo
export PLSQLDEMO=$ORACLE_HOME/plsql/demo
export PLSQLPUBL=$ORACLE_HOME/plsql/public
export O=$ORACLE_HOME
export
PATH=./:${BUMPX_DIR}:${UTILS}:${DBGEN}:${MAIN
T}:${ACID_DIR}:${FRAME}/bin:${FRAME}/bin:${REG
R_TEST}:${PATH}
########### ENVIRONMENT VARIABLES
##################
export WORKLOAD=TPCH
export HOST=
export OPTLEVEL=
export GETOPT=-DSTDLIB_HAS_GETOPT
export PLATFORM=
#export
INITORA=$KIT_DIR/schema/test_db/testdb.ora
export INITORA=$KIT_DIR/schema/test_db/sf100.ora

########### ALIASES
#################################

########### RULES - do not change these
#############
case "$SCALE_FACTOR" in
   1) export NUM_STREAMS=2;;
   10) export NUM_STREAMS=3;;
   100) export NUM_STREAMS=4;;
   300) export NUM_STREAMS=6;;
   1000) export NUM_STREAMS=7;;
   3000) export NUM_STREAMS=8;;
   10000) export NUM_STREAMS=9;;
esac
DATABASE_USER=tpch/tpch
```

==========

Solaris Parameters: /etc/system

==========

```
* Begin FJSVssf (do not edit)
set ftrace_atboot = 1
set kmem_flags = 0x100
set kmem_lite_maxalign = 8192
* End FJSVssf (do not edit)
* Begin FJSVpnl (do not edit)
forceload:          drv/FJSVpanel
* End FJSVpnl (do not edit)
forceload:          drv/se
forceload:          drv/fjmse

forceload: drv/clone

set pcipsy:pci_stream_buf_enable = 0

set shmsys:shminfo_shmmax=0xffffffffffffffff
set shmsys:shminfo_shmmin=1
set shmsys:shminfo_shmmni=1024
set shmsys:shminfo_shmseg=500

set semsys:seminfo_semmap=8388608
set semsys:seminfo_semmni=4096
set semsys:seminfo_semmns=8388608
set semsys:seminfo_semmnu=4096
set semsys:seminfo_semmsl=2048
set semsys:seminfo_semume=2048
set semsys:seminfo_semopm=100
set semsys:seminfo_semvmx=32767

set msgsys:msginfo_msgmap=2048
set msgsys:msginfo_msgmax=8192
set msgsys:msginfo_msgmnb=16384
set msgsys:msginfo_msgssz=32
set msgsys:msginfo_msgtql=2048
set msgsys:msginfo_msgseg=32767

set maxpgio=131072
set maxphys=4194304
set bufhwm=8000
set segspt_minfree=16000
set tune_t_fsflushr=10
set autoup=1800
set memscrub_period_sec=172900

set seg_pwindow=28311552
set p_hashsize=131072
set seg_pmaxqlen=128
set segmap_percent=2

* vxvm_START (do not remove)
forceload: drv/vxdmp
forceload: drv/vxio
forceload: drv/vxspec
* vxvm_END (do not remove)
```

Appendix B. Programs and Scripts

==========

bumpx.pl

==========

```
#!/usr/local/bin/perl

$os = $ENV{'OS'};
if (($os cmp 'Windows_NT') != 0) { # os is UNIX
      $os = "unix";$nt = 0;$unix = 1;
} else {
      $os = "nt"; $nt = 1; $unix = 0;
}
$| = 1;
$verbose = 0;
if (($os cmp "unix")==0) {
      $defphases =
"dbcre,sctso,scuto,dbgen,dapop,anlyz,ixcre";
} else {
      $defphases =
"sdgen,shutd,start,dbgen,plcre,dbcre,sctso,scuto,dapo
p,scuvo,anlyz,ixcre,chob";
}
$allbmtypes = "tpcd,wisc";
$bmtype = "tpcd" if !defined $bmtype;
$pdfile =    "$ENV{'BUMPX_DIR'}/param.txt";    # This
file contains the description of all possible parameters.
while ($arg = shift(@ARGV)) {
      if ($arg !~ /-(i|o|t|p|d|a|s|h)/){
            $error =    "** Error: Bad argument to $0:
$arg\n";
            &usage;
      }
      if ($arg =~ /-h/) { &usage;ext(0);}
      $runsilent = 1 if ($arg =~ /-s/);
      $outfile = shift(@ARGV) if ($arg =~ /-o/);
      $bmtype = shift(@ARGV) if ($arg =~ /-t/);
      $phaselist = shift(@ARGV) if ($arg =~ /-p/);
      if ($arg =~ /-d/) {
          $defpar = shift(@ARGV);
          @keys = keys %params;
          while ($#keys >=0) {
                $key = pop(@keys);
                if (($defpar cmp "") ==0) {
                      print $key, "=", $params{$key},
"\n";
                } else {
                      print $key, "=", $params{$key}, "\n"
if ($key =~ /$defpar/);
                }
          }
          exit(0);
      }
}
$outfile = "$ENV{'BUMPX_DIR'}/bumpx.dat" if !defined
$outfile;
if ($nt) {
      $listdir = $filedir."list/";
      if (!-e $listfile) {
          system ("mkdir $listdir");
      }
}
if (($os cmp "nt") == 0) {          ## NT Port (Use tmpfile
to buffer
      $tmpfile = "tmp.txt";          ## commands and
nruntpb to synchronize them)
      $tmpfile = $filedir.$tmpfile;
      $nruntpb =    "nruntpb.exe";
} ## NT End
if (!-e $outfile) {
      $error = "** Error: -o file, $outfile, does not exist\n";
      &usage;
}
$phaselist = $defphases if !defined $phaselist;
@phases = split(/,/, $phaselist);
## NT Port (Use tmpfile to buffer commands for
nruntpb)
open (TMPFILE, ">$tmpfile") if ( (($os cmp "nt") == 0));
## NT End
&doexecute;
## NT Port
close(TMPFILE) if ( (($os cmp "nt") == 0));
## NT End
exit(0);

sub doexecute { # First, do preprocessing stuff
      print "Execution pass begun." if $verbose;
      open (INFILE, $outfile);
   WLOOP1:
      while ($line = <INFILE>)
      {
            study $line;
            next WLOOP1 if $line =~ /^\s*\#/;
            next WLOOP1 if $line =~ /^\s*\n/;
            if ($line =~ /^%b-preproc/)
            {
                  $insection = 1;
                  next WLOOP1;
            }
            next WLOOP1 if ($insection != 1);
            if ($line =~ /^%e-preproc/)
            {
                  $insection = 0;
                  $commands{$shortcmd} = $longcmd if
defined $shortcmd;
                  last WLOOP1;
            }
            if ($line =~ /^\*/)
            {
                  $commands{$shortcmd} = $longcmd if
defined $shortcmd;
                  $line =~ /^(\*.*\S+)\s*\n$/;
                  $shortcmd = $1;
                  $longcmd = "";
                  next WLOOP1;
            }
            if ($line =~ /^\\/)
            {
                  $line =~ /\\(.*\n)/;
                  $longcmd = $longcmd . $1;
                  next WLOOP1;
            }
            print "Illegal entry in preproc stage:\n
$line";
      }
      close (INFILE);

      $execctr = 0;
      foreach $phase (@phases)
      {
          $phase_cmd_num = 0;
```

```
        print "\n    Executing phase \'$phase\'" if
$verbose;
        $bg = 0;
          open (INFILE, $outfile);
        WLOOP2:
          while ($line = <INFILE>)
          {
                study $line;
                next WLOOP2 if $line =~ /^\s*\#/;
                next WLOOP2 if $line =~ /^\s*\n/;
                if ($line =~ /^\*ignon/)
                {
                      $ignon = 1;
                      next WLOOP2;
                }
                if ($line =~ /^\*ignoff/)
                {
                      $ignon = 0;
                      next WLOOP2;
                }
                next WLOOP2 if ($ignon == 1);
                if ($line =~ /^%b-$phase/)
                {
                      $insection = 1;
                      $execcmd = "";
                      next WLOOP2;
                }
                next WLOOP2 if ($insection != 1);
                if ($line =~ /^%e-$phase/)
                {
                      $insection = 0;
                      &execute ($execcmd);
                      last WLOOP2;
                }
                if ($line =~ /^\*(.*)/)
                {
                      &execute ($execcmd);
                      if (($1 =~ /bgo/) || ($1 =~ /wait/) || ($1
=~ /ignore/))
                      {
                            $execcmd = $line;
                            next WLOOP2;
                      }
                      $line =~ /^(\*.*\S+)\s*\n$/;
                      $execcmd = $commands{$1};
                      next WLOOP2;
                }
                if ($line =~ /^\{(.*)\}/)
                {
                      $insert = "";
                      $insert = $1;
                      $execcmd =~ s/\{\}/$insert/;
                      next WLOOP2;
                }
                if ($line =~ /^\{(.*)$/)
                {
                      $insubsection = 1;
                      $insert = "";
                      $insert = $1;
                      next WLOOP2;
                }
                if ($line =~ /^(.*)\}/)
                {
                      $insubsection = 0;
                      $insert = $insert . $1;
                        if (($os cmp "nt") == 0){ ## NT Port
(Ignore '\n')
                              $insert =~ /(.*)\n$/s;
                              $insert = $1;
                        } ## NT End
                      $execcmd =~ s/\{\}/$insert/;
                      next WLOOP2;
                }
                $insert = $insert . $line if ($insubsection
== 1);
          }
          close (INFILE);
      }
      print "\nExecution pass complete.\n" if $verbose;
}

sub execute
{
      $cmd = shift(@_);
      if ($cmd)
      {
            return if ($cmd =~ /^\*ignore/);
            if ($cmd =~ /^\*bgon=(.*)/)
            {
                  $bgmax = $1;
                  $bg = 1;
                  $bgrun = 0;
                  return;
            }
            if ($cmd =~ /^\*bgoff/)
            {
                  $bg = 0;
                  return;
            }

          if ($cmd =~ /^\*time=(.*)/)    ##NT only
            {
                print $1 . "\n";
                print localtime(time) . "\n";
                  return;
            }
            if ($cmd =~ /^copy (.*)/) ## NT only
            {
                system($cmd);
                  ## Quit if failed
                  if ($?) {
                        print "system copy command
failed:\n$cmd\nreason: $? ($!)\n";
                      exit(-1);
                }
                  return;
            }
          if ($cmd =~ /^del (.*)/) ## NT only
            {
                system($cmd);
                  ## Quit if failed
                  if ($?) {
                        print "system del command
failed:\n$cmd\nreason: $? ($!)\n";
                      exit(-1);
                }
                  return;
            }

          if ($cmd =~ /^\*wait/) ## This deals with main
differences between NT and UNIX
            {
                if (($os cmp "unix") == 0)
                {
                        while ($fpid = shift(@wpids))
                        {
                              waitpid($fpid, 0);
                        }
                }
                else
                {       ## NT Port (Start background tasks
if any. nruntpb will wait until all tasks are done)
                        if ($bgrun >= 1)
                        {
```

```
                        close(TMPFILE);
                        system("cat $tmpfile >>
$listdir$phase.lst");
                        system("vi $tmpfile") if
$debug;
                        system("$nruntpb -p <
$tmpfile") if !$debug;
                        if ($?)
                        {
                                print "system command
failed:\n$nruntpb < $tmpfile\n";
                                print "reason: $?
($!)\n";
                                print "Please check the
contents in the input file.\n";
                                exit(-1);
                        }
                        open(TMPFILE, ">$tmpfile");
                    }
                }
                  $bgrun = 0;
                  return;
            }
            if ($cmd =~ /(s|g)etenv/)
            {
                @lines = split(/\n/, $cmd);
                  $cmd = "";
                  foreach $line (@lines)
                  {
                        while (1)
                        {
                            last if ($line !~ /getenv/);
                            $line =~
/(.*)\*getenv\(([^(\)|\*)]*)\)(.*)/;
                            $line = $1 . $ENV{$2} . $3;
                        }
                        if ($line =~ /jojo/) #we do not want to
use this for now
                        {
                            $line =~
/setenv\s+(\S+)\s+(\S+)/;
                            $ENV{$1} = $2;
                        }
                        else
                        {
                            $cmd = $cmd . $line. "\n";
                        }
                  }
            }
            return if ($cmd !~ /\S+/); # return if nothing left
to execute
          $execctr++;
            $ENV{'BUMPX_CTR'} = $$.'-'.$execctr;
          if (($os cmp "unix") == 0)
          {
                if ($bg == 1)
                {
                        print "." if $verbose;
                        $fpid = fork;
                        if ($fpid == 0)
                        {
                            exec ($cmd);
                            print "exec\'d command
failed:\n$cmd\nreason: $!\n";
                            exit(-1);
                        }
                        unshift (@wpids, $fpid);
                        $bgrun = $bgrun + 1;
                        &execute ("*wait") if (($bgrun >=
$bgmax) && ($bgmax >= 0));
                }
                else
                {
                        system ($cmd);
                        print "system\'d command
failed:\n$cmd\nreason: $? ($!)\n" if $?;
                }
          }
          else ## NT support
          {
            ## NT Port (Submit background tasks if there
are bgmax of them, otherwise write to tmpfile)
                if ($bg == 1)
                {
                        print "." if $verbose;
                        if ($bgrun < $bgmax)
                        {
                            $cmd =~
s/phase\#.lst/$listdir$phase\_$phase_cmd_num.lst/;
                            ++$phase_cmd_num;
                            print TMPFILE $cmd;
                            $bgrun = $bgrun + 1;
                        }
                        else
                        {
                            close(TMPFILE);
                            system("cat $tmpfile >>
$listdir$phase.lst");
                            system("$nruntpb -p <
$tmpfile");
                            if ($?) {
                                print "system command
failed:\n$nruntpb < $tmpfile\nreason: $? ($!)\n";
                                print "Please check the
contents in the input file.\n";
                                exit(-1);
                            }
                            open(TMPFILE, ">$tmpfile");
                            $cmd =~
s/phase\#.lst/$listdir$phase\_$phase_cmd_num.lst/;
                            ++$phase_cmd_num;
                            print TMPFILE $cmd;
                            $bgrun = 1;
                        }
                }
                else
                {
                        $cmd =~
s/phase\#.lst/$listdir$phase\_$phase_cmd_num.lst/;
                        ++$phase_cmd_num;
                        print TMPFILE $cmd;
                        close(TMPFILE);
                        system("cat $tmpfile >>
$listdir$phase.lst");
                        system ("sh $tmpfile");
                        if ($?) {
                            print "system\'d command
failed:\nsh $tmpfile\nreason: $? ($!)\n";
                            print "Please check the
contents in the shell script.\n";
                            exit(-1);
                        }
                        open(TMPFILE, ">$tmpfile");
                }
          }   ## NT support End
      }
}

sub usage
{
      print "Usage:\n";
      print "This is a lite version of bumpx.pl.    It can
only be used to execute a .dat file\n";
      print " $0 [-o outfile] [-p phaselist] [-t type]\n";
```

```
	print "	-o : intermediary file to be created and/or
used\n";
	print "		defaults to bumpx.dat in
\$BUMPX_DIR or \$CWD\n";
	print "	-p : list of phases to create/execute\n";
	print "		phaselist is a comma separated list
of phases in order\n";
	print "		possible phases are:\n";
	print "		  sdgen = seed file generation\n";
	print "		  dbgen = data flat file
generation\n";
	print "		  plcre = NT raw partition and links
creation\n";
	print "		  dbcre = database creation\n";
	print "		  shutd = shutdown database (on
all instances)\n";
	print "		  start = startup database (on all
instances)\n";
	print "		  sccre = schema creation\n";
	print "		  sctso = schema creation
(tablespaces only)\n";
	print "		  scuto = schema creation (user
and tables only)\n";
	print "		  scuvo = schema creation (views
only)\n";
	print "		  dapop = data population\n";
	print "		  ixcre = index creation (including
constraints)\n";
	print "		  anlyz = analyze objects\n";
	print "		  chob  = change parameters of
objects\n";
	print "		  expln = create explain plans\n";
	print "		  query = run and time queries\n";
	print "		defaults to $defphases\n";
	print "	-t : type of benchmark\n";
	print "		enables benchmark-specific
defaults\n";
	print "		current possibilties are:
$allbmtypes\n";
	print "		defaults to tpcd\n";
	print "	-s : run silent (no parameter checking is
done)\n";
	print "\n";
	print "Examples:\n";
	print " $0 -p dapop\n";
	print "	Executes data population phase of
intermediary file bumpx.dat.\n";
	print "\n";
	print "$error\n";
	exit(-1);
}
```

==========

3tb_16.dat

```
==========
################################################
##############################
# preprocessing-like directives
%b-preproc
*sql
\sqlplus -s /NOLOG <<!
\set echo on;
\set termout on;
\spool phase#.lst;
\connect / as sysdba;
\select to_char(sysdate, 'MM-DD-YYYY HH24:MI:SS')
now from dual;
\{}
\select to_char(sysdate, 'MM-DD-YYYY HH24:MI:SS')
now from dual;
\exit;
\!

*load1
\sqlldr {}

*mknod
\mknod {}

*dbgen
\dbgen {}

*sh
\{}

%e-preproc
%b-dbcre
*bgon=1
################################################
##################################
# Database Creation Phase
*sql
{
shutdown abort;
}
*wait
# creating database
*sql
{
startup pfile=
/export/home/oracle/tpch/admin/init_build.ora
nomount;
create database
   controlfile reuse
   logfile '/tpch_df/log_1' size 31000m reuse,
           '/tpch_df/log_2' size 31000m reuse
   datafile '/tpch_df/sys_1' size 3300m reuse
   sysaux datafile '/tpch_df/sys_2' size 1000m reuse
   undo tablespace ts_undo1
   datafile '/tpch_df/undo_1' size 30570m reuse
   maxdatafiles 5000
   maxinstances 1
;

}
*wait
# creating extra logfile threads for rac 1 nodes
*sql
{
}
*wait
# building data dictionary
*sql
{
set termout off
set echo off
spool /export/home/oracle/tpch/log/data_dict.out
@?/rdbms/admin/catalog.sql;
@?/rdbms/admin/catparr.sql;
@?/rdbms/admin/catproc.sql;
connect system/manager
@?/rdbms/admin/utlxplan.sql;
@/ora10100/sqlplus/admin/pupbld.sql;
}
*wait
*sql
{
shutdown;
}
*wait
*sql
{
```

```
startup
pfile=/export/home/oracle/tpch/admin/init_build.ora
}
*wait
*bgoff
%e-dbcre
%b-sctso
*bgon=128
##########################################
##################################
# Schema Creation Phase - datafiles only (no tables or
users)
# creating data tablespaces, datafiles
# creating tpch's ts_s tablespace
*sql
{
drop tablespace ts_s including contents;
create tablespace ts_s
datafile '/tpch_df/s_1' size 5565m reuse
extent management local
autoallocate
  nologging
;
}
# creating tpch's ts_c tablespace
*sql
{
drop tablespace ts_c including contents;
create tablespace ts_c
datafile '/tpch_df/c_1' size 24860m reuse
extent management local
autoallocate
  nologging
;
}
# creating tpch's ts_ps tablespace
*sql
{
drop tablespace ts_ps including contents;
create tablespace ts_ps
datafile '/tpch_df/ps_1' size 29010m reuse
extent management local
autoallocate
  nologging
;
}
# creating tpch's ts_p tablespace
*sql
{
drop tablespace ts_p including contents;
create tablespace ts_p
datafile '/tpch_df/p_1' size 27795m reuse
extent management local
autoallocate
  nologging
;
}
# creating tpch's ts_def tablespace
*sql
{
drop tablespace ts_def including contents;
create tablespace ts_def
datafile '/tpch_df/def_1' size 9900m reuse
;
}
# creating tpch's ts_o1 tablespace
*sql
{
drop tablespace ts_o1 including contents;
create tablespace ts_o1
datafile '/tpch_df/o_1' size 8500m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_o2 tablespace
*sql
{
drop tablespace ts_o2 including contents;
create tablespace ts_o2
datafile '/tpch_df/o_2' size 9303m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_o3 tablespace
*sql
{
drop tablespace ts_o3 including contents;
create tablespace ts_o3
datafile '/tpch_df/o_3' size 9303m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_o4 tablespace
*sql
{
drop tablespace ts_o4 including contents;
create tablespace ts_o4
datafile '/tpch_df/o_4' size 9303m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_o5 tablespace
*sql
{
drop tablespace ts_o5 including contents;
create tablespace ts_o5
datafile '/tpch_df/o_5' size 9303m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_o6 tablespace
*sql
{
drop tablespace ts_o6 including contents;
create tablespace ts_o6
datafile '/tpch_df/o_6' size 9303m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_o7 tablespace
*sql
{
drop tablespace ts_o7 including contents;
create tablespace ts_o7
datafile '/tpch_df/o_7' size 9303m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_o8 tablespace
*sql
{
drop tablespace ts_o8 including contents;
create tablespace ts_o8
datafile '/tpch_df/o_8' size 9303m reuse
extent management local
autoallocate
;
```

```
}
# creating tpch's ts_o9 tablespace
*sql
{
drop tablespace ts_o9 including contents;
create tablespace ts_o9
datafile '/tpch_df/o_9' size 9303m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_o10 tablespace
*sql
{
drop tablespace ts_o10 including contents;
create tablespace ts_o10
datafile '/tpch_df/o_10' size 9303m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_o11 tablespace
*sql
{
drop tablespace ts_o11 including contents;
create tablespace ts_o11
datafile '/tpch_df/o_11' size 9303m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_o12 tablespace
*sql
{
drop tablespace ts_o12 including contents;
create tablespace ts_o12
datafile '/tpch_df/o_12' size 9303m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_o13 tablespace
*sql
{
drop tablespace ts_o13 including contents;
create tablespace ts_o13
datafile '/tpch_df/o_13' size 9303m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_o14 tablespace
*sql
{
drop tablespace ts_o14 including contents;
create tablespace ts_o14
datafile '/tpch_df/o_14' size 9303m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_o15 tablespace
*sql
{
drop tablespace ts_o15 including contents;
create tablespace ts_o15
datafile '/tpch_df/o_15' size 9303m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_o16 tablespace
*sql
{
drop tablespace ts_o16 including contents;
create tablespace ts_o16
datafile '/tpch_df/o_16' size 9303m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_o17 tablespace
*sql
{
drop tablespace ts_o17 including contents;
create tablespace ts_o17
datafile '/tpch_df/o_17' size 9303m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_o18 tablespace
*sql
{
drop tablespace ts_o18 including contents;
create tablespace ts_o18
datafile '/tpch_df/o_18' size 9303m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_o19 tablespace
*sql
{
drop tablespace ts_o19 including contents;
create tablespace ts_o19
datafile '/tpch_df/o_19' size 9303m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_o20 tablespace
*sql
{
drop tablespace ts_o20 including contents;
create tablespace ts_o20
datafile '/tpch_df/o_20' size 9303m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_o21 tablespace
*sql
{
drop tablespace ts_o21 including contents;
create tablespace ts_o21
datafile '/tpch_df/o_21' size 9303m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_o22 tablespace
*sql
{
drop tablespace ts_o22 including contents;
create tablespace ts_o22
datafile '/tpch_df/o_22' size 9303m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_o23 tablespace
*sql
{
```

```
drop tablespace ts_o23 including contents;
create tablespace ts_o23
datafile '/tpch_df/o_23' size 9303m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_o24 tablespace
*sql
{
drop tablespace ts_o24 including contents;
create tablespace ts_o24
datafile '/tpch_df/o_24' size 9303m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_o25 tablespace
*sql
{
drop tablespace ts_o25 including contents;
create tablespace ts_o25
datafile '/tpch_df/o_25' size 9303m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_o26 tablespace
*sql
{
drop tablespace ts_o26 including contents;
create tablespace ts_o26
datafile '/tpch_df/o_26' size 9303m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_o27 tablespace
*sql
{
drop tablespace ts_o27 including contents;
create tablespace ts_o27
datafile '/tpch_df/o_27' size 9303m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_o28 tablespace
*sql
{
drop tablespace ts_o28 including contents;
create tablespace ts_o28
datafile '/tpch_df/o_28' size 9303m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_o29 tablespace
*sql
{
drop tablespace ts_o29 including contents;
create tablespace ts_o29
datafile '/tpch_df/o_29' size 9303m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_o30 tablespace
*sql
{
drop tablespace ts_o30 including contents;
create tablespace ts_o30
datafile '/tpch_df/o_30' size 9303m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_o31 tablespace
*sql
{
drop tablespace ts_o31 including contents;
create tablespace ts_o31
datafile '/tpch_df/o_31' size 9303m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_o32 tablespace
*sql
{
drop tablespace ts_o32 including contents;
create tablespace ts_o32
datafile '/tpch_df/o_32' size 9303m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_o33 tablespace
*sql
{
drop tablespace ts_o33 including contents;
create tablespace ts_o33
datafile '/tpch_df/o_33' size 9303m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_o34 tablespace
*sql
{
drop tablespace ts_o34 including contents;
create tablespace ts_o34
datafile '/tpch_df/o_34' size 9303m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_o35 tablespace
*sql
{
drop tablespace ts_o35 including contents;
create tablespace ts_o35
datafile '/tpch_df/o_35' size 9303m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_o36 tablespace
*sql
{
drop tablespace ts_o36 including contents;
create tablespace ts_o36
datafile '/tpch_df/o_36' size 9303m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_o37 tablespace
*sql
{
drop tablespace ts_o37 including contents;
create tablespace ts_o37
datafile '/tpch_df/o_37' size 9303m reuse
extent management local
```

```
autoallocate
;
}
# creating tpch's ts_o38 tablespace
*sql
{
drop tablespace ts_o38 including contents;
create tablespace ts_o38
datafile '/tpch_df/o_38' size 9303m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_o39 tablespace
*sql
{
drop tablespace ts_o39 including contents;
create tablespace ts_o39
datafile '/tpch_df/o_39' size 9303m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_o40 tablespace
*sql
{
drop tablespace ts_o40 including contents;
create tablespace ts_o40
datafile '/tpch_df/o_40' size 9303m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_o41 tablespace
*sql
{
drop tablespace ts_o41 including contents;
create tablespace ts_o41
datafile '/tpch_df/o_41' size 9303m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_o42 tablespace
*sql
{
drop tablespace ts_o42 including contents;
create tablespace ts_o42
datafile '/tpch_df/o_42' size 9303m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_o43 tablespace
*sql
{
drop tablespace ts_o43 including contents;
create tablespace ts_o43
datafile '/tpch_df/o_43' size 9303m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_o44 tablespace
*sql
{
drop tablespace ts_o44 including contents;
create tablespace ts_o44
datafile '/tpch_df/o_44' size 9303m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_o45 tablespace
*sql
{
drop tablespace ts_o45 including contents;
create tablespace ts_o45
datafile '/tpch_df/o_45' size 9303m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_o46 tablespace
*sql
{
drop tablespace ts_o46 including contents;
create tablespace ts_o46
datafile '/tpch_df/o_46' size 9303m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_o47 tablespace
*sql
{
drop tablespace ts_o47 including contents;
create tablespace ts_o47
datafile '/tpch_df/o_47' size 9303m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_o48 tablespace
*sql
{
drop tablespace ts_o48 including contents;
create tablespace ts_o48
datafile '/tpch_df/o_48' size 9303m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_o49 tablespace
*sql
{
drop tablespace ts_o49 including contents;
create tablespace ts_o49
datafile '/tpch_df/o_49' size 9303m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_o50 tablespace
*sql
{
drop tablespace ts_o50 including contents;
create tablespace ts_o50
datafile '/tpch_df/o_50' size 9303m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_o51 tablespace
*sql
{
drop tablespace ts_o51 including contents;
create tablespace ts_o51
datafile '/tpch_df/o_51' size 9303m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_o52 tablespace
```

```
*sql
{
drop tablespace ts_o52 including contents;
create tablespace ts_o52
datafile '/tpch_df/o_52' size 9303m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_o53 tablespace
*sql
{
drop tablespace ts_o53 including contents;
create tablespace ts_o53
datafile '/tpch_df/o_53' size 9303m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_o54 tablespace
*sql
{
drop tablespace ts_o54 including contents;
create tablespace ts_o54
datafile '/tpch_df/o_54' size 9303m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_o55 tablespace
*sql
{
drop tablespace ts_o55 including contents;
create tablespace ts_o55
datafile '/tpch_df/o_55' size 9303m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_o56 tablespace
*sql
{
drop tablespace ts_o56 including contents;
create tablespace ts_o56
datafile '/tpch_df/o_56' size 9303m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_o57 tablespace
*sql
{
drop tablespace ts_o57 including contents;
create tablespace ts_o57
datafile '/tpch_df/o_57' size 9303m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_o58 tablespace
*sql
{
drop tablespace ts_o58 including contents;
create tablespace ts_o58
datafile '/tpch_df/o_58' size 9303m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_o59 tablespace
*sql
{
drop tablespace ts_o59 including contents;
create tablespace ts_o59
datafile '/tpch_df/o_59' size 9303m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_o60 tablespace
*sql
{
drop tablespace ts_o60 including contents;
create tablespace ts_o60
datafile '/tpch_df/o_60' size 9303m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_o61 tablespace
*sql
{
drop tablespace ts_o61 including contents;
create tablespace ts_o61
datafile '/tpch_df/o_61' size 9303m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_o62 tablespace
*sql
{
drop tablespace ts_o62 including contents;
create tablespace ts_o62
datafile '/tpch_df/o_62' size 9303m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_o63 tablespace
*sql
{
drop tablespace ts_o63 including contents;
create tablespace ts_o63
datafile '/tpch_df/o_63' size 9303m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_o64 tablespace
*sql
{
drop tablespace ts_o64 including contents;
create tablespace ts_o64
datafile '/tpch_df/o_64' size 9303m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_o65 tablespace
*sql
{
drop tablespace ts_o65 including contents;
create tablespace ts_o65
datafile '/tpch_df/o_65' size 9303m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_o66 tablespace
*sql
{
drop tablespace ts_o66 including contents;
create tablespace ts_o66
```

```
datafile '/tpch_df/o_66' size 9303m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_o67 tablespace
*sql
{
drop tablespace ts_o67 including contents;
create tablespace ts_o67
datafile '/tpch_df/o_67' size 9303m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_o68 tablespace
*sql
{
drop tablespace ts_o68 including contents;
create tablespace ts_o68
datafile '/tpch_df/o_68' size 9303m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_o69 tablespace
*sql
{
drop tablespace ts_o69 including contents;
create tablespace ts_o69
datafile '/tpch_df/o_69' size 9303m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_o70 tablespace
*sql
{
drop tablespace ts_o70 including contents;
create tablespace ts_o70
datafile '/tpch_df/o_70' size 9303m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_o71 tablespace
*sql
{
drop tablespace ts_o71 including contents;
create tablespace ts_o71
datafile '/tpch_df/o_71' size 9303m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_o72 tablespace
*sql
{
drop tablespace ts_o72 including contents;
create tablespace ts_o72
datafile '/tpch_df/o_72' size 9303m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_o73 tablespace
*sql
{
drop tablespace ts_o73 including contents;
create tablespace ts_o73
datafile '/tpch_df/o_73' size 9303m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_o74 tablespace
*sql
{
drop tablespace ts_o74 including contents;
create tablespace ts_o74
datafile '/tpch_df/o_74' size 9303m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_o75 tablespace
*sql
{
drop tablespace ts_o75 including contents;
create tablespace ts_o75
datafile '/tpch_df/o_75' size 9303m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_o76 tablespace
*sql
{
drop tablespace ts_o76 including contents;
create tablespace ts_o76
datafile '/tpch_df/o_76' size 9303m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_o77 tablespace
*sql
{
drop tablespace ts_o77 including contents;
create tablespace ts_o77
datafile '/tpch_df/o_77' size 9303m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_o78 tablespace
*sql
{
drop tablespace ts_o78 including contents;
create tablespace ts_o78
datafile '/tpch_df/o_78' size 9303m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_o79 tablespace
*sql
{
drop tablespace ts_o79 including contents;
create tablespace ts_o79
datafile '/tpch_df/o_79' size 9303m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_o80 tablespace
*sql
{
drop tablespace ts_o80 including contents;
create tablespace ts_o80
datafile '/tpch_df/o_80' size 9303m reuse
extent management local
autoallocate
;
```

```
}
# creating tpch's ts_o81 tablespace
*sql
{
drop tablespace ts_o81 including contents;
create tablespace ts_o81
datafile '/tpch_df/o_81' size 9303m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_o82 tablespace
*sql
{
drop tablespace ts_o82 including contents;
create tablespace ts_o82
datafile '/tpch_df/o_82' size 9303m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_o83 tablespace
*sql
{
drop tablespace ts_o83 including contents;
create tablespace ts_o83
datafile '/tpch_df/o_83' size 9303m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_o84 tablespace
*sql
{
drop tablespace ts_o84 including contents;
create tablespace ts_o84
datafile '/tpch_df/o_84' size 9303m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l1 tablespace
*sql
{
drop tablespace ts_l1 including contents;
create tablespace ts_l1
datafile '/tpch_df/l_1' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l2 tablespace
*sql
{
drop tablespace ts_l2 including contents;
create tablespace ts_l2
datafile '/tpch_df/l_2' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l3 tablespace
*sql
{
drop tablespace ts_l3 including contents;
create tablespace ts_l3
datafile '/tpch_df/l_3' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l4 tablespace
*sql
{
drop tablespace ts_l4 including contents;
create tablespace ts_l4
datafile '/tpch_df/l_4' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l5 tablespace
*sql
{
drop tablespace ts_l5 including contents;
create tablespace ts_l5
datafile '/tpch_df/l_5' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l6 tablespace
*sql
{
drop tablespace ts_l6 including contents;
create tablespace ts_l6
datafile '/tpch_df/l_6' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l7 tablespace
*sql
{
drop tablespace ts_l7 including contents;
create tablespace ts_l7
datafile '/tpch_df/l_7' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l8 tablespace
*sql
{
drop tablespace ts_l8 including contents;
create tablespace ts_l8
datafile '/tpch_df/l_8' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l9 tablespace
*sql
{
drop tablespace ts_l9 including contents;
create tablespace ts_l9
datafile '/tpch_df/l_9' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l10 tablespace
*sql
{
drop tablespace ts_l10 including contents;
create tablespace ts_l10
datafile '/tpch_df/l_10' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l11 tablespace
*sql
{
```

```
drop tablespace ts_l11 including contents;
create tablespace ts_l11
datafile '/tpch_df/l_11' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l12 tablespace
*sql
{
drop tablespace ts_l12 including contents;
create tablespace ts_l12
datafile '/tpch_df/l_12' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l13 tablespace
*sql
{
drop tablespace ts_l13 including contents;
create tablespace ts_l13
datafile '/tpch_df/l_13' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l14 tablespace
*sql
{
drop tablespace ts_l14 including contents;
create tablespace ts_l14
datafile '/tpch_df/l_14' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l15 tablespace
*sql
{
drop tablespace ts_l15 including contents;
create tablespace ts_l15
datafile '/tpch_df/l_15' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l16 tablespace
*sql
{
drop tablespace ts_l16 including contents;
create tablespace ts_l16
datafile '/tpch_df/l_16' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l17 tablespace
*sql
{
drop tablespace ts_l17 including contents;
create tablespace ts_l17
datafile '/tpch_df/l_17' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l18 tablespace
*sql
{
drop tablespace ts_l18 including contents;
create tablespace ts_l18
datafile '/tpch_df/l_18' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l19 tablespace
*sql
{
drop tablespace ts_l19 including contents;
create tablespace ts_l19
datafile '/tpch_df/l_19' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l20 tablespace
*sql
{
drop tablespace ts_l20 including contents;
create tablespace ts_l20
datafile '/tpch_df/l_20' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l21 tablespace
*sql
{
drop tablespace ts_l21 including contents;
create tablespace ts_l21
datafile '/tpch_df/l_21' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l22 tablespace
*sql
{
drop tablespace ts_l22 including contents;
create tablespace ts_l22
datafile '/tpch_df/l_22' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l23 tablespace
*sql
{
drop tablespace ts_l23 including contents;
create tablespace ts_l23
datafile '/tpch_df/l_23' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l24 tablespace
*sql
{
drop tablespace ts_l24 including contents;
create tablespace ts_l24
datafile '/tpch_df/l_24' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l25 tablespace
*sql
{
drop tablespace ts_l25 including contents;
create tablespace ts_l25
datafile '/tpch_df/l_25' size 21005m reuse
extent management local
```

```
autoallocate
;
}
# creating tpch's ts_l26 tablespace
*sql
{
drop tablespace ts_l26 including contents;
create tablespace ts_l26
datafile '/tpch_df/l_26' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l27 tablespace
*sql
{
drop tablespace ts_l27 including contents;
create tablespace ts_l27
datafile '/tpch_df/l_27' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l28 tablespace
*sql
{
drop tablespace ts_l28 including contents;
create tablespace ts_l28
datafile '/tpch_df/l_28' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l29 tablespace
*sql
{
drop tablespace ts_l29 including contents;
create tablespace ts_l29
datafile '/tpch_df/l_29' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l30 tablespace
*sql
{
drop tablespace ts_l30 including contents;
create tablespace ts_l30
datafile '/tpch_df/l_30' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l31 tablespace
*sql
{
drop tablespace ts_l31 including contents;
create tablespace ts_l31
datafile '/tpch_df/l_31' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l32 tablespace
*sql
{
drop tablespace ts_l32 including contents;
create tablespace ts_l32
datafile '/tpch_df/l_32' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l33 tablespace
*sql
{
drop tablespace ts_l33 including contents;
create tablespace ts_l33
datafile '/tpch_df/l_33' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l34 tablespace
*sql
{
drop tablespace ts_l34 including contents;
create tablespace ts_l34
datafile '/tpch_df/l_34' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l35 tablespace
*sql
{
drop tablespace ts_l35 including contents;
create tablespace ts_l35
datafile '/tpch_df/l_35' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l36 tablespace
*sql
{
drop tablespace ts_l36 including contents;
create tablespace ts_l36
datafile '/tpch_df/l_36' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l37 tablespace
*sql
{
drop tablespace ts_l37 including contents;
create tablespace ts_l37
datafile '/tpch_df/l_37' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l38 tablespace
*sql
{
drop tablespace ts_l38 including contents;
create tablespace ts_l38
datafile '/tpch_df/l_38' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l39 tablespace
*sql
{
drop tablespace ts_l39 including contents;
create tablespace ts_l39
datafile '/tpch_df/l_39' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l40 tablespace
```

```
*sql
{
drop tablespace ts_l40 including contents;
create tablespace ts_l40
datafile '/tpch_df/l_40' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l41 tablespace
*sql
{
drop tablespace ts_l41 including contents;
create tablespace ts_l41
datafile '/tpch_df/l_41' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l42 tablespace
*sql
{
drop tablespace ts_l42 including contents;
create tablespace ts_l42
datafile '/tpch_df/l_42' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l43 tablespace
*sql
{
drop tablespace ts_l43 including contents;
create tablespace ts_l43
datafile '/tpch_df/l_43' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l44 tablespace
*sql
{
drop tablespace ts_l44 including contents;
create tablespace ts_l44
datafile '/tpch_df/l_44' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l45 tablespace
*sql
{
drop tablespace ts_l45 including contents;
create tablespace ts_l45
datafile '/tpch_df/l_45' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l46 tablespace
*sql
{
drop tablespace ts_l46 including contents;
create tablespace ts_l46
datafile '/tpch_df/l_46' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l47 tablespace
*sql
{
drop tablespace ts_l47 including contents;
create tablespace ts_l47
datafile '/tpch_df/l_47' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l48 tablespace
*sql
{
drop tablespace ts_l48 including contents;
create tablespace ts_l48
datafile '/tpch_df/l_48' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l49 tablespace
*sql
{
drop tablespace ts_l49 including contents;
create tablespace ts_l49
datafile '/tpch_df/l_49' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l50 tablespace
*sql
{
drop tablespace ts_l50 including contents;
create tablespace ts_l50
datafile '/tpch_df/l_50' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l51 tablespace
*sql
{
drop tablespace ts_l51 including contents;
create tablespace ts_l51
datafile '/tpch_df/l_51' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l52 tablespace
*sql
{
drop tablespace ts_l52 including contents;
create tablespace ts_l52
datafile '/tpch_df/l_52' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l53 tablespace
*sql
{
drop tablespace ts_l53 including contents;
create tablespace ts_l53
datafile '/tpch_df/l_53' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l54 tablespace
*sql
{
drop tablespace ts_l54 including contents;
create tablespace ts_l54
```

```
datafile '/tpch_df/l_54' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l55 tablespace
*sql
{
drop tablespace ts_l55 including contents;
create tablespace ts_l55
datafile '/tpch_df/l_55' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l56 tablespace
*sql
{
drop tablespace ts_l56 including contents;
create tablespace ts_l56
datafile '/tpch_df/l_56' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l57 tablespace
*sql
{
drop tablespace ts_l57 including contents;
create tablespace ts_l57
datafile '/tpch_df/l_57' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l58 tablespace
*sql
{
drop tablespace ts_l58 including contents;
create tablespace ts_l58
datafile '/tpch_df/l_58' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l59 tablespace
*sql
{
drop tablespace ts_l59 including contents;
create tablespace ts_l59
datafile '/tpch_df/l_59' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l60 tablespace
*sql
{
drop tablespace ts_l60 including contents;
create tablespace ts_l60
datafile '/tpch_df/l_60' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l61 tablespace
*sql
{
drop tablespace ts_l61 including contents;
create tablespace ts_l61
datafile '/tpch_df/l_61' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l62 tablespace
*sql
{
drop tablespace ts_l62 including contents;
create tablespace ts_l62
datafile '/tpch_df/l_62' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l63 tablespace
*sql
{
drop tablespace ts_l63 including contents;
create tablespace ts_l63
datafile '/tpch_df/l_63' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l64 tablespace
*sql
{
drop tablespace ts_l64 including contents;
create tablespace ts_l64
datafile '/tpch_df/l_64' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l65 tablespace
*sql
{
drop tablespace ts_l65 including contents;
create tablespace ts_l65
datafile '/tpch_df/l_65' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l66 tablespace
*sql
{
drop tablespace ts_l66 including contents;
create tablespace ts_l66
datafile '/tpch_df/l_66' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l67 tablespace
*sql
{
drop tablespace ts_l67 including contents;
create tablespace ts_l67
datafile '/tpch_df/l_67' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l68 tablespace
*sql
{
drop tablespace ts_l68 including contents;
create tablespace ts_l68
datafile '/tpch_df/l_68' size 21005m reuse
extent management local
autoallocate
;
```

```
}
# creating tpch's ts_l69 tablespace
*sql
{
drop tablespace ts_l69 including contents;
create tablespace ts_l69
datafile '/tpch_df/l_69' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l70 tablespace
*sql
{
drop tablespace ts_l70 including contents;
create tablespace ts_l70
datafile '/tpch_df/l_70' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l71 tablespace
*sql
{
drop tablespace ts_l71 including contents;
create tablespace ts_l71
datafile '/tpch_df/l_71' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l72 tablespace
*sql
{
drop tablespace ts_l72 including contents;
create tablespace ts_l72
datafile '/tpch_df/l_72' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l73 tablespace
*sql
{
drop tablespace ts_l73 including contents;
create tablespace ts_l73
datafile '/tpch_df/l_73' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l74 tablespace
*sql
{
drop tablespace ts_l74 including contents;
create tablespace ts_l74
datafile '/tpch_df/l_74' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l75 tablespace
*sql
{
drop tablespace ts_l75 including contents;
create tablespace ts_l75
datafile '/tpch_df/l_75' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l76 tablespace
*sql
{
drop tablespace ts_l76 including contents;
create tablespace ts_l76
datafile '/tpch_df/l_76' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l77 tablespace
*sql
{
drop tablespace ts_l77 including contents;
create tablespace ts_l77
datafile '/tpch_df/l_77' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l78 tablespace
*sql
{
drop tablespace ts_l78 including contents;
create tablespace ts_l78
datafile '/tpch_df/l_78' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l79 tablespace
*sql
{
drop tablespace ts_l79 including contents;
create tablespace ts_l79
datafile '/tpch_df/l_79' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l80 tablespace
*sql
{
drop tablespace ts_l80 including contents;
create tablespace ts_l80
datafile '/tpch_df/l_80' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l81 tablespace
*sql
{
drop tablespace ts_l81 including contents;
create tablespace ts_l81
datafile '/tpch_df/l_81' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l82 tablespace
*sql
{
drop tablespace ts_l82 including contents;
create tablespace ts_l82
datafile '/tpch_df/l_82' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l83 tablespace
*sql
{
```

```
drop tablespace ts_l83 including contents;
create tablespace ts_l83
datafile '/tpch_df/l_83' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l84 tablespace
*sql
{
drop tablespace ts_l84 including contents;
create tablespace ts_l84
datafile '/tpch_df/l_84' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l85 tablespace
*sql
{
drop tablespace ts_l85 including contents;
create tablespace ts_l85
datafile '/tpch_df/l_85' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l86 tablespace
*sql
{
drop tablespace ts_l86 including contents;
create tablespace ts_l86
datafile '/tpch_df/l_86' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l87 tablespace
*sql
{
drop tablespace ts_l87 including contents;
create tablespace ts_l87
datafile '/tpch_df/l_87' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l88 tablespace
*sql
{
drop tablespace ts_l88 including contents;
create tablespace ts_l88
datafile '/tpch_df/l_88' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l89 tablespace
*sql
{
drop tablespace ts_l89 including contents;
create tablespace ts_l89
datafile '/tpch_df/l_89' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l90 tablespace
*sql
{
drop tablespace ts_l90 including contents;
create tablespace ts_l90
datafile '/tpch_df/l_90' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l91 tablespace
*sql
{
drop tablespace ts_l91 including contents;
create tablespace ts_l91
datafile '/tpch_df/l_91' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l92 tablespace
*sql
{
drop tablespace ts_l92 including contents;
create tablespace ts_l92
datafile '/tpch_df/l_92' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l93 tablespace
*sql
{
drop tablespace ts_l93 including contents;
create tablespace ts_l93
datafile '/tpch_df/l_93' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l94 tablespace
*sql
{
drop tablespace ts_l94 including contents;
create tablespace ts_l94
datafile '/tpch_df/l_94' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l95 tablespace
*sql
{
drop tablespace ts_l95 including contents;
create tablespace ts_l95
datafile '/tpch_df/l_95' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l96 tablespace
*sql
{
drop tablespace ts_l96 including contents;
create tablespace ts_l96
datafile '/tpch_df/l_96' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l97 tablespace
*sql
{
drop tablespace ts_l97 including contents;
create tablespace ts_l97
datafile '/tpch_df/l_97' size 21005m reuse
extent management local
```

```
autoallocate
;
}
# creating tpch's ts_l98 tablespace
*sql
{
drop tablespace ts_l98 including contents;
create tablespace ts_l98
datafile '/tpch_df/l_98' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l99 tablespace
*sql
{
drop tablespace ts_l99 including contents;
create tablespace ts_l99
datafile '/tpch_df/l_99' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l100 tablespace
*sql
{
drop tablespace ts_l100 including contents;
create tablespace ts_l100
datafile '/tpch_df/l_100' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l101 tablespace
*sql
{
drop tablespace ts_l101 including contents;
create tablespace ts_l101
datafile '/tpch_df/l_101' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l102 tablespace
*sql
{
drop tablespace ts_l102 including contents;
create tablespace ts_l102
datafile '/tpch_df/l_102' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l103 tablespace
*sql
{
drop tablespace ts_l103 including contents;
create tablespace ts_l103
datafile '/tpch_df/l_103' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l104 tablespace
*sql
{
drop tablespace ts_l104 including contents;
create tablespace ts_l104
datafile '/tpch_df/l_104' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l105 tablespace
*sql
{
drop tablespace ts_l105 including contents;
create tablespace ts_l105
datafile '/tpch_df/l_105' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l106 tablespace
*sql
{
drop tablespace ts_l106 including contents;
create tablespace ts_l106
datafile '/tpch_df/l_106' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l107 tablespace
*sql
{
drop tablespace ts_l107 including contents;
create tablespace ts_l107
datafile '/tpch_df/l_107' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l108 tablespace
*sql
{
drop tablespace ts_l108 including contents;
create tablespace ts_l108
datafile '/tpch_df/l_108' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l109 tablespace
*sql
{
drop tablespace ts_l109 including contents;
create tablespace ts_l109
datafile '/tpch_df/l_109' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l110 tablespace
*sql
{
drop tablespace ts_l110 including contents;
create tablespace ts_l110
datafile '/tpch_df/l_110' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l111 tablespace
*sql
{
drop tablespace ts_l111 including contents;
create tablespace ts_l111
datafile '/tpch_df/l_111' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l112 tablespace
```

```
*sql
{
drop tablespace ts_l112 including contents;
create tablespace ts_l112
datafile '/tpch_df/l_112' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l113 tablespace
*sql
{
drop tablespace ts_l113 including contents;
create tablespace ts_l113
datafile '/tpch_df/l_113' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l114 tablespace
*sql
{
drop tablespace ts_l114 including contents;
create tablespace ts_l114
datafile '/tpch_df/l_114' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l115 tablespace
*sql
{
drop tablespace ts_l115 including contents;
create tablespace ts_l115
datafile '/tpch_df/l_115' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l116 tablespace
*sql
{
drop tablespace ts_l116 including contents;
create tablespace ts_l116
datafile '/tpch_df/l_116' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l117 tablespace
*sql
{
drop tablespace ts_l117 including contents;
create tablespace ts_l117
datafile '/tpch_df/l_117' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l118 tablespace
*sql
{
drop tablespace ts_l118 including contents;
create tablespace ts_l118
datafile '/tpch_df/l_118' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l119 tablespace
*sql
{
drop tablespace ts_l119 including contents;
create tablespace ts_l119
datafile '/tpch_df/l_119' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l120 tablespace
*sql
{
drop tablespace ts_l120 including contents;
create tablespace ts_l120
datafile '/tpch_df/l_120' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l121 tablespace
*sql
{
drop tablespace ts_l121 including contents;
create tablespace ts_l121
datafile '/tpch_df/l_121' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l122 tablespace
*sql
{
drop tablespace ts_l122 including contents;
create tablespace ts_l122
datafile '/tpch_df/l_122' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l123 tablespace
*sql
{
drop tablespace ts_l123 including contents;
create tablespace ts_l123
datafile '/tpch_df/l_123' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l124 tablespace
*sql
{
drop tablespace ts_l124 including contents;
create tablespace ts_l124
datafile '/tpch_df/l_124' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l125 tablespace
*sql
{
drop tablespace ts_l125 including contents;
create tablespace ts_l125
datafile '/tpch_df/l_125' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l126 tablespace
*sql
{
drop tablespace ts_l126 including contents;
create tablespace ts_l126
```

```
datafile '/tpch_df/l_126' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l127 tablespace
*sql
{
drop tablespace ts_l127 including contents;
create tablespace ts_l127
datafile '/tpch_df/l_127' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l128 tablespace
*sql
{
drop tablespace ts_l128 including contents;
create tablespace ts_l128
datafile '/tpch_df/l_128' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l129 tablespace
*sql
{
drop tablespace ts_l129 including contents;
create tablespace ts_l129
datafile '/tpch_df/l_129' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l130 tablespace
*sql
{
drop tablespace ts_l130 including contents;
create tablespace ts_l130
datafile '/tpch_df/l_130' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l131 tablespace
*sql
{
drop tablespace ts_l131 including contents;
create tablespace ts_l131
datafile '/tpch_df/l_131' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l132 tablespace
*sql
{
drop tablespace ts_l132 including contents;
create tablespace ts_l132
datafile '/tpch_df/l_132' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l133 tablespace
*sql
{
drop tablespace ts_l133 including contents;
create tablespace ts_l133
datafile '/tpch_df/l_133' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l134 tablespace
*sql
{
drop tablespace ts_l134 including contents;
create tablespace ts_l134
datafile '/tpch_df/l_134' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l135 tablespace
*sql
{
drop tablespace ts_l135 including contents;
create tablespace ts_l135
datafile '/tpch_df/l_135' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l136 tablespace
*sql
{
drop tablespace ts_l136 including contents;
create tablespace ts_l136
datafile '/tpch_df/l_136' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l137 tablespace
*sql
{
drop tablespace ts_l137 including contents;
create tablespace ts_l137
datafile '/tpch_df/l_137' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l138 tablespace
*sql
{
drop tablespace ts_l138 including contents;
create tablespace ts_l138
datafile '/tpch_df/l_138' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l139 tablespace
*sql
{
drop tablespace ts_l139 including contents;
create tablespace ts_l139
datafile '/tpch_df/l_139' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l140 tablespace
*sql
{
drop tablespace ts_l140 including contents;
create tablespace ts_l140
datafile '/tpch_df/l_140' size 21005m reuse
extent management local
autoallocate
;
```

```
}
# creating tpch's ts_l141 tablespace
*sql
{
drop tablespace ts_l141 including contents;
create tablespace ts_l141
datafile '/tpch_df/l_141' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l142 tablespace
*sql
{
drop tablespace ts_l142 including contents;
create tablespace ts_l142
datafile '/tpch_df/l_142' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l143 tablespace
*sql
{
drop tablespace ts_l143 including contents;
create tablespace ts_l143
datafile '/tpch_df/l_143' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l144 tablespace
*sql
{
drop tablespace ts_l144 including contents;
create tablespace ts_l144
datafile '/tpch_df/l_144' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l145 tablespace
*sql
{
drop tablespace ts_l145 including contents;
create tablespace ts_l145
datafile '/tpch_df/l_145' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l146 tablespace
*sql
{
drop tablespace ts_l146 including contents;
create tablespace ts_l146
datafile '/tpch_df/l_146' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l147 tablespace
*sql
{
drop tablespace ts_l147 including contents;
create tablespace ts_l147
datafile '/tpch_df/l_147' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l148 tablespace
*sql
{
drop tablespace ts_l148 including contents;
create tablespace ts_l148
datafile '/tpch_df/l_148' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l149 tablespace
*sql
{
drop tablespace ts_l149 including contents;
create tablespace ts_l149
datafile '/tpch_df/l_149' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l150 tablespace
*sql
{
drop tablespace ts_l150 including contents;
create tablespace ts_l150
datafile '/tpch_df/l_150' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l151 tablespace
*sql
{
drop tablespace ts_l151 including contents;
create tablespace ts_l151
datafile '/tpch_df/l_151' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l152 tablespace
*sql
{
drop tablespace ts_l152 including contents;
create tablespace ts_l152
datafile '/tpch_df/l_152' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l153 tablespace
*sql
{
drop tablespace ts_l153 including contents;
create tablespace ts_l153
datafile '/tpch_df/l_153' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l154 tablespace
*sql
{
drop tablespace ts_l154 including contents;
create tablespace ts_l154
datafile '/tpch_df/l_154' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l155 tablespace
*sql
{
```

```
drop tablespace ts_l155 including contents;
create tablespace ts_l155
datafile '/tpch_df/l_155' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l156 tablespace
*sql
{
drop tablespace ts_l156 including contents;
create tablespace ts_l156
datafile '/tpch_df/l_156' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l157 tablespace
*sql
{
drop tablespace ts_l157 including contents;
create tablespace ts_l157
datafile '/tpch_df/l_157' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l158 tablespace
*sql
{
drop tablespace ts_l158 including contents;
create tablespace ts_l158
datafile '/tpch_df/l_158' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l159 tablespace
*sql
{
drop tablespace ts_l159 including contents;
create tablespace ts_l159
datafile '/tpch_df/l_159' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l160 tablespace
*sql
{
drop tablespace ts_l160 including contents;
create tablespace ts_l160
datafile '/tpch_df/l_160' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l161 tablespace
*sql
{
drop tablespace ts_l161 including contents;
create tablespace ts_l161
datafile '/tpch_df/l_161' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l162 tablespace
*sql
{
drop tablespace ts_l162 including contents;
create tablespace ts_l162
datafile '/tpch_df/l_162' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l163 tablespace
*sql
{
drop tablespace ts_l163 including contents;
create tablespace ts_l163
datafile '/tpch_df/l_163' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l164 tablespace
*sql
{
drop tablespace ts_l164 including contents;
create tablespace ts_l164
datafile '/tpch_df/l_164' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l165 tablespace
*sql
{
drop tablespace ts_l165 including contents;
create tablespace ts_l165
datafile '/tpch_df/l_165' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l166 tablespace
*sql
{
drop tablespace ts_l166 including contents;
create tablespace ts_l166
datafile '/tpch_df/l_166' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l167 tablespace
*sql
{
drop tablespace ts_l167 including contents;
create tablespace ts_l167
datafile '/tpch_df/l_167' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_l168 tablespace
*sql
{
drop tablespace ts_l168 including contents;
create tablespace ts_l168
datafile '/tpch_df/l_168' size 21005m reuse
extent management local
autoallocate
;
}
# creating tpch's ts_okey tablespace
*sql
{
drop tablespace ts_okey including contents;
create tablespace ts_okey
datafile '/tpch_df/okey_1' size 26540m reuse
extent management local
```

```
autoallocate
  nologging
;
}
# creating tpch's ts_lokey tablespace
*sql
{
drop tablespace ts_lokey including contents;
create tablespace ts_lokey
datafile '/tpch_df/lokey_1' size 30900m reuse
extent management local
autoallocate
  nologging
;
}
# creating tpch's ts_ckey tablespace
*sql
{
drop tablespace ts_ckey including contents;
create tablespace ts_ckey
datafile '/tpch_df/ckey_1' size 22510m reuse
extent management local
autoallocate
  nologging
;
}
# creating tpch's ts_temp tablespace
*sql
{
drop tablespace ts_temp including contents;
create temporary tablespace ts_temp
tempfile '/tpch_df/tmp_1' size 29550m reuse
extent management local
uniform size 10m
;
}
*wait
# adding tpch's ts_s datafiles
# adding tpch's ts_c datafiles
*sql
{
alter tablespace ts_c
   add datafile '/tpch_df/c_2' size 24860m reuse;
}
*sql
{
alter tablespace ts_c
   add datafile '/tpch_df/c_3' size 24860m reuse;
}
# adding tpch's ts_undo1 datafiles
*sql
{
alter tablespace ts_undo1
   add datafile '/tpch_df/undo_2' size 30570m reuse;
}
*sql
{
alter tablespace ts_undo1
   add datafile '/tpch_df/undo_3' size 30570m reuse;
}
*sql
{
alter tablespace ts_undo1
   add datafile '/tpch_df/undo_4' size 30570m reuse;
}
*sql
{
alter tablespace ts_undo1
   add datafile '/tpch_df/undo_5' size 30570m reuse;
}
*sql
{
alter tablespace ts_undo1
   add datafile '/tpch_df/undo_6' size 30570m reuse;
}
*sql
{
alter tablespace ts_undo1
   add datafile '/tpch_df/undo_7' size 30570m reuse;
}
*sql
{
alter tablespace ts_undo1
   add datafile '/tpch_df/undo_8' size 30570m reuse;
}
# adding tpch's ts_ps datafiles
*sql
{
alter tablespace ts_ps
   add datafile '/tpch_df/ps_2' size 29010m reuse;
}
*sql
{
alter tablespace ts_ps
   add datafile '/tpch_df/ps_3' size 29010m reuse;
}
*sql
{
alter tablespace ts_ps
   add datafile '/tpch_df/ps_4' size 29010m reuse;
}
*sql
{
alter tablespace ts_ps
   add datafile '/tpch_df/ps_5' size 29010m reuse;
}
*sql
{
alter tablespace ts_ps
   add datafile '/tpch_df/ps_6' size 29010m reuse;
}
*sql
{
alter tablespace ts_ps
   add datafile '/tpch_df/ps_7' size 29010m reuse;
}
*sql
{
alter tablespace ts_ps
   add datafile '/tpch_df/ps_8' size 29010m reuse;
}
*sql
{
alter tablespace ts_ps
   add datafile '/tpch_df/ps_9' size 29010m reuse;
}
*sql
{
alter tablespace ts_ps
   add datafile '/tpch_df/ps_10' size 29010m reuse;
}
*sql
{
alter tablespace ts_ps
   add datafile '/tpch_df/ps_11' size 29010m reuse;
}
*sql
{
alter tablespace ts_ps
   add datafile '/tpch_df/ps_12' size 29010m reuse;
}
*sql
{
alter tablespace ts_ps
```

```
   add datafile '/tpch_df/ps_13' size 29010m reuse;
}
*sql
{
alter tablespace ts_ps
   add datafile '/tpch_df/ps_14' size 29010m reuse;
}
# adding tpch's ts_p datafiles
*sql
{
alter tablespace ts_p
   add datafile '/tpch_df/p_2' size 27795m reuse;
}
*sql
{
alter tablespace ts_p
   add datafile '/tpch_df/p_3' size 27795m reuse;
}
# adding tpch's ts_okey datafiles
*sql
{
alter tablespace ts_okey
   add datafile '/tpch_df/okey_2' size 26540m reuse;
}
*sql
{
alter tablespace ts_okey
   add datafile '/tpch_df/okey_3' size 26540m reuse;
}
*sql
{
alter tablespace ts_okey
   add datafile '/tpch_df/okey_4' size 26540m reuse;
}
*sql
{
alter tablespace ts_okey
   add datafile '/tpch_df/okey_5' size 26540m reuse;
}
*sql
{
alter tablespace ts_okey
   add datafile '/tpch_df/okey_6' size 26540m reuse;
}
# adding tpch's ts_lokey datafiles
*sql
{
alter tablespace ts_lokey
   add datafile '/tpch_df/lokey_2' size 30900m reuse;
}
*sql
{
alter tablespace ts_lokey
   add datafile '/tpch_df/lokey_3' size 30900m reuse;
}
*sql
{
alter tablespace ts_lokey
   add datafile '/tpch_df/lokey_4' size 30900m reuse;
}
*sql
{
alter tablespace ts_lokey
   add datafile '/tpch_df/lokey_5' size 30900m reuse;
}
*sql
{
alter tablespace ts_lokey
   add datafile '/tpch_df/lokey_6' size 30900m reuse;
}
*sql
{
alter tablespace ts_lokey
   add datafile '/tpch_df/lokey_7' size 30900m reuse;
}
*sql
{
alter tablespace ts_lokey
   add datafile '/tpch_df/lokey_8' size 30900m reuse;
}
*sql
{
alter tablespace ts_lokey
   add datafile '/tpch_df/lokey_9' size 30900m reuse;
}
*sql
{
alter tablespace ts_lokey
   add datafile '/tpch_df/lokey_10' size 30900m reuse;
}
*sql
{
alter tablespace ts_lokey
   add datafile '/tpch_df/lokey_11' size 30900m reuse;
}
*sql
{
alter tablespace ts_lokey
   add datafile '/tpch_df/lokey_12' size 30900m reuse;
}
*sql
{
alter tablespace ts_lokey
   add datafile '/tpch_df/lokey_13' size 30900m reuse;
}
*sql
{
alter tablespace ts_lokey
   add datafile '/tpch_df/lokey_14' size 30900m reuse;
}
*sql
{
alter tablespace ts_lokey
   add datafile '/tpch_df/lokey_15' size 30900m reuse;
}
*sql
{
alter tablespace ts_lokey
   add datafile '/tpch_df/lokey_16' size 30900m reuse;
}
# adding tpch's ts_ckey datafiles
*sql
{
alter tablespace ts_ckey
   add datafile '/tpch_df/ckey_2' size 22510m reuse;
}
*sql
{
alter tablespace ts_ckey
   add datafile '/tpch_df/ckey_3' size 22510m reuse;
}
# adding tpch's ts_temp datafiles
*sql
{
alter tablespace ts_temp
   add tempfile '/tpch_df/tmp_2' size 29560m reuse;
}
*sql
{
alter tablespace ts_temp
   add tempfile '/tpch_df/tmp_3' size 29560m reuse;
}
*sql
{
```

```
alter tablespace ts_temp
   add tempfile '/tpch_df/tmp_4' size 29560m reuse;
}
*sql
{
alter tablespace ts_temp
   add tempfile '/tpch_df/tmp_5' size 29560m reuse;
}
*sql
{
alter tablespace ts_temp
   add tempfile '/tpch_df/tmp_6' size 29560m reuse;
}
*sql
{
alter tablespace ts_temp
   add tempfile '/tpch_df/tmp_7' size 29560m reuse;
}
*sql
{
alter tablespace ts_temp
   add tempfile '/tpch_df/tmp_8' size 29560m reuse;
}
*sql
{
alter tablespace ts_temp
   add tempfile '/tpch_df/tmp_9' size 29560m reuse;
}
*sql
{
alter tablespace ts_temp
   add tempfile '/tpch_df/tmp_10' size 29560m reuse;
}
*sql
{
alter tablespace ts_temp
   add tempfile '/tpch_df/tmp_11' size 29560m reuse;
}
*sql
{
alter tablespace ts_temp
   add tempfile '/tpch_df/tmp_12' size 29560m reuse;
}
*sql
{
alter tablespace ts_temp
   add tempfile '/tpch_df/tmp_13' size 29560m reuse;
}
*sql
{
alter tablespace ts_temp
   add tempfile '/tpch_df/tmp_14' size 29560m reuse;
}
*sql
{
alter tablespace ts_temp
   add tempfile '/tpch_df/tmp_15' size 29560m reuse;
}
*sql
{
alter tablespace ts_temp
   add tempfile '/tpch_df/tmp_16' size 29560m reuse;
}
*sql
{
alter tablespace ts_temp
   add tempfile '/tpch_df/tmp_17' size 29560m reuse;
}
*sql
{
alter tablespace ts_temp
   add tempfile '/tpch_df/tmp_18' size 29560m reuse;
}
*sql
{
alter tablespace ts_temp
   add tempfile '/tpch_df/tmp_19' size 29560m reuse;
}
*sql
{
alter tablespace ts_temp
   add tempfile '/tpch_df/tmp_20' size 29560m reuse;
}
*sql
{
alter tablespace ts_temp
   add tempfile '/tpch_df/tmp_21' size 29560m reuse;
}
*sql
{
alter tablespace ts_temp
   add tempfile '/tpch_df/tmp_22' size 29560m reuse;
}
*sql
{
alter tablespace ts_temp
   add tempfile '/tpch_df/tmp_23' size 29560m reuse;
}
*sql
{
alter tablespace ts_temp
   add tempfile '/tpch_df/tmp_24' size 29560m reuse;
}
*sql
{
alter tablespace ts_temp
   add tempfile '/tpch_df/tmp_25' size 29560m reuse;
}
*sql
{
alter tablespace ts_temp
   add tempfile '/tpch_df/tmp_26' size 29560m reuse;
}
*sql
{
alter tablespace ts_temp
   add tempfile '/tpch_df/tmp_27' size 29560m reuse;
}
*sql
{
alter tablespace ts_temp
   add tempfile '/tpch_df/tmp_28' size 29560m reuse;
}
*sql
{
alter tablespace ts_temp
   add tempfile '/tpch_df/tmp_29' size 29560m reuse;
}
*sql
{
alter tablespace ts_temp
   add tempfile '/tpch_df/tmp_30' size 29560m reuse;
}
*sql
{
alter tablespace ts_temp
   add tempfile '/tpch_df/tmp_31' size 29560m reuse;
}
*sql
{
alter tablespace ts_temp
   add tempfile '/tpch_df/tmp_32' size 29560m reuse;
}
*sql
```

```
{
alter tablespace ts_temp
   add tempfile '/tpch_df/tmp_33' size 29560m reuse;
}
*sql
{
alter tablespace ts_temp
   add tempfile '/tpch_df/tmp_34' size 29560m reuse;
}
*sql
{
alter tablespace ts_temp
   add tempfile '/tpch_df/tmp_35' size 29560m reuse;
}
*sql
{
alter tablespace ts_temp
   add tempfile '/tpch_df/tmp_36' size 29560m reuse;
}
*sql
{
alter tablespace ts_temp
   add tempfile '/tpch_df/tmp_37' size 29560m reuse;
}
*sql
{
alter tablespace ts_temp
   add tempfile '/tpch_df/tmp_38' size 29560m reuse;
}
*sql
{
alter tablespace ts_temp
   add tempfile '/tpch_df/tmp_39' size 29560m reuse;
}
*sql
{
alter tablespace ts_temp
   add tempfile '/tpch_df/tmp_40' size 29560m reuse;
}
*sql
{
alter tablespace ts_temp
   add tempfile '/tpch_df/tmp_41' size 29560m reuse;
}
*sql
{
alter tablespace ts_temp
   add tempfile '/tpch_df/tmp_42' size 29560m reuse;
}
*sql
{
alter tablespace ts_temp
   add tempfile '/tpch_df/tmp_43' size 29560m reuse;
}
*sql
{
alter tablespace ts_temp
   add tempfile '/tpch_df/tmp_44' size 29560m reuse;
}
*sql
{
alter tablespace ts_temp
   add tempfile '/tpch_df/tmp_45' size 29560m reuse;
}
*sql
{
alter tablespace ts_temp
   add tempfile '/tpch_df/tmp_46' size 29560m reuse;
}
*sql
{
alter tablespace ts_temp
   add tempfile '/tpch_df/tmp_47' size 29560m reuse;
}
*sql
{
alter tablespace ts_temp
   add tempfile '/tpch_df/tmp_48' size 29560m reuse;
}
*sql
{
alter tablespace ts_temp
   add tempfile '/tpch_df/tmp_49' size 29560m reuse;
}
*sql
{
alter tablespace ts_temp
   add tempfile '/tpch_df/tmp_50' size 29560m reuse;
}
*sql
{
alter tablespace ts_temp
   add tempfile '/tpch_df/tmp_51' size 29560m reuse;
}
*sql
{
alter tablespace ts_temp
   add tempfile '/tpch_df/tmp_52' size 29560m reuse;
}
*sql
{
alter tablespace ts_temp
   add tempfile '/tpch_df/tmp_53' size 29560m reuse;
}
*sql
{
alter tablespace ts_temp
   add tempfile '/tpch_df/tmp_54' size 29560m reuse;
}
*sql
{
alter tablespace ts_temp
   add tempfile '/tpch_df/tmp_55' size 29560m reuse;
}
*sql
{
alter tablespace ts_temp
   add tempfile '/tpch_df/tmp_56' size 29560m reuse;
}
*sql
{
alter tablespace ts_temp
   add tempfile '/tpch_df/tmp_57' size 29560m reuse;
}
*sql
{
alter tablespace ts_temp
   add tempfile '/tpch_df/tmp_58' size 29560m reuse;
}
*sql
{
alter tablespace ts_temp
   add tempfile '/tpch_df/tmp_59' size 29560m reuse;
}
*sql
{
alter tablespace ts_temp
   add tempfile '/tpch_df/tmp_60' size 29560m reuse;
}
*sql
{
alter tablespace ts_temp
   add tempfile '/tpch_df/tmp_61' size 29560m reuse;
}
```

```
*sql
{
alter tablespace ts_temp
   add tempfile '/tpch_df/tmp_62' size 29560m reuse;
}
*sql
{
alter tablespace ts_temp
   add tempfile '/tpch_df/tmp_63' size 29560m reuse;
}
*sql
{
alter tablespace ts_temp
   add tempfile '/tpch_df/tmp_64' size 29560m reuse;
}
*sql
{
alter tablespace ts_temp
   add tempfile '/tpch_df/tmp_65' size 29560m reuse;
}
*sql
{
alter tablespace ts_temp
   add tempfile '/tpch_df/tmp_66' size 29560m reuse;
}
*sql
{
alter tablespace ts_temp
   add tempfile '/tpch_df/tmp_67' size 29560m reuse;
}
*sql
{
alter tablespace ts_temp
   add tempfile '/tpch_df/tmp_68' size 29560m reuse;
}
*wait
*wait
*bgoff
%e-sctso
%b-dapop
*bgon=1
###########################################
###################################
# Schema Creation Phase - User and Tables
#    AND    Database Population Phase
*sql
{
shutdown;
startup pfile =
/export/home/oracle/tpch/admin/init_build.ora
}
*wait
# creating tpch user
*sql
{
drop user tpch cascade;
grant DBA
   to tpch identified by tpch;
}
*wait
*sql
{
connect tpch/tpch;
}
*wait
# altering tpch's temp and default tablespace
*sql
{
alter user tpch temporary tablespace ts_temp;
alter user tpch default tablespace ts_def;
}
*wait
*sql
{
connect tpch/tpch
@?/rdbms/admin/utlxplan.sql;
}
*wait
# External Tables Definition Phase
*sql
{
connect tpch/tpch;
drop directory data_dir;
create directory data_dir as '/flat';
}
*wait
*sql
{
connect tpch/tpch;
drop table lineitem_et;
create table lineitem_et (
      l_orderkey              number ,
      l_partkey               number ,
      l_suppkey               number ,
      l_linenumber            number ,
      l_quantity              number ,
      l_extendedprice         number ,
      l_discount              number ,
      l_tax                   number ,
      l_returnflag            char(1) ,
      l_linestatus            char(1) ,
      l_shipdate              date ,
      l_commitdate            date ,
      l_receiptdate           date ,
      l_shipinstruct          char(25) ,
      l_shipmode              char(10) ,
      l_comment               varchar(44)
)
organization external (
type ORACLE_LOADER
default directory data_dir
access parameters
(
         records delimited by newline
         badfile 'lineitem.bad'
         logfile 'lineitem.log'
         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','lineitem.tbl.17','lineitem.tbl.18',
'lineitem.tbl.19','lineitem.tbl.20','lineitem.tbl.21',
'lineitem.tbl.22','lineitem.tbl.23','lineitem.tbl.24',
'lineitem.tbl.25','lineitem.tbl.26','lineitem.tbl.27',
'lineitem.tbl.28','lineitem.tbl.29','lineitem.tbl.30',
'lineitem.tbl.31','lineitem.tbl.32','lineitem.tbl.33',
'lineitem.tbl.34','lineitem.tbl.35','lineitem.tbl.36',
'lineitem.tbl.37','lineitem.tbl.38','lineitem.tbl.39',
'lineitem.tbl.40','lineitem.tbl.41','lineitem.tbl.42',
'lineitem.tbl.43','lineitem.tbl.44','lineitem.tbl.45',
'lineitem.tbl.46','lineitem.tbl.47','lineitem.tbl.48',
'lineitem.tbl.49','lineitem.tbl.50','lineitem.tbl.51',
'lineitem.tbl.52','lineitem.tbl.53','lineitem.tbl.54',
'lineitem.tbl.55','lineitem.tbl.56','lineitem.tbl.57',
'lineitem.tbl.58','lineitem.tbl.59','lineitem.tbl.60',
'lineitem.tbl.61','lineitem.tbl.62','lineitem.tbl.63',
'lineitem.tbl.64','lineitem.tbl.65','lineitem.tbl.66',
'lineitem.tbl.67','lineitem.tbl.68','lineitem.tbl.69',
```

```
'lineitem.tbl.70','lineitem.tbl.71','lineitem.tbl.72',
'lineitem.tbl.73','lineitem.tbl.74','lineitem.tbl.75',
'lineitem.tbl.76','lineitem.tbl.77','lineitem.tbl.78',
'lineitem.tbl.79','lineitem.tbl.80','lineitem.tbl.81',
'lineitem.tbl.82','lineitem.tbl.83','lineitem.tbl.84'

))reject limit unlimited;
alter table lineitem_et parallel;
}
*sql
{
connect tpch/tpch;
drop table orders_et;
create table orders_et (
      o_orderkey          number ,
      o_custkey           number ,
      o_orderstatus       char(1) ,
      o_totalprice        number ,
      o_orderdate         date ,
      o_orderpriority     char(15) ,
      o_clerk             char(15) ,
      o_shippriority      number ,
      o_comment           varchar(79)
)
organization external (
type ORACLE_LOADER
default directory data_dir
access parameters
(
            records delimited by newline
            badfile 'orders.bad'
            logfile 'orders.log'
            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','orders.tbl.17','orders.tbl.18',
'orders.tbl.19','orders.tbl.20','orders.tbl.21',
'orders.tbl.22','orders.tbl.23','orders.tbl.24',
'orders.tbl.25','orders.tbl.26','orders.tbl.27',
'orders.tbl.28','orders.tbl.29','orders.tbl.30',
'orders.tbl.31','orders.tbl.32','orders.tbl.33',
'orders.tbl.34','orders.tbl.35','orders.tbl.36',
'orders.tbl.37','orders.tbl.38','orders.tbl.39',
'orders.tbl.40','orders.tbl.41','orders.tbl.42',
'orders.tbl.43','orders.tbl.44','orders.tbl.45',
'orders.tbl.46','orders.tbl.47','orders.tbl.48',
'orders.tbl.49','orders.tbl.50','orders.tbl.51',
'orders.tbl.52','orders.tbl.53','orders.tbl.54',
'orders.tbl.55','orders.tbl.56','orders.tbl.57',
'orders.tbl.58','orders.tbl.59','orders.tbl.60',
'orders.tbl.61','orders.tbl.62','orders.tbl.63',
'orders.tbl.64','orders.tbl.65','orders.tbl.66',
'orders.tbl.67','orders.tbl.68','orders.tbl.69',
'orders.tbl.70','orders.tbl.71','orders.tbl.72',
'orders.tbl.73','orders.tbl.74','orders.tbl.75',
'orders.tbl.76','orders.tbl.77','orders.tbl.78',
'orders.tbl.79','orders.tbl.80','orders.tbl.81',
'orders.tbl.82','orders.tbl.83','orders.tbl.84'

))reject limit unlimited;
alter table orders_et parallel;
}
*sql
{
connect tpch/tpch;
drop table part_et;
create table part_et (
      p_partkey           number ,
      p_name              varchar(55) ,
      p_mfgr              char(25) ,
      p_brand             char(10) ,
      p_type              varchar(25) ,
      p_size              number ,
      p_container         char(10) ,
      p_retailprice       number ,
      p_comment           varchar(23)
)
organization external (
type ORACLE_LOADER
default directory data_dir
access parameters
(
            records delimited by newline
            badfile 'part.bad'
            logfile 'part.log'
            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','part.tbl.17','part.tbl.18',
'part.tbl.19','part.tbl.20','part.tbl.21',
'part.tbl.22','part.tbl.23','part.tbl.24',
'part.tbl.25','part.tbl.26','part.tbl.27',
'part.tbl.28','part.tbl.29','part.tbl.30',
'part.tbl.31','part.tbl.32'
))reject limit unlimited;
alter table part_et parallel;
}
*sql
{
connect tpch/tpch;
drop table partsupp_et;
create table partsupp_et (
      ps_partkey          number ,
      ps_suppkey          number ,
      ps_availqty         number ,
      ps_supplycost       number ,
      ps_comment          varchar(199)
)
organization external (
type ORACLE_LOADER
default directory data_dir
access parameters
(
            records delimited by newline
            badfile 'partsupp.bad'
            logfile 'partsupp.log'
            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','partsupp.tbl.17','partsupp.tbl.18',
'partsupp.tbl.19','partsupp.tbl.20','partsupp.tbl.21',
'partsupp.tbl.22','partsupp.tbl.23','partsupp.tbl.24',
'partsupp.tbl.25','partsupp.tbl.26','partsupp.tbl.27',
```

```
'partsupp.tbl.28','partsupp.tbl.29','partsupp.tbl.30',
'partsupp.tbl.31','partsupp.tbl.32'
))reject limit unlimited;
alter table partsupp_et parallel;
}
*sql
{
connect tpch/tpch;
drop table supplier_et;
create table supplier_et (
      s_suppkey                  number ,
      s_name                      char(25) ,
      s_address                  varchar(40) ,
      s_nationkey               number ,
      s_phone                     char(15) ,
      s_acctbal                  number ,
      s_comment                   varchar(101)
)
organization external (
type ORACLE_LOADER
default directory data_dir
access parameters
(
            records delimited by newline
            badfile 'supplier.bad'
            logfile 'supplier.log'
            nodiscardfile
            fields terminated by '|'
            missing field values are null
)
location (
'supplier.tbl'
))reject limit unlimited;
alter table supplier_et parallel;
}
*sql
{
connect tpch/tpch;
drop table customer_et;
create table customer_et (
      c_custkey                  number ,
      c_name                      varchar(25) ,
      c_address                  varchar(40) ,
      c_nationkey               number ,
      c_phone                     char(15) ,
      c_acctbal                  number ,
      c_mktsegment              char(10) ,
      c_comment                   varchar(117)
)
organization external (
type ORACLE_LOADER
default directory data_dir
access parameters
(
            records delimited by newline
            badfile 'customer.bad'
            logfile 'customer.log'
            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'
))reject limit unlimited;
alter table customer_et parallel;
}
*sql
{
connect tpch/tpch;
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
            badfile 'nation.bad'
            logfile 'nation.log'
            nodiscardfile
            fields terminated by '|'
            missing field values are null
)
location (
'nation.tbl'
))reject limit unlimited;
alter table nation_et parallel;
}
*sql
{
connect tpch/tpch;
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
            badfile 'region.bad'
            logfile 'region.log'
            nodiscardfile
            fields terminated by '|'
            missing field values are null
)
location (
'region.tbl'
))reject limit unlimited;
alter table region_et parallel;
}
################################################
#################################
# Schema Creation Phase - User and Tables ONLY
(no datafiles)
*wait
*sql
{
connect tpch/tpch;
}
*wait
*sql
{
connect tpch/tpch
@?/rdbms/admin/utlxplan.sql;
}
*wait
*sql
{
connect tpch/tpch;
set timing on
set echo on
!date
```

```
rem drop table lineitem;
create table lineitem(
      l_shipdate              ,
      l_orderkey               NOT NULL,
      l_discount              NOT NULL,
      l_extendedprice         NOT NULL,
      l_suppkey                NOT NULL,
      l_quantity              NOT NULL,
      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
storage (initial 1500m freelist groups 4 freelists 84)
parallel
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'))
store in (ts_l1,ts_l2)
,
partition item2 values less than
(to_date('1992-02-01','YYYY-MM-DD'))
store in (ts_l3,ts_l4)
,
partition item3 values less than
(to_date('1992-03-01','YYYY-MM-DD'))
store in (ts_l5,ts_l6)
,
partition item4 values less than
(to_date('1992-04-01','YYYY-MM-DD'))
store in (ts_l7,ts_l8)
,
partition item5 values less than
(to_date('1992-05-01','YYYY-MM-DD'))
store in (ts_l9,ts_l10)
,
partition item6 values less than
(to_date('1992-06-01','YYYY-MM-DD'))
store in (ts_l11,ts_l12)
,
partition item7 values less than
(to_date('1992-07-01','YYYY-MM-DD'))
store in (ts_l13,ts_l14)
,
partition item8 values less than
(to_date('1992-08-01','YYYY-MM-DD'))
store in (ts_l15,ts_l16)
,
partition item9 values less than
(to_date('1992-09-01','YYYY-MM-DD'))
store in (ts_l17,ts_l18)
,
partition item10 values less than
(to_date('1992-10-01','YYYY-MM-DD'))
store in (ts_l19,ts_l20)
,
partition item11 values less than
(to_date('1992-11-01','YYYY-MM-DD'))
store in (ts_l21,ts_l22)
,
partition item12 values less than
(to_date('1992-12-01','YYYY-MM-DD'))
store in (ts_l23,ts_l24)
,
partition item13 values less than
(to_date('1993-01-01','YYYY-MM-DD'))
store in (ts_l25,ts_l26)
,
partition item14 values less than
(to_date('1993-02-01','YYYY-MM-DD'))
store in (ts_l27,ts_l28)
,
partition item15 values less than
(to_date('1993-03-01','YYYY-MM-DD'))
store in (ts_l29,ts_l30)
,
partition item16 values less than
(to_date('1993-04-01','YYYY-MM-DD'))
store in (ts_l31,ts_l32)
,
partition item17 values less than
(to_date('1993-05-01','YYYY-MM-DD'))
store in (ts_l33,ts_l34)
,
partition item18 values less than
(to_date('1993-06-01','YYYY-MM-DD'))
store in (ts_l35,ts_l36)
,
partition item19 values less than
(to_date('1993-07-01','YYYY-MM-DD'))
store in (ts_l37,ts_l38)
,
partition item20 values less than
(to_date('1993-08-01','YYYY-MM-DD'))
store in (ts_l39,ts_l40)
,
partition item21 values less than
(to_date('1993-09-01','YYYY-MM-DD'))
store in (ts_l41,ts_l42)
,
partition item22 values less than
(to_date('1993-10-01','YYYY-MM-DD'))
store in (ts_l43,ts_l44)
,
partition item23 values less than
(to_date('1993-11-01','YYYY-MM-DD'))
store in (ts_l45,ts_l46)
,
partition item24 values less than
(to_date('1993-12-01','YYYY-MM-DD'))
store in (ts_l47,ts_l48)
,
partition item25 values less than
(to_date('1994-01-01','YYYY-MM-DD'))
store in (ts_l49,ts_l50)
,
partition item26 values less than
(to_date('1994-02-01','YYYY-MM-DD'))
store in (ts_l51,ts_l52)
,
partition item27 values less than
(to_date('1994-03-01','YYYY-MM-DD'))
store in (ts_l53,ts_l54)
,
partition item28 values less than
(to_date('1994-04-01','YYYY-MM-DD'))
store in (ts_l55,ts_l56)
,
partition item29 values less than
(to_date('1994-05-01','YYYY-MM-DD'))
store in (ts_l57,ts_l58)
```

```
,
partition item30 values less than
(to_date('1994-06-01','YYYY-MM-DD'))
store in (ts_l59,ts_l60)
,
partition item31 values less than
(to_date('1994-07-01','YYYY-MM-DD'))
store in (ts_l61,ts_l62)
,
partition item32 values less than
(to_date('1994-08-01','YYYY-MM-DD'))
store in (ts_l63,ts_l64)
,
partition item33 values less than
(to_date('1994-09-01','YYYY-MM-DD'))
store in (ts_l65,ts_l66)
,
partition item34 values less than
(to_date('1994-10-01','YYYY-MM-DD'))
store in (ts_l67,ts_l68)
,
partition item35 values less than
(to_date('1994-11-01','YYYY-MM-DD'))
store in (ts_l69,ts_l70)
,
partition item36 values less than
(to_date('1994-12-01','YYYY-MM-DD'))
store in (ts_l71,ts_l72)
,
partition item37 values less than
(to_date('1995-01-01','YYYY-MM-DD'))
store in (ts_l73,ts_l74)
,
partition item38 values less than
(to_date('1995-02-01','YYYY-MM-DD'))
store in (ts_l75,ts_l76)
,
partition item39 values less than
(to_date('1995-03-01','YYYY-MM-DD'))
store in (ts_l77,ts_l78)
,
partition item40 values less than
(to_date('1995-04-01','YYYY-MM-DD'))
store in (ts_l79,ts_l80)
,
partition item41 values less than
(to_date('1995-05-01','YYYY-MM-DD'))
store in (ts_l81,ts_l82)
,
partition item42 values less than
(to_date('1995-06-01','YYYY-MM-DD'))
store in (ts_l83,ts_l84)
,
partition item43 values less than
(to_date('1995-07-01','YYYY-MM-DD'))
store in (ts_l85,ts_l86)
,
partition item44 values less than
(to_date('1995-08-01','YYYY-MM-DD'))
store in (ts_l87,ts_l88)
,
partition item45 values less than
(to_date('1995-09-01','YYYY-MM-DD'))
store in (ts_l89,ts_l90)
,
partition item46 values less than
(to_date('1995-10-01','YYYY-MM-DD'))
store in (ts_l91,ts_l92)
,
partition item47 values less than
(to_date('1995-11-01','YYYY-MM-DD'))
store in (ts_l93,ts_l94)
,
partition item48 values less than
(to_date('1995-12-01','YYYY-MM-DD'))
store in (ts_l95,ts_l96)
,
partition item49 values less than
(to_date('1996-01-01','YYYY-MM-DD'))
store in (ts_l97,ts_l98)
,
partition item50 values less than
(to_date('1996-02-01','YYYY-MM-DD'))
store in (ts_l99,ts_l100)
,
partition item51 values less than
(to_date('1996-03-01','YYYY-MM-DD'))
store in (ts_l101,ts_l102)
,
partition item52 values less than
(to_date('1996-04-01','YYYY-MM-DD'))
store in (ts_l103,ts_l104)
,
partition item53 values less than
(to_date('1996-05-01','YYYY-MM-DD'))
store in (ts_l105,ts_l106)
,
partition item54 values less than
(to_date('1996-06-01','YYYY-MM-DD'))
store in (ts_l107,ts_l108)
,
partition item55 values less than
(to_date('1996-07-01','YYYY-MM-DD'))
store in (ts_l109,ts_l110)
,
partition item56 values less than
(to_date('1996-08-01','YYYY-MM-DD'))
store in (ts_l111,ts_l112)
,
partition item57 values less than
(to_date('1996-09-01','YYYY-MM-DD'))
store in (ts_l113,ts_l114)
,
partition item58 values less than
(to_date('1996-10-01','YYYY-MM-DD'))
store in (ts_l115,ts_l116)
,
partition item59 values less than
(to_date('1996-11-01','YYYY-MM-DD'))
store in (ts_l117,ts_l118)
,
partition item60 values less than
(to_date('1996-12-01','YYYY-MM-DD'))
store in (ts_l119,ts_l120)
,
partition item61 values less than
(to_date('1997-01-01','YYYY-MM-DD'))
store in (ts_l121,ts_l122)
,
partition item62 values less than
(to_date('1997-02-01','YYYY-MM-DD'))
store in (ts_l123,ts_l124)
,
partition item63 values less than
(to_date('1997-03-01','YYYY-MM-DD'))
store in (ts_l125,ts_l126)
,
partition item64 values less than
(to_date('1997-04-01','YYYY-MM-DD'))
store in (ts_l127,ts_l128)
,
partition item65 values less than
(to_date('1997-05-01','YYYY-MM-DD'))
store in (ts_l129,ts_l130)
```

```
,
partition item66 values less than
(to_date('1997-06-01','YYYY-MM-DD'))
store in (ts_l131,ts_l132)
,
partition item67 values less than
(to_date('1997-07-01','YYYY-MM-DD'))
store in (ts_l133,ts_l134)
,
partition item68 values less than
(to_date('1997-08-01','YYYY-MM-DD'))
store in (ts_l135,ts_l136)
,
partition item69 values less than
(to_date('1997-09-01','YYYY-MM-DD'))
store in (ts_l137,ts_l138)
,
partition item70 values less than
(to_date('1997-10-01','YYYY-MM-DD'))
store in (ts_l139,ts_l140)
,
partition item71 values less than
(to_date('1997-11-01','YYYY-MM-DD'))
store in (ts_l141,ts_l142)
,
partition item72 values less than
(to_date('1997-12-01','YYYY-MM-DD'))
store in (ts_l143,ts_l144)
,
partition item73 values less than
(to_date('1998-01-01','YYYY-MM-DD'))
store in (ts_l145,ts_l146)
,
partition item74 values less than
(to_date('1998-02-01','YYYY-MM-DD'))
store in (ts_l147,ts_l148)
,
partition item75 values less than
(to_date('1998-03-01','YYYY-MM-DD'))
store in (ts_l149,ts_l150)
,
partition item76 values less than
(to_date('1998-04-01','YYYY-MM-DD'))
store in (ts_l151,ts_l152)
,
partition item77 values less than
(to_date('1998-05-01','YYYY-MM-DD'))
store in (ts_l153,ts_l154)
,
partition item78 values less than
(to_date('1998-06-01','YYYY-MM-DD'))
store in (ts_l155,ts_l156)
,
partition item79 values less than
(to_date('1998-07-01','YYYY-MM-DD'))
store in (ts_l157,ts_l158)
,
partition item80 values less than
(to_date('1998-08-01','YYYY-MM-DD'))
store in (ts_l159,ts_l160)
,
partition item81 values less than
(to_date('1998-09-01','YYYY-MM-DD'))
store in (ts_l161,ts_l162)
,
partition item82 values less than
(to_date('1998-10-01','YYYY-MM-DD'))
store in (ts_l163,ts_l164)
,
partition item83 values less than
(to_date('1998-11-01','YYYY-MM-DD'))
store in (ts_l165,ts_l166)
,
partition item84 values less than (MAXVALUE)
store in (ts_l167,ts_l168)
)
as select
      l_shipdate        ,
      l_orderkey        ,
      l_discount        ,
      l_extendedprice   ,
      l_suppkey         ,
      l_quantity        ,
      l_returnflag      ,
      l_partkey         ,
      l_linestatus      ,
      l_tax             ,
      l_commitdate      ,
      l_receiptdate     ,
      l_shipmode        ,
      l_linenumber      ,
      l_shipinstruct    ,
      l_comment
from lineitem_et;
rem drop table lineitem_et;
}
*wait
*sql
{
connect tpch/tpch;
set timing on
set echo on
!date

rem 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
storage (initial 400m freelist groups 4 freelists 84)
parallel
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_o13
,
partition ord14 values less than
(to_date('1993-02-01','YYYY-MM-DD'))
tablespace ts_o14
,
partition ord15 values less than
(to_date('1993-03-01','YYYY-MM-DD'))
tablespace ts_o15
,
partition ord16 values less than
(to_date('1993-04-01','YYYY-MM-DD'))
tablespace ts_o16
,
partition ord17 values less than
(to_date('1993-05-01','YYYY-MM-DD'))
tablespace ts_o17
,
partition ord18 values less than
(to_date('1993-06-01','YYYY-MM-DD'))
tablespace ts_o18
,
partition ord19 values less than
(to_date('1993-07-01','YYYY-MM-DD'))
tablespace ts_o19
,
partition ord20 values less than
(to_date('1993-08-01','YYYY-MM-DD'))
tablespace ts_o20
,
partition ord21 values less than
(to_date('1993-09-01','YYYY-MM-DD'))
tablespace ts_o21
,
partition ord22 values less than
(to_date('1993-10-01','YYYY-MM-DD'))
tablespace ts_o22
,
partition ord23 values less than
(to_date('1993-11-01','YYYY-MM-DD'))
tablespace ts_o23
,
partition ord24 values less than
(to_date('1993-12-01','YYYY-MM-DD'))
tablespace ts_o24
,
partition ord25 values less than
(to_date('1994-01-01','YYYY-MM-DD'))
tablespace ts_o25
,
partition ord26 values less than
(to_date('1994-02-01','YYYY-MM-DD'))
tablespace ts_o26
,
partition ord27 values less than
(to_date('1994-03-01','YYYY-MM-DD'))
tablespace ts_o27
,
partition ord28 values less than
(to_date('1994-04-01','YYYY-MM-DD'))
tablespace ts_o28
,
partition ord29 values less than
(to_date('1994-05-01','YYYY-MM-DD'))
tablespace ts_o29
,
partition ord30 values less than
(to_date('1994-06-01','YYYY-MM-DD'))
tablespace ts_o30
,
partition ord31 values less than
(to_date('1994-07-01','YYYY-MM-DD'))
tablespace ts_o31
,
partition ord32 values less than
(to_date('1994-08-01','YYYY-MM-DD'))
tablespace ts_o32
,
partition ord33 values less than
(to_date('1994-09-01','YYYY-MM-DD'))
tablespace ts_o33
,
partition ord34 values less than
(to_date('1994-10-01','YYYY-MM-DD'))
tablespace ts_o34
,
partition ord35 values less than
(to_date('1994-11-01','YYYY-MM-DD'))
tablespace ts_o35
,
partition ord36 values less than
(to_date('1994-12-01','YYYY-MM-DD'))
tablespace ts_o36
,
partition ord37 values less than
(to_date('1995-01-01','YYYY-MM-DD'))
tablespace ts_o37
,
partition ord38 values less than
(to_date('1995-02-01','YYYY-MM-DD'))
tablespace ts_o38
,
partition ord39 values less than
(to_date('1995-03-01','YYYY-MM-DD'))
tablespace ts_o39
,
partition ord40 values less than
(to_date('1995-04-01','YYYY-MM-DD'))
tablespace ts_o40
,
partition ord41 values less than
(to_date('1995-05-01','YYYY-MM-DD'))
```

```
tablespace ts_o41
,
partition ord42 values less than
(to_date('1995-06-01','YYYY-MM-DD'))
tablespace ts_o42
,
partition ord43 values less than
(to_date('1995-07-01','YYYY-MM-DD'))
tablespace ts_o43
,
partition ord44 values less than
(to_date('1995-08-01','YYYY-MM-DD'))
tablespace ts_o44
,
partition ord45 values less than
(to_date('1995-09-01','YYYY-MM-DD'))
tablespace ts_o45
,
partition ord46 values less than
(to_date('1995-10-01','YYYY-MM-DD'))
tablespace ts_o46
,
partition ord47 values less than
(to_date('1995-11-01','YYYY-MM-DD'))
tablespace ts_o47
,
partition ord48 values less than
(to_date('1995-12-01','YYYY-MM-DD'))
tablespace ts_o48
,
partition ord49 values less than
(to_date('1996-01-01','YYYY-MM-DD'))
tablespace ts_o49
,
partition ord50 values less than
(to_date('1996-02-01','YYYY-MM-DD'))
tablespace ts_o50
,
partition ord51 values less than
(to_date('1996-03-01','YYYY-MM-DD'))
tablespace ts_o51
,
partition ord52 values less than
(to_date('1996-04-01','YYYY-MM-DD'))
tablespace ts_o52
,
partition ord53 values less than
(to_date('1996-05-01','YYYY-MM-DD'))
tablespace ts_o53
,
partition ord54 values less than
(to_date('1996-06-01','YYYY-MM-DD'))
tablespace ts_o54
,
partition ord55 values less than
(to_date('1996-07-01','YYYY-MM-DD'))
tablespace ts_o55
,
partition ord56 values less than
(to_date('1996-08-01','YYYY-MM-DD'))
tablespace ts_o56
,
partition ord57 values less than
(to_date('1996-09-01','YYYY-MM-DD'))
tablespace ts_o57
,
partition ord58 values less than
(to_date('1996-10-01','YYYY-MM-DD'))
tablespace ts_o58
,
partition ord59 values less than
(to_date('1996-11-01','YYYY-MM-DD'))
tablespace ts_o59
,
partition ord60 values less than
(to_date('1996-12-01','YYYY-MM-DD'))
tablespace ts_o60
,
partition ord61 values less than
(to_date('1997-01-01','YYYY-MM-DD'))
tablespace ts_o61
,
partition ord62 values less than
(to_date('1997-02-01','YYYY-MM-DD'))
tablespace ts_o62
,
partition ord63 values less than
(to_date('1997-03-01','YYYY-MM-DD'))
tablespace ts_o63
,
partition ord64 values less than
(to_date('1997-04-01','YYYY-MM-DD'))
tablespace ts_o64
,
partition ord65 values less than
(to_date('1997-05-01','YYYY-MM-DD'))
tablespace ts_o65
,
partition ord66 values less than
(to_date('1997-06-01','YYYY-MM-DD'))
tablespace ts_o66
,
partition ord67 values less than
(to_date('1997-07-01','YYYY-MM-DD'))
tablespace ts_o67
,
partition ord68 values less than
(to_date('1997-08-01','YYYY-MM-DD'))
tablespace ts_o68
,
partition ord69 values less than
(to_date('1997-09-01','YYYY-MM-DD'))
tablespace ts_o69
,
partition ord70 values less than
(to_date('1997-10-01','YYYY-MM-DD'))
tablespace ts_o70
,
partition ord71 values less than
(to_date('1997-11-01','YYYY-MM-DD'))
tablespace ts_o71
,
partition ord72 values less than
(to_date('1997-12-01','YYYY-MM-DD'))
tablespace ts_o72
,
partition ord73 values less than
(to_date('1998-01-01','YYYY-MM-DD'))
tablespace ts_o73
,
partition ord74 values less than
(to_date('1998-02-01','YYYY-MM-DD'))
tablespace ts_o74
,
partition ord75 values less than
(to_date('1998-03-01','YYYY-MM-DD'))
tablespace ts_o75
,
partition ord76 values less than
(to_date('1998-04-01','YYYY-MM-DD'))
tablespace ts_o76
,
partition ord77 values less than
(to_date('1998-05-01','YYYY-MM-DD'))
```

```
tablespace ts_o77
,
partition ord78 values less than
(to_date('1998-06-01','YYYY-MM-DD'))
tablespace ts_o78
,
partition ord79 values less than
(to_date('1998-07-01','YYYY-MM-DD'))
tablespace ts_o79
,
partition ord80 values less than
(to_date('1998-08-01','YYYY-MM-DD'))
tablespace ts_o80
,
partition ord81 values less than
(to_date('1998-09-01','YYYY-MM-DD'))
tablespace ts_o81
,
partition ord82 values less than
(to_date('1998-10-01','YYYY-MM-DD'))
tablespace ts_o82
,
partition ord83 values less than
(to_date('1998-11-01','YYYY-MM-DD'))
tablespace ts_o83
,
partition ord84 values less than (MAXVALUE)
tablespace ts_o84
)
as select
      o_orderdate          ,
      o_orderkey           ,
      o_custkey            ,
      o_orderpriority      ,
      o_shippriority       ,
      o_clerk              ,
      o_orderstatus        ,
      o_totalprice         ,
      o_comment
from orders_et;
rem drop table orders_et;
}
*wait
*sql
{
connect tpch/tpch;
set timing on
set echo on
!date

rem drop table partsupp;
create table partsupp(
      ps_partkey           NOT NULL,
      ps_suppkey           NOT NULL,
      ps_supplycost        NOT NULL,
      ps_availqty          ,
      ps_comment           ,
      constraint pk_partkey_suppkey_1 primary
key(ps_partkey,ps_suppkey)
)
organization index
pctthreshold 50
tablespace ts_ps
compress
storage (initial 1500m)
parallel
nologging
partition by hash (ps_partkey)
partitions 128
as select
      ps_partkey           ,
      ps_suppkey           ,
      ps_supplycost        ,
      ps_availqty          ,
      ps_comment
from partsupp_et;
rem drop table partsupp_et;
}
*wait
*sql
{
connect tpch/tpch;
set timing on
set echo on
!date

rem 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 0
pctused 99
tablespace ts_p
parallel
storage (initial 200m freelists 84)
nologging
partition by hash (p_partkey)
partitions 128
as select
      p_partkey            ,
      p_type               ,
      p_size               ,
      p_brand              ,
      p_name               ,
      p_container          ,
      p_mfgr               ,
      p_retailprice        ,
      p_comment
from part_et;
rem drop table part_et;
}
*wait
*sql
{
connect tpch/tpch;
set timing on
set echo on
!date

rem 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 0
pctused 99
tablespace ts_c
parallel
storage (initial 200m freelists 84)
nologging
```

```
partition by hash (c_custkey)
partitions 128
as select
        c_custkey                ,
        c_mktsegment             ,
        c_nationkey              ,
        c_name                   ,
        c_address                ,
        c_phone                  ,
        c_acctbal                ,
        c_comment
from customer_et;
rem drop table customer_et;
}
*wait
*sql
{
connect tpch/tpch;
set timing on
set echo on
!date

rem drop table supplier;
create table supplier(
        s_suppkey                NOT NULL,
        s_nationkey              ,
        s_comment                ,
        s_name                   ,
        s_address                ,
        s_phone                  ,
        s_acctbal
)
pctfree 0
pctused 99
tablespace ts_s
parallel
storage (initial 40m freelists 84)
nologging
partition by hash (s_suppkey)
partitions 128
as select
        s_suppkey                ,
        s_nationkey              ,
        s_comment                ,
        s_name                   ,
        s_address                ,
        s_phone                  ,
        s_acctbal
from supplier_et;
rem drop table supplier_et;
}
*wait
*sql
{
connect tpch/tpch;
set timing on
set echo on
!date

rem drop table nation;
create table nation(
        n_nationkey              NOT NULL,
        n_name                   NOT NULL,
        n_regionkey              NOT NULL,
        n_comment                NOT NULL
)
tablespace ts_def
as select * from nation_et;
rem drop table nation_et;
}
*wait
*sql
{
connect tpch/tpch;
set timing on
set echo on
!date

rem drop table region;
create table region(
        r_regionkey              NOT NULL,
        r_name                   NOT NULL,
        r_comment                NOT NULL
)
tablespace ts_def
as select * from region_et;
rem drop table region_et;
}
*wait
*sql
{
connect tpch/tpch;

drop table lineitem_et;
drop table orders_et;
drop table part_et;
drop table partsupp_et;
drop table supplier_et;
drop table customer_et;
drop table nation_et;
drop table region_et;
}
*wait
*wait
*bgoff
%e-dapop
%b-ixcre
*bgon=1
###########################################
###################################
# Index Creation Phase
*sql
{
connect tpch/tpch;


drop index l_orderkey;
create index l_orderkey
on lineitem (l_orderkey)
pctfree 2
initrans 10
compute statistics
tablespace ts_lokey
storage (freelist groups 4 freelists 84)
parallel
;
}
*sql
{
connect tpch/tpch;

drop index o_orderkey;
create unique index o_orderkey
on orders (o_orderkey)
pctfree 2
initrans 10
compute statistics
tablespace ts_okey
storage (freelist groups 4 freelists 84)
parallel
;
}
*sql
{
```

```
connect tpch/tpch;


drop index c_custkey;
create unique index c_custkey
on customer (c_custkey)
pctfree 2
initrans 10
compute statistics
tablespace ts_ckey
storage (freelists 84)
parallel
;
}
*wait
*sql
{
connect tpch/tpch;

alter index l_orderkey allocate extent (size 10000m
instance 1);
alter index l_orderkey allocate extent (size 10000m
instance 1);
alter index l_orderkey allocate extent (size 10000m
instance 1);
alter index o_orderkey allocate extent (size 10000m
instance 1);
alter index o_orderkey allocate extent (size 10000m
instance 1);
}
*wait
*bgoff
%e-ixcre
%b-anlyz
*bgon=1
########################################
##################################
# Analyze Phase
*sql
{
connect tpch/tpch;


execute dbms_stats.gather_schema_stats('tpch' ,
estimate_percent => 1, degree => 128 , granularity =>
'GLOBAL');
}
*wait
*wait
*bgoff
%e-anlyz
```

==========

a_query.sql

==========

```
set serverout on;

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

select SUM(trunc(trunc(l_extendedprice *
(1-l_discount),2) * (1+l_tax),2)) AS RESULT
from lineitem
where l_orderkey = &&1;

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

exit;
```

==========

a_query2.sql

==========

```
set serverout on;

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

select *
from partsupp
where ps_partkey = &&1
and ps_suppkey = &&2;

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

exit;
```

==========

atom.sh

==========

```
#!/bin/ksh

. $KIT_DIR/env_mg

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`..."
```

```
=======================================
atranspl.c
=======================================
/* Copyright (c) 2001, 2002, 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)

*/

#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_DEFAU
LT)) != 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(l
name),OCI_ATTR_USERNAME,
          errhp);

OCIaset(tpcusr,OCI_HTYPE_SESSION,passwd,strlen
(passwd),OCI_ATTR_PASSWORD,
          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_ke
y),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),S
IZ(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),SI
Z(delta),SQLT_INT);

OCIbbname(curr,l_pkey_bp,errhp,":l_pkey",ADR(l_pke
y),SIZ(l_pkey),SQLT_INT);

OCIbbname(curr,l_skey_bp,errhp,":l_skey",ADR(l_ske
y),SIZ(l_skey),SQLT_INT);

OCIbbname(curr,l_quan_bp,errhp,":l_quan",ADR(l_qu
an),SIZ(l_quan),SQLT_INT);

OCIbbname(curr,l_newquan_bp,errhp,":l_newquan",A
DR(l_newquan),
                SIZ(l_newquan),SQLT_INT);

OCIbbname(curr,l_tax_bp,errhp,":l_tax",ADR(l_tax),SI
Z(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_e
price),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_newepri
ce",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_k
ey),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_newtpri
ce",ADR(o_newtprice),
                SIZ(o_newtprice),SQLT_FLT);

OCIbbname(cure2,o_key2_bp,errhp,":o_key",ADR(o_k
ey),SIZ(o_key),SQLT_INT);

}
```

==========

atranspl.h

==========

```
/* Copyright (c) 2001, 2002, Oracle Corporation.    All
rights reserved.    */

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

    DESCRIPTION

    MODIFIED     (MM/DD/YY)

*/
#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 84)"
#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

. $KIT_DIR/env_mg

sqlplus -s /NOLOG<< !

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

==========

cnt_hist.sql

==========

```
set verify off
set termout on
set echo on

select count(*)      from HISTORY;

select to_char(sysdate,'YYYY-MM-DD HH:MI:SS')
CURRENT_DATE from          dual;

exit;
```

==========

consist.sh

==========

```
#!/bin/ksh

. $KIT_DIR/env_mg

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=${NUM_STREAMS}
STREAM=8
let STREAM="$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

==========

```
set verify off

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
```

==========

cnt_commits.sh

==========

```
if [ $# -lt 1 ]
then
echo 'USAGE:' $0 '<number of streams> '
```

```
exit
fi

. $KIT_DIR/env_mg

NS=$1
H=`expr $NS - 1`
i=0
sum=0
while [ $i -lt $NS ]
do
file=$ACID_OUT/dura$i
h=`fgrep -c Completed $file`
sum=`expr $sum + $h`
i=`expr $i + 1`
done

echo ' sum of completed TAs of success-files
($ACID_OUT/dura[0..'$H']): ' $sum
```

==========

d_hist.sql

==========

```
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

. $KIT_DIR/env_mg

OH=$ORACLE_HOME
OUT_DIR=$ACID_OUT/
DURA_DIR=$ACID_OUT/dura
RUN_ID_FILE=$ACID_DIR/run_id

ITER=10000
STEM=9
PROG=${ACID_DIR}/atranspl.ott
IN=${ACID_DIR}/acid_in
DURA=${ACID_OUT}/dura
OUT=${ACID_OUT}/drate
DSMPL=${DURA_DIR}/durasmpl
KEY=${DURA_DIR}/key${1}_
USER=tpch/tpch
TRIG=1
HCNT=duracnta

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

i=0
while [ $i -lt $STEM ]
do
    for j in `head -10 ${KEY}${i} | awk '{printf "%d ",$1}'`
    do
        sqlplus $USER @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
echo "counts of entries in
successfile(dura"$i" )":>>$ACID_OUT/drate$i
fgrep -c Completed $ACID_OUT/dura$i >>
$ACID_OUT/drate$i
i=`expr $i + 1`
done
```

==========

gettime.c

==========

```
#ifdef RCSID
static char *RCSid =
#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)

*/

/*
**   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 */
#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;

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

}
double getcpu ()

{

#ifdef CPU_W_TIMES
    struct tms buf;

    (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
#       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.

. $KIT_DIR/env_mg

RSH=ksh

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; HOST="$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
```

```
randkey 1 0.1 u"$USER" > $KEYFILE

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


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


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


sleep 10


echo "Running ACID query 10 seconds AFTER the
start of ACID Transaction" \
>> $TXN2FILE
echo "`date`" >> $TXN2FILE
if [ "$HOST" != "" ]
then
echo "Starting ACID query on node $HOST" >>
$TXN2FILE
${RSH} -n ${HOST}    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

. $KIT_DIR/env_mg

RSH=ksh

OH=$ORACLE_HOME
OUT_DIR=$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; HOST="$1";;
    -h) usage; exit 0;;
    --) break;;
    esac
    shift;
done


randkey 1 0.1 u"$USER" > $KEYFILE

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

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

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

sleep 10

echo "Running ACID query 10 seconds AFTER the
start of ACID transaction" \
>> $TXN2FILE
echo "`date`" >> $TXN2FILE
if [ "$HOST" != "" ]
then
echo "Starting ACID query on node $HOST" >>
$TXN2FILE
${RSH} -n ${HOST}    sqlplus $USER
@$ACID_DIR/isolarion/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
#       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.

. $KIT_DIR/env_mg

RSH=ksh

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; HOST="$1";;
    -h) usage; exit 0;;
    --) break;;
    esac
    shift
done


randkey 1 0.1 u"$USER" > $KEYFILE

sleep 1

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

sleep 10


if [ "$HOST" != "" ]
then
echo "Starting TXN2 on node $HOST" >> $TXN2FILE
${RSH} -n ${HOST} $PROG 2 2 1 1 i$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

. $KIT_DIR/env_mg

RSH=ksh

OH=$ORACLE_HOME
OUT_DIR=$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; HOST="$1";;
    -h) usage; exit 0;;
    --) break;;
```

```
    esac
    shift
done

randkey 1 0.1 u"$USER" > $KEYFILE

sleep 1

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

sleep 10


if [ "$HOST" != "" ]
then
echo "Starting TXN2 on node $HOST" >> $TXN2FILE
${RSH} -n ${HOST} $PROG 2 2 1 1 i$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

. $KIT_DIR/env_mg

RSH=ksh

OH=$ORACLE_HOME
OUT_DIR=$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; HOST="$1";;
    -h) usage; exit 0;;
    --) break;;
    esac
    shift;
done


randkey 1 0.1 u"$USER" > $KEYFILE

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


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

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

sleep 5

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 [ "$HOST" != "" ]
then
echo "Starting PARTSUPP query on node $HOST" >>
$TXN2FILE
${RSH} -n ${HOST} 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
```

```
. $KIT_DIR/env_mg

RSH=ksh

QUERY_DIR=$KIT_DIR/queries_used
OH=/private/tpcd
OUT_DIR=$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; HOST="$1";;
    -h) usage; exit 0;;
    --) break;;
    esac
    shift;
done


randkey 1 0.1 u"$USER" > $KEYFILE

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


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


#echo "Running Query 17b at `date`" >> $TXN1FILE
#sqlplus $USER @a_q17b >> $TXN1FILE &
echo "Running Query 17b at `date`" >> $TXN1FILE
sqlplus $USER @$ACID_DIR/isolation/a_q17 >>
$TXN1FILE &

sleep 2

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

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

sleep 2

#echo "Running 2nd Query 17b at `date`" >>
$TXN3FILE
#sqlplus $USER @a_q17b >> $TXN3FILE &
echo "Running 2nd Query 17b at `date`" >>
$TXN3FILE
sqlplus $USER @$ACID_DIR/isolation/a_q17 >>
$TXN3FILE &

wait

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

cat $TXN1FILE $TXN2FILE $TXN3FILE >> $ISOFILE

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

==========

randkey.c

==========

```
/* Copyright (c) 2001, 2002, Oracle Corporation.    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(l
name),OCI_ATTR_USERNAME,
            errhp);

OCIaset(tpcusr,OCI_HTYPE_SESSION,passwd,strlen
(passwd),OCI_ATTR_PASSWORD,
            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),S
IZ(l_key),SQLT_INT);
```

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

==========

randpsup.c

==========

```
/* Copyright (c) 2001, 2002, Oracle Corporation.    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

MODIFIED

*/

#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");
}
```

==========

sample.sh

==========

```
#!/bin/ksh

. $KIT_DIR/env_mg

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 tpch/tpch @sample $j
i=`expr $i + 1`
done

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

==========

sample.sql

==========

```
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;
```

==========

atrans.sql

==========

```
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;
```

==========

run_acid.sh

==========

```
#!/bin/ksh

. $KIT_DIR/env_mg

OH=$ORACLE_HOME
ACID_DIR=$ACID_DIR
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 tpcd/tpcd"
    echo "-t trigger    : trigger time between process
starts, default is 1 second"
    echo "-h                : print this usage summary"
    exit 1;
}

ITER=10000
STEM=9
SF=1
PROG=atranspl
IN=${ACID_DIR}/acid_in
DURA_DIR=$ACID_OUT/dura
OUT=$ACID_OUT/drate
DURA=$ACID_OUT/dura
KEY=${DURA_DIR}/key$$_
USER=tpch/tpch
TRIG=1
HCNT=duracntb

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

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`


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

while [ $i -lt $STEM ]
do
    randkey 1000 ${SF} u${USER} > ${KEY}${i} &
    i=`expr $i + 1`
done
sync;

wait

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

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"
```

==========

Disk Configuration Details

==========

The following is the output of vxprint -th
for a datafile volume as a sample (see chapter 5.2).

```
Disk group: dgrp1

V  NAME         RVG          KSTATE
STATE    LENGTH    READPOL    PREFPLEX
UTYPE
PL NAME         VOLUME       KSTATE
STATE    LENGTH    LAYOUT     NCOL/WID
MODE
SD NAME         PLEX         DISK
DISKOFFS LENGTH    [COL/]OFF DEVICE    MODE
SV NAME         PLEX         VOLNAME
NVOLLAYR LENGTH    [COL/]OFF AM/NM
MODE
DC NAME         PARENTVOL    LOGVOL
SP NAME         SNAPVOL      DCO

v  volline1-00  -            ENABLED  ACTIVE
44040192 ROUND      -          gen
pl line1-00     volline1-00  ENABLED  ACTIVE
44040192 STRIPE     336/2048 RW
sd c117t0d0-02  line1-00     c117t0d0 379776
131072   0/0        c117t0d0 ENA
sd c122t0d0-02  line1-00     c122t0d0 379776
131072   1/0        c122t0d0 ENA
sd c129t0d0-02  line1-00     c129t0d0 379776
131072   2/0        c129t0d0 ENA
sd c130t0d0-02  line1-00     c130t0d0 379776
131072   3/0        c130t0d0 ENA
sd c116t0d0-02  line1-00     c116t0d0 379776
131072   4/0        c116t0d0 ENA
sd c143t0d0-02  line1-00     c143t0d0 379776
131072   5/0        c143t0d0 ENA
sd c144t0d0-02  line1-00     c144t0d0 379776
131072   6/0        c144t0d0 ENA
sd c150t0d0-02  line1-00     c150t0d0 379776
131072   7/0        c150t0d0 ENA
sd c159t0d0-02  line1-00     c159t0d0 379776
131072   8/0        c159t0d0 ENA
sd c160t0d0-02  line1-00     c160t0d0 379776
131072   9/0        c160t0d0 ENA
sd c166t0d0-02  line1-00     c166t0d0 379776
131072   10/0       c166t0d0 ENA
sd c175t0d0-02  line1-00     c175t0d0 379776
131072   11/0       c175t0d0 ENA
sd c120t0d0-02  line1-00     c120t0d0 379776
131072   12/0       c120t0d0 ENA
```

```
sd c125t0d6-02  line1-00        c125t0d6 379776
131072    13/0        c125t0d6 ENA
sd c132t0d0-02  line1-00        c132t0d0 379776
131072    14/0        c132t0d0 ENA
sd c133t0d0-02  line1-00        c133t0d0 379776
131072    15/0        c133t0d0 ENA
sd c138t0d0-02  line1-00        c138t0d0 379776
131072    16/0        c138t0d0 ENA
sd c147t0d0-02  line1-00        c147t0d0 379776
131072    17/0        c147t0d0 ENA
sd c148t0d0-02  line1-00        c148t0d0 379776
131072    18/0        c148t0d0 ENA
sd c154t0d0-02  line1-00        c154t0d0 379776
131072    19/0        c154t0d0 ENA
sd c163t0d0-02  line1-00        c163t0d0 379776
131072    20/0        c163t0d0 ENA
sd c164t0d0-02  line1-00        c164t0d0 379776
131072    21/0        c164t0d0 ENA
sd c170t0d0-02  line1-00        c170t0d0 379776
131072    22/0        c170t0d0 ENA
sd c112t0d0-02  line1-00        c112t0d0 379776
131072    23/0        c112t0d0 ENA
sd c123t0d0-02  line1-00        c123t0d0 379776
131072    24/0        c123t0d0 ENA
sd c128t0d0-02  line1-00        c128t0d0 379776
131072    25/0        c128t0d0 ENA
sd c135t0d0-02  line1-00        c135t0d0 379776
131072    26/0        c135t0d0 ENA
sd c136t0d0-02  line1-00        c136t0d0 379776
131072    27/0        c136t0d0 ENA
sd c142t0d0-02  line1-00        c142t0d0 379776
131072    28/0        c142t0d0 ENA
sd c151t0d0-02  line1-00        c151t0d0 379776
131072    29/0        c151t0d0 ENA
sd c152t0d0-02  line1-00        c152t0d0 379776
131072    30/0        c152t0d0 ENA
sd c158t0d0-02  line1-00        c158t0d0 379776
131072    31/0        c158t0d0 ENA
sd c167t0d0-02  line1-00        c167t0d0 379776
131072    32/0        c167t0d0 ENA
sd c168t0d0-02  line1-00        c168t0d0 379776
131072    33/0        c168t0d0 ENA
sd c174t0d0-02  line1-00        c174t0d0 379776
131072    34/0        c174t0d0 ENA
sd c113t0d0-02  line1-00        c113t0d0 379776
131072    35/0        c113t0d0 ENA
sd c114t0d0-02  line1-00        c114t0d0 379776
131072    36/0        c114t0d0 ENA
sd c115t0d0-02  line1-00        c115t0d0 379776
131072    37/0        c115t0d0 ENA
sd c139t0d0-02  line1-00        c139t0d0 379776
131072    38/0        c139t0d0 ENA
sd c140t0d0-02  line1-00        c140t0d0 379776
131072    39/0        c140t0d0 ENA
sd c146t0d0-02  line1-00        c146t0d0 379776
131072    40/0        c146t0d0 ENA
sd c155t0d0-02  line1-00        c155t0d0 379776
131072    41/0        c155t0d0 ENA
sd c156t0d0-02  line1-00        c156t0d0 379776
131072    42/0        c156t0d0 ENA
sd c162t0d0-02  line1-00        c162t0d0 379776
131072    43/0        c162t0d0 ENA
sd c171t0d0-02  line1-00        c171t0d0 379776
131072    44/0        c171t0d0 ENA
sd c172t0d0-02  line1-00        c172t0d0 379776
131072    45/0        c172t0d0 ENA
sd c119t0d0-02  line1-00        c119t0d0 379776
131072    46/0        c119t0d0 ENA
sd c126t0d0-02  line1-00        c126t0d0 379776
131072    47/0        c126t0d0 ENA
sd c117t0d1-02  line1-00        c117t0d1 379776
131072    48/0        c117t0d1 ENA
sd c122t0d1-02  line1-00        c122t0d1 379776
131072    49/0        c122t0d1 ENA
sd c129t0d1-02  line1-00        c129t0d1 379776
131072    50/0        c129t0d1 ENA
sd c130t0d1-02  line1-00        c130t0d1 379776
131072    51/0        c130t0d1 ENA
sd c116t0d1-02  line1-00        c116t0d1 379776
131072    52/0        c116t0d1 ENA
sd c143t0d1-02  line1-00        c143t0d1 379776
131072    53/0        c143t0d1 ENA
sd c144t0d1-02  line1-00        c144t0d1 379776
131072    54/0        c144t0d1 ENA
sd c150t0d1-02  line1-00        c150t0d1 379776
131072    55/0        c150t0d1 ENA
sd c159t0d1-02  line1-00        c159t0d1 379776
131072    56/0        c159t0d1 ENA
sd c160t0d1-02  line1-00        c160t0d1 379776
131072    57/0        c160t0d1 ENA
sd c166t0d1-02  line1-00        c166t0d1 379776
131072    58/0        c166t0d1 ENA
sd c175t0d1-02  line1-00        c175t0d1 379776
131072    59/0        c175t0d1 ENA
sd c120t0d1-02  line1-00        c120t0d1 379776
131072    60/0        c120t0d1 ENA
sd c125t0d1-02  line1-00        c125t0d1 379776
131072    61/0        c125t0d1 ENA
sd c132t0d1-02  line1-00        c132t0d1 379776
131072    62/0        c132t0d1 ENA
sd c133t0d1-02  line1-00        c133t0d1 379776
131072    63/0        c133t0d1 ENA
sd c138t0d1-02  line1-00        c138t0d1 379776
131072    64/0        c138t0d1 ENA
sd c147t0d1-02  line1-00        c147t0d1 379776
131072    65/0        c147t0d1 ENA
sd c148t0d1-02  line1-00        c148t0d1 379776
131072    66/0        c148t0d1 ENA
sd c154t0d1-02  line1-00        c154t0d1 379776
131072    67/0        c154t0d1 ENA
sd c163t0d1-02  line1-00        c163t0d1 379776
131072    68/0        c163t0d1 ENA
sd c164t0d1-02  line1-00        c164t0d1 379776
131072    69/0        c164t0d1 ENA
sd c170t0d1-02  line1-00        c170t0d1 379776
131072    70/0        c170t0d1 ENA
sd c112t0d1-02  line1-00        c112t0d1 379776
131072    71/0        c112t0d1 ENA
sd c123t0d1-02  line1-00        c123t0d1 379776
131072    72/0        c123t0d1 ENA
sd c128t0d1-02  line1-00        c128t0d1 379776
131072    73/0        c128t0d1 ENA
sd c135t0d1-02  line1-00        c135t0d1 379776
131072    74/0        c135t0d1 ENA
sd c136t0d1-02  line1-00        c136t0d1 379776
131072    75/0        c136t0d1 ENA
sd c142t0d1-02  line1-00        c142t0d1 379776
131072    76/0        c142t0d1 ENA
sd c151t0d1-02  line1-00        c151t0d1 379776
131072    77/0        c151t0d1 ENA
sd c152t0d1-02  line1-00        c152t0d1 379776
131072    78/0        c152t0d1 ENA
sd c158t0d1-02  line1-00        c158t0d1 379776
131072    79/0        c158t0d1 ENA
sd c167t0d1-02  line1-00        c167t0d1 379776
131072    80/0        c167t0d1 ENA
sd c168t0d1-02  line1-00        c168t0d1 379776
131072    81/0        c168t0d1 ENA
sd c174t0d1-02  line1-00        c174t0d1 379776
131072    82/0        c174t0d1 ENA
sd c113t0d1-02  line1-00        c113t0d1 379776
131072    83/0        c113t0d1 ENA
sd c114t0d1-02  line1-00        c114t0d1 379776
131072    84/0        c114t0d1 ENA
```

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sd c139t0d1-02  line1-00      c139t0d1 379776
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sd c140t0d1-02  line1-00      c140t0d1 379776
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sd c155t0d1-02  line1-00      c155t0d1 379776
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sd c156t0d1-02  line1-00      c156t0d1 379776
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sd c172t0d1-02  line1-00      c172t0d1 379776
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sd c119t0d1-02  line1-00      c119t0d1 379776
131072    94/0      c119t0d1 ENA
sd c126t0d1-02  line1-00      c126t0d1 379776
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sd c117t0d2-02  line1-00      c117t0d2 379776
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sd c122t0d2-02  line1-00      c122t0d2 379776
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sd c130t0d2-02  line1-00      c130t0d2 379776
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sd c116t0d2-02  line1-00      c116t0d2 379776
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sd c143t0d2-02  line1-00      c143t0d2 379776
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sd c150t0d2-02  line1-00      c150t0d2 379776
131072    103/0     c150t0d2 ENA
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131072    156/0     c120t0d3 ENA
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sd c172t0d3-02  line1-00      c172t0d3 379776
131072    189/0       c172t0d3 ENA
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131072    191/0       c126t0d3 ENA
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sd c122t0d4-02  line1-00      c122t0d4 379776
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sd c129t0d4-02  line1-00      c129t0d4 379776
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sd c130t0d4-02  line1-00      c130t0d4 379776
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131072    211/0       c154t0d4 ENA
sd c163t0d4-02  line1-00      c163t0d4 379776
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sd c164t0d4-02  line1-00      c164t0d4 379776
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131072    215/0       c112t0d4 ENA
sd c123t0d4-02  line1-00      c123t0d4 379776
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sd c128t0d4-02  line1-00      c128t0d4 379776
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sd c135t0d4-02  line1-00      c135t0d4 379776
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131072    228/0       c114t0d4 ENA
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sd c154t0d5-02  line1-00        c154t0d5 379776
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131072    265/0       c128t0d5 ENA
sd c135t0d5-02  line1-00        c135t0d5 379776
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sd c142t0d5-02  line1-00        c142t0d5 379776
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sd c151t0d5-02  line1-00        c151t0d5 379776
131072    269/0       c151t0d5 ENA
sd c152t0d5-02  line1-00        c152t0d5 379776
131072    270/0       c152t0d5 ENA
sd c158t0d5-02  line1-00        c158t0d5 379776
131072    271/0       c158t0d5 ENA
sd c167t0d5-02  line1-00        c167t0d5 379776
131072    272/0       c167t0d5 ENA
sd c168t0d5-02  line1-00        c168t0d5 379776
131072    273/0       c168t0d5 ENA
sd c174t0d5-02  line1-00        c174t0d5 379776
131072    274/0       c174t0d5 ENA
sd c113t0d5-02  line1-00        c113t0d5 379776
131072    275/0       c113t0d5 ENA
sd c114t0d5-02  line1-00        c114t0d5 379776
131072    276/0       c114t0d5 ENA
sd c115t0d5-02  line1-00        c115t0d5 379776
131072    277/0       c115t0d5 ENA
sd c139t0d5-02  line1-00        c139t0d5 379776
131072    278/0       c139t0d5 ENA
sd c140t0d5-02  line1-00        c140t0d5 379776
131072    279/0       c140t0d5 ENA
sd c146t0d5-02  line1-00        c146t0d5 379776
131072    280/0       c146t0d5 ENA
sd c155t0d5-02  line1-00        c155t0d5 379776
131072    281/0       c155t0d5 ENA
sd c156t0d5-02  line1-00        c156t0d5 379776
131072    282/0       c156t0d5 ENA
sd c162t0d5-02  line1-00        c162t0d5 379776
131072    283/0       c162t0d5 ENA
sd c171t0d5-02  line1-00        c171t0d5 379776
131072    284/0       c171t0d5 ENA
sd c172t0d5-02  line1-00        c172t0d5 379776
131072    285/0       c172t0d5 ENA
sd c119t0d5-02  line1-00        c119t0d5 379776
131072    286/0       c119t0d5 ENA
sd c126t0d5-02  line1-00        c126t0d5 379776
131072    287/0       c126t0d5 ENA
sd c118t0d0-02  line1-00        c118t0d0 379776
131072    288/0       c118t0d0 ENA
sd c121t0d0-02  line1-00        c121t0d0 379776
131072    289/0       c121t0d0 ENA
sd c124t0d0-02  line1-00        c124t0d0 379776
131072    290/0       c124t0d0 ENA
sd c127t0d0-02  line1-00        c127t0d0 379776
131072    291/0       c127t0d0 ENA
sd c131t0d0-02  line1-00        c131t0d0 379776
131072    292/0       c131t0d0 ENA
sd c134t0d0-02  line1-00        c134t0d0 379776
131072    293/0       c134t0d0 ENA
sd c137t0d0-02  line1-00        c137t0d0 379776
131072    294/0       c137t0d0 ENA
sd c141t0d0-02  line1-00        c141t0d0 379776
131072    295/0       c141t0d0 ENA
sd c145t0d0-02  line1-00        c145t0d0 379776
131072    296/0       c145t0d0 ENA
sd c149t0d0-02  line1-00        c149t0d0 379776
131072    297/0       c149t0d0 ENA
sd c153t0d0-02  line1-00        c153t0d0 379776
131072    298/0       c153t0d0 ENA
sd c157t0d0-02  line1-00        c157t0d0 379776
131072    299/0       c157t0d0 ENA
sd c161t0d0-02  line1-00        c161t0d0 379776
131072    300/0       c161t0d0 ENA
```

```
sd c165t0d0-02  line1-00      c165t0d0 379776
131072    301/0       c165t0d0 ENA
sd c169t0d0-02  line1-00      c169t0d0 379776
131072    302/0       c169t0d0 ENA
sd c173t0d0-02  line1-00      c173t0d0 379776
131072    303/0       c173t0d0 ENA
sd c118t0d1-02  line1-00      c118t0d1 379776
131072    304/0       c118t0d1 ENA
sd c121t0d1-02  line1-00      c121t0d1 379776
131072    305/0       c121t0d1 ENA
sd c124t0d1-02  line1-00      c124t0d1 379776
131072    306/0       c124t0d1 ENA
sd c127t0d1-02  line1-00      c127t0d1 379776
131072    307/0       c127t0d1 ENA
sd c131t0d1-02  line1-00      c131t0d1 379776
131072    308/0       c131t0d1 ENA
sd c134t0d1-02  line1-00      c134t0d1 379776
131072    309/0       c134t0d1 ENA
sd c137t0d1-02  line1-00      c137t0d1 379776
131072    310/0       c137t0d1 ENA
sd c141t0d1-02  line1-00      c141t0d1 379776
131072    311/0       c141t0d1 ENA
sd c145t0d1-02  line1-00      c145t0d1 379776
131072    312/0       c145t0d1 ENA
sd c149t0d1-02  line1-00      c149t0d1 379776
131072    313/0       c149t0d1 ENA
sd c153t0d1-02  line1-00      c153t0d1 379776
131072    314/0       c153t0d1 ENA
sd c157t0d1-02  line1-00      c157t0d1 379776
131072    315/0       c157t0d1 ENA
sd c161t0d1-02  line1-00      c161t0d1 379776
131072    316/0       c161t0d1 ENA
sd c165t0d1-02  line1-00      c165t0d1 379776
131072    317/0       c165t0d1 ENA
sd c169t0d1-02  line1-00      c169t0d1 379776
131072    318/0       c169t0d1 ENA
sd c173t0d1-02  line1-00      c173t0d1 379776
131072    319/0       c173t0d1 ENA
sd c118t0d2-02  line1-00      c118t0d2 379776
131072    320/0       c118t0d2 ENA
sd c121t0d2-02  line1-00      c121t0d2 379776
131072    321/0       c121t0d2 ENA
sd c124t0d2-02  line1-00      c124t0d2 379776
131072    322/0       c124t0d2 ENA
sd c127t0d2-02  line1-00      c127t0d2 379776
131072    323/0       c127t0d2 ENA
sd c131t0d2-02  line1-00      c131t0d2 379776
131072    324/0       c131t0d2 ENA
sd c134t0d2-02  line1-00      c134t0d2 379776
131072    325/0       c134t0d2 ENA
sd c137t0d2-02  line1-00      c137t0d2 379776
131072    326/0       c137t0d2 ENA
sd c141t0d2-02  line1-00      c141t0d2 379776
131072    327/0       c141t0d2 ENA
sd c145t0d2-02  line1-00      c145t0d2 379776
131072    328/0       c145t0d2 ENA
sd c149t0d2-02  line1-00      c149t0d2 379776
131072    329/0       c149t0d2 ENA
sd c153t0d2-02  line1-00      c153t0d2 379776
131072    330/0       c153t0d2 ENA
sd c157t0d2-02  line1-00      c157t0d2 379776
131072    331/0       c157t0d2 ENA
sd c161t0d2-02  line1-00      c161t0d2 379776
131072    332/0       c161t0d2 ENA
sd c165t0d2-02  line1-00      c165t0d2 379776
131072    333/0       c165t0d2 ENA
sd c169t0d2-02  line1-00      c169t0d2 379776
131072    334/0       c169t0d2 ENA
sd c173t0d2-02  line1-00      c173t0d2 379776
131072    335/0       c173t0d2 ENA
```

Appendix C. Query Text and Query Output

```
========================================
qual1.v1
========================================
Begin Execution at Tue Aug 19 12:31:52 2003

-- 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.

Statement Processed in 1.07 seconds.

Ended Executing this Query at Tue Aug 19 12:31:53
2003

Query Started at 1061289112.87
Query Ended at 1061289113.94
Query Processed in 1.07 seconds

SQL statements processed: 1
Queries processed: 1

========================================
qual2.v1
========================================
Begin Execution at Tue Aug 19 12:31:54 2003

-- 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

... rows truncated ...

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
2Z0JGkiv01Y00oCFwUGfvIlbhzCdy
16-464-517-8943
carefully bold accounts doub


100 rows processed.
Statement Processed in 4.63 seconds.

Ended Executing this Query at Tue Aug 19 12:31:58
2003


Query Started at 1061289114.09
Query Ended at 1061289118.72
Query Processed in 4.63 seconds


SQL statements processed: 1
Queries processed: 1

========================================
```

qual3.v1

```
========================================
Begin Execution at Tue Aug 19 12:31:58 2003


-- 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
05-MAR-95     0.00
3459808.00                  405838.70
04-MAR-95     0.00
492164.00                   390324.06
19-FEB-95     0.00
1188320.00                  384537.94
09-MAR-95     0.00
2435712.00                  378673.06
26-FEB-95     0.00
4878020.00                  378376.80
12-MAR-95     0.00
5521732.00                  375153.92
13-MAR-95     0.00
2628192.00                  373133.31
22-FEB-95     0.00
993600.00                   371407.46
05-MAR-95     0.00
2300070.00                  367371.15
13-MAR-95     0.00

10 rows processed.
Statement Processed in 0.99 seconds.

Ended Executing this Query at Tue Aug 19 12:31:59
2003

Query Started at 1061289118.87
Query Ended at 1061289119.86
Query Processed in 0.99 seconds


SQL statements processed: 1
Queries processed: 1
```

==========

qual4.v1

==========

```
Begin Execution at Tue Aug 19 12:32:00 2003

-- 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.
Statement Processed in 0.90 seconds.

Ended Executing this Query at Tue Aug 19 12:32:00
2003

Query Started at 1061289120.01
Query Ended at 1061289120.91
Query Processed in 0.90 seconds

SQL statements processed: 1
Queries processed: 1
```

==========

qual5.v1

==========

```
Begin Execution at Tue Aug 19 12:32:01 2003

-- 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.
Statement Processed in 4.43 seconds.

Ended Executing this Query at Tue Aug 19 12:32:05
2003

Query Started at 1061289121.06
Query Ended at 1061289125.49
Query Processed in 4.43 seconds

SQL statements processed: 1
Queries processed: 1
```

==========

qual6.v1

```
==========================================
Begin Execution at Tue Aug 19 12:32:05 2003


-- 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.
Statement Processed in 0.28 seconds.

Ended Executing this Query at Tue Aug 19 12:32:05
2003

Query Started at 1061289125.65
Query Ended at 1061289125.94
Query Processed in 0.28 seconds

SQL statements processed: 1
Queries processed: 1

==========================================
```

qual7.v1

```
==========================================
Begin Execution at Tue Aug 19 12:32:06 2003

-- 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.
Statement Processed in 5.82 seconds.

Ended Executing this Query at Tue Aug 19 12:32:11
2003

Query Started at 1061289126.09
Query Ended at 1061289131.91
Query Processed in 5.82 seconds

SQL statements processed: 1
Queries processed: 1

==========================================
```

qual8.v1

```
==========================================
Begin Execution at Tue Aug 19 12:32:12 2003

-- 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.
Statement Processed in 4.08 seconds.

Ended Executing this Query at Tue Aug 19 12:32:16
2003

Query Started at 1061289132.06
Query Ended at 1061289136.14
Query Processed in 4.08 seconds

SQL statements processed: 1
Queries processed: 1

========================================
```

qual9.v1

```
========================================
Begin Execution at Tue Aug 19 12:32:16 2003

-- 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

... rows truncated ...

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.
Statement Processed in 7.69 seconds.
```

```
Ended Executing this Query at Tue Aug 19 12:32:23
2003

Query Started at 1061289136.30
Query Ended at 1061289143.99
Query Processed in 7.69 seconds

SQL statements processed: 1
Queries processed: 1

========================================
```

qual10.v1

```
========================================
Begin Execution at Tue Aug 19 12:32:24 2003

-- 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
orders,
lineitem,
customer,
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
W556MXuoiaYCCZamJl,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.
Statement Processed in 2.87 seconds.

Ended Executing this Query at Tue Aug 19 12:32:27 2003

Query Started at 1061289144.14
Query Ended at 1061289147.01
Query Processed in 2.87 seconds

SQL statements processed: 1
Queries processed: 1

==========

qual11.v1

==========

Begin Execution at Tue Aug 19 12:32:27 2003

-- 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

... rows truncated ...

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.
Statement Processed in 3.14 seconds.

Ended Executing this Query at Tue Aug 19 12:32:30 2003

Query Started at 1061289147.16
Query Ended at 1061289150.30
Query Processed in 3.14 seconds

SQL statements processed: 1
Queries processed: 1

==========

qual12.v1

==========

Begin Execution at Tue Aug 19 12:32:30 2003

```
-- 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.
Statement Processed in 0.79 seconds.

Ended Executing this Query at Tue Aug 19 12:32:31
2003

Query Started at 1061289150.45
Query Ended at 1061289151.24
Query Processed in 0.79 seconds

SQL statements processed: 1
Queries processed: 1

========================================
```

qual13.v1

```
========================================
Begin Execution at Tue Aug 19 12:32:31 2003

-- 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.
Statement Processed in 1.86 seconds.

Ended Executing this Query at Tue Aug 19 12:32:33
2003

Query Started at 1061289151.40
Query Ended at 1061289153.26
Query Processed in 1.86 seconds


SQL statements processed: 1
Queries processed: 1

========================================
```

qual14.v1

```
========================================
Begin Execution at Tue Aug 19 12:32:33 2003

-- 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.
Statement Processed in 0.38 seconds.
```

```
Ended Executing this Query at Tue Aug 19 12:32:33
2003

Query Started at 1061289153.41
Query Ended at 1061289153.79
Query Processed in 0.38 seconds

SQL statements processed: 1
Queries processed: 1
```

==========

qual15.v1

==========

```
Begin Execution at Tue Aug 19 12:32:33 2003

-- using default substitutions

with revenue as (
                select
                        l_suppkey supplier_no,
                        sum(l_extendedprice *
(1-l_discount)) total_revenue
                from
                        lineitem
                where
                        l_shipdate >= date
'1996-01-01'
                        and l_shipdate < date
'1996-01-01' + interval '3' month
                group by
                        l_suppkey
)
select
        s_suppkey,
        s_name,
        s_address,
        s_phone,
        total_revenue
from
        supplier,
        revenue
where
        s_suppkey = supplier_no
        and total_revenue = (
                select
                        max(total_revenue)
                from
                        revenue
        )
order by
        s_suppkey

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

1 row    processed.
Statement Processed in 10.39 seconds.

Ended Executing this Query at Tue Aug 19 12:32:44
2003

Query Started at 1061289153.94
Query Ended at 1061289164.33
Query Processed in 10.39 seconds

SQL statements processed: 1
Queries processed: 1
```

==========

qual16.v1

==========

```
Begin Execution at Tue Aug 19 12:32:44 2003

-- 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
Brand#11    LARGE BRUSHED COPPER        49.00
20.00
Brand#11    LARGE POLISHED COPPER       49.00
20.00

... rows truncated ...

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.
Statement Processed in 3.11 seconds.

Ended Executing this Query at Tue Aug 19 12:32:47
2003

Query Started at 1061289164.48
Query Ended at 1061289167.59
Query Processed in 3.11 seconds

SQL statements processed: 1
Queries processed: 1

========================================
```

qual17.v1

```
========================================
Begin Execution at Tue Aug 19 12:32:47 2003

-- 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.
Statement Processed in 3.10 seconds.

Ended Executing this Query at Tue Aug 19 12:32:50
2003

Query Started at 1061289167.76
Query Ended at 1061289170.86
Query Processed in 3.10 seconds

SQL statements processed: 1
Queries processed: 1

========================================
```

qual18.v1

```
========================================
Begin Execution at Tue Aug 19 12:32:51 2003

-- 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                      07-APR-94
544089.09                       323.00
Customer#000144617              144617.00
3043270.00                      12-FEB-97
530604.44                       317.00
Customer#000013940              13940.00
2232932.00                      13-APR-97
522720.61                       304.00
Customer#000066790              66790.00
2199712.00                      30-SEP-96
515531.82                       327.00
Customer#000046435              46435.00
4745607.00                      03-JUL-97
508047.99                       309.00
Customer#000015272              15272.00
3883783.00                      28-JUL-93
500241.33                       302.00
Customer#000146608              146608.00
3342468.00                      12-JUN-94
499794.58                       303.00
Customer#000096103              96103.00
5984582.00                      16-MAR-92
494398.79                       312.00
Customer#000024341              24341.00
1474818.00                      15-NOV-92
491348.26                       302.00
Customer#000137446              137446.00
5489475.00                      23-MAY-97
487763.25                       311.00
Customer#000107590              107590.00
4267751.00                      04-NOV-94
485141.38                       301.00
Customer#000050008              50008.00
2366755.00                      09-DEC-96
483891.26                       302.00
Customer#000015619              15619.00
3767271.00                      07-AUG-96
480083.96                       318.00
Customer#000077260              77260.00
1436544.00                      12-SEP-92

... rows truncated ...

436275.31                       305.00
Customer#000081581              81581.00
4739650.00                      04-NOV-95
435405.90                       305.00
Customer#000119989              119989.00
1544643.00                      20-SEP-97
434568.25                       320.00
Customer#000003680              3680.00
3861123.00                      03-JUL-98
433525.97                       301.00
Customer#000113131              113131.00
967334.00                       15-DEC-95
432957.75                       301.00
Customer#000141098              141098.00
565574.00                       24-SEP-95
430986.69                       301.00
Customer#000093392              93392.00
5200102.00                      22-JAN-97
425487.51                       304.00
Customer#000015631              15631.00
1845057.00                      12-MAY-94
419879.59                       302.00
Customer#000112987              112987.00
4439686.00                      17-SEP-96
418161.49                       305.00
Customer#000012599              12599.00
4259524.00                      12-FEB-98
415200.61                       304.00
Customer#000105410              105410.00
4478371.00                      05-MAR-96
412754.51                       302.00
Customer#000149842              149842.00
5156581.00                      30-MAY-94
411329.35                       302.00
Customer#000010129              10129.00
5849444.00                      21-MAR-94
```

```
409129.85               309.00
Customer#000069904          69904.00
1742403.00              19-OCT-96
408513.00               305.00
Customer#000017746          17746.00
6882.00                 09-APR-97
408446.93               303.00
Customer#000013072          13072.00
1481925.00              15-MAR-98
399195.47               301.00
Customer#000082441          82441.00
857959.00               07-FEB-94
382579.74               305.00
Customer#000088703          88703.00
2995076.00              30-JAN-94
363812.12               302.00

57 rows processed.
Statement Processed in 2.02 seconds.

Ended Executing this Query at Tue Aug 19 12:32:53
2003

Query Started at 1061289171.01
Query Ended at 1061289173.03
Query Processed in 2.02 seconds

SQL statements processed: 1
Queries processed: 1
```

==========

qual19.v1

==========

```
Begin Execution at Tue Aug 19 12:32:53 2003

-- 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.
Statement Processed in 2.06 seconds.

Ended Executing this Query at Tue Aug 19 12:32:55
2003

Query Started at 1061289173.18
Query Ended at 1061289175.24
Query Processed in 2.06 seconds

SQL statements processed: 1
Queries processed: 1
```

==========

qual20.v1

==========

```
Begin Execution at Tue Aug 19 12:32:55 2003

-- 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

... rows truncated ...

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.
Statement Processed in 3.96 seconds.

Ended Executing this Query at Tue Aug 19 12:32:59
2003

Query Started at 1061289175.39
Query Ended at 1061289179.35
Query Processed in 3.96 seconds

SQL statements processed: 1
Queries processed: 1

========================================
```

qual21.v1

```
========================================
Begin Execution at Tue Aug 19 12:32:59 2003

-- 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

... rows truncated ...

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.
Statement Processed in 5.58 seconds.

Ended Executing this Query at Tue Aug 19 12:33:05
2003

Query Started at 1061289179.50
Query Ended at 1061289185.08
Query Processed in 5.58 seconds

SQL statements processed: 1
Queries processed: 1

========================================
```

qual22.v1

```
========================================
Begin Execution at Tue Aug 19 12:33:05 2003

-- 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.
Statement Processed in 0.99 seconds.

Ended Executing this Query at Tue Aug 19 12:33:06
2003

Query Started at 1061289185.23
Query Ended at 1061289186.23
Query Processed in 0.99 seconds

SQL statements processed: 1
Queries processed: 1
```

Appendix D. Seed and Query Substitution Parameters

This Appendix contains Seed values and substitution parameters for each stream.

This Appendix contains Seed values and substitution parameters for each stream

==========

seed values

==========

session 00 816165405
session 01 816165406
session 02 816165407
session 03 816165408
session 04 816165409
session 05 816165410
session 06 816165411
session 07 816165412
session 08 816165413

==========

stream 00 substitution parameters

==========

14 1993-03-01
2 41 NICKEL AFRICA
9 violet
20 khaki 1997-01-01 FRANCE
6 1994-01-01 0.06 24
17 Brand#25 WRAP BAG
18 315
8 EGYPT MIDDLE EAST PROMO POLISHED COPPER
21 UNITED KINGDOM
13 unusual packages
3 HOUSEHOLD 1995-03-03
22 16 21 33 15
20 27 24
16 Brand#52 PROMO BURNISHED 43
22 12 13 27
2 20 19
4 1993-07-01
11 MOZAMBIQUE 0.0000000333
15 1997-01-01
1 68
10 1993-11-01
19 Brand#53 Brand#52 Brand#35 2
13 27
5 MIDDLE EAST 1994-01-01
7 KENYA EGYPT
12 AIR MAIL 1993-01-01

==========

stream 01 substitution parameters

==========

21 MOROCCO
3 AUTOMOBILE 1995-03-20
18 313
5 AMERICA 1994-01-01
11 EGYPT 0.0000000333
7 FRANCE VIETNAM
6 1994-01-01 0.04 25
20 sienna 1996-01-01 VIETNAM
17 Brand#22 WRAP PACK
12 REG AIR MAIL 1993-01-01
16 Brand#32 SMALL PLATED 47
43 31 9 13
15 44 28
15 1994-10-01
13 unusual packages
10 1994-08-01
2 29 COPPER EUROPE
8 VIETNAM ASIA PROMO PLATED TIN
14 1993-06-01
19 Brand#55 Brand#45 Brand#34 7
14 23
9 spring
22 31 21 32 16
10 15 29
1 76
4 1996-02-01

==========

stream 02 substitution parameters

==========

6 1994-01-01 0.09 25
17 Brand#24 WRAP DRUM
14 1993-09-01
16 Brand#22 LARGE BRUSHED 6
14 48 49 21
13 24 47
19 Brand#52 Brand#23 Brand#33 3
15 20
10 1993-05-01
9 seashell
2 17 STEEL AFRICA
15 1997-05-01
8 JORDAN MIDDLE EAST PROMO ANODIZED TIN
5 ASIA 1994-01-01
22 13 10 26 30
22 33 23
12 SHIP MAIL 1993-01-01
7 UNITED KINGDOM JORDAN
13 unusual packages
18 314
1 84
4 1993-11-01
20 dim 1994-01-01 IRAN
3 FURNITURE 1995-03-05
11 PERU 0.0000000333
21 GERMANY

==========

stream 03 substitution parameters

==========

8 ETHIOPIA AFRICA ECONOMY POLISHED TIN
5 EUROPE 1994-01-01
4 1996-06-01
6 1994-01-01 0.06 24

17 Brand#21 SM BAG
7 MOROCCO ETHIOPIA
1 92
18 312
22 19 18 22 28
21 29 27
14 1993-12-01
9 rose
10 1994-03-01
15 1995-01-01
11 ETHIOPIA 0.0000000333
20 peach 1997-01-01 ALGERIA
2 4 BRASS EUROPE
21 UNITED STATES
19 Brand#14 Brand#51 Brand#23 8
16 27
13 unusual packages
16 Brand#52 STANDARD ANODIZED
4 13 50 3
5 10 38 18
12 FOB MAIL 1993-01-01
3 AUTOMOBILE 1995-03-22

==========

stream 04 substitution parameters

==========

5 MIDDLE EAST 1995-01-01
21 MOZAMBIQUE
14 1994-03-01
19 Brand#11 Brand#44 Brand#22 3
17 23
15 1997-08-01
17 Brand#23 SM PACK
12 MAIL FOB 1994-01-01
6 1995-01-01 0.04 25
4 1994-03-01
9 pink
8 RUSSIA EUROPE ECONOMY BURNISHED TIN
16 Brand#32 MEDIUM PLATED 7
28 34 31 11
42 10 13
11 CHINA 0.0000000333
2 42 NICKEL AMERICA
10 1994-12-01
18 313
1 100
13 unusual packages
7 GERMANY RUSSIA
22 34 16 28 12
31 19 21
3 FURNITURE 1995-03-07
20 blue 1996-01-01 MOROCCO

==========

stream 05 substitution parameters

==========

21 INDONESIA
15 1995-05-01
4 1996-09-01
6 1995-01-01 0.09 25
7 UNITED STATES KENYA
16 Brand#22 ECONOMY POLISHED
31 2 6 1
3 7 36 8
19 Brand#13 Brand#21 Brand#11 8
18 30
18 315
14 1994-07-01
22 17 10 16 19
11 34 26
11 FRANCE 0.0000000333
13 express requests
3 MACHINERY 1995-03-24
1 108
2 30 TIN EUROPE
5 AFRICA 1995-01-01
8 KENYA AFRICA LARGE BRUSHED TIN
20 magenta 1994-01-01 EGYPT
12 RAIL FOB 1994-01-01
17 Brand#24 SM DRUM
10 1993-09-01
9 orange

==========

stream 06 substitution parameters

==========

10 1994-06-01
3 FURNITURE 1995-03-09
15 1993-02-01
13 express requests
6 1995-01-01 0.07 24
8 FRANCE EUROPE LARGE PLATED NICKEL
9 mint
7 MOZAMBIQUE FRANCE
4 1994-06-01
11 ROMANIA 0.0000000333
22 30 23 26 15
24 25 13
18 312
12 AIR FOB 1994-01-01
1 116
5 AMERICA 1995-01-01
16 Brand#52 SMALL ANODIZED 24
47 18 15 20
22 48 19
2 18 STEEL AMERICA
14 1994-10-01
19 Brand#25 Brand#14 Brand#15 4
19 26
20 thistle 1993-01-01 ROMANIA
17 Brand#21 LG BAG
21 ARGENTINA

==========

stream 07 substitution parameters

==========

18 314
8 UNITED KINGDOM EUROPE LARGE ANODIZED NICKEL
20 ghost 1996-01-01 INDONESIA
21 CHINA
2 5 BRASS MIDDLE EAST
4 1997-01-01
22 19 18 10 29
33 16 21
17 Brand#23 LG PACK
1 63
11 GERMANY 0.0000000333
9 linen
19 Brand#22 Brand#42 Brand#15 9
20 23
3 MACHINERY 1995-03-26
13 express requests
5 ASIA 1995-01-01
7 INDIA UNITED KINGDOM
10 1993-03-01
16 Brand#32 LARGE BURNISHED 17
18 5 15 29
41 43 23
6 1995-01-01 0.04 25
14 1995-01-01

15 1995-08-01
12 REG AIR FOB 1994-01-01

==========

stream 08 substitution parameters

==========

19 Brand#24 Brand#35 Brand#54 4
10 30
1 71
15 1993-05-01
17 Brand#25 LG DRUM
5 EUROPE 1996-01-01
8 MOROCCO AFRICA MEDIUM POLISHED NICKEL
9 lace
12 SHIP TRUCK 1993-01-01
14 1995-04-01
7 ALGERIA MOROCCO
4 1994-10-01
3 BUILDING 1995-03-12
20 rose 1995-01-01 UNITED STATES
16 Brand#22 PROMO POLISHED 20
18 8 21 15
9 31 23
6 1996-01-01 0.02 25
22 18 27 23 29
13 33 32
10 1994-01-01
13 express requests
2 43 NICKEL AMERICA
21 IRAN
18 315
11 SAUDI ARABIA 0.0000000333

Appendix E. Implementation-Specific Layer/Driver Code

```
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```
buildTPCH
```
========================================
#!/bin/ksh
. $KIT_DIR/env

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
FIRST_TEN=${OUT_DIR}/firstten
LD1DBCRE=${OUT_DIR}/Ld1dbcre
LD2SCTSO=${OUT_DIR}/Ld2sctso
LD3DAPOP=${OUT_DIR}/Ld4dapop
LD4IXCRE=${OUT_DIR}/Ld5ixcre
LD5ANLYZ=${OUT_DIR}/Ld5anlyz
DAT_FILE=${TPCH}/bmc/schema/3tb/var9/3tb_16.dat


echo Start TPC-H Benchmark SEQUENCE NUMBER:
$RUN_ID > $SCRIPT_LOG_FILE
echo >> $SCRIPT_LOG_FILE
echo "Starting a new Oracle log file:
$ORACLE_HOME/rdbms/log/alert_${ORACLE_SID}.lo
g" >> $SCRIPT_LOG_FILE
echo >> $SCRIPT_LOG_FILE

mv
$ORACLE_HOME/rdbms/log/alert_${ORACLE_SID}.lo
g
$ORACLE_HOME/rdbms/log/alert_${ORACLE_SID}.lo
g.preAudit.$RUN_ID
touch
$ORACLE_HOME/rdbms/log/alert_${ORACLE_SID}.lo
g

echo "Start: load database `date`" >>
$SCRIPT_LOG_FILE
bumpx.pl -s -x -o ${DAT_FILE} -p dbcre >
$LD1DBCRE
bumpx.pl -s -x -o ${DAT_FILE} -p sctso > $LD2SCTSO
STIME=`$GTIME`
echo "Start: timed load portion `date`" >>
$SCRIPT_LOG_FILE
bumpx.pl -s -x -o ${DAT_FILE} -p dapop >
$LD3DAPOP
bumpx.pl -s -x -o ${DAT_FILE} -p ixcre > $LD4IXCRE
bumpx.pl -s -x -o ${DAT_FILE} -p anlyz > $LD5ANLYZ
# tshut
# tstart
ckpnt.sh
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 and count.sql" >>
$SCRIPT_LOG_FILE
$sqlplus ${DATABASE_USER}
@$KIT_DIR/audit/dbtables > ${RDB_TABLES} 2>&1
$sqlplus ${DATABASE_USER}
@$KIT_DIR/audit/firstten > ${FIRST_TEN} 2>&1
echo "End: dbtables.sql and count.sql `date`" >>
$SCRIPT_LOG_FILE

$BMC/scripts/set_dop.sh 128

tshut >>    $SCRIPT_LOG_FILE
# tstart >>    $SCRIPT_LOG_FILE
# ckpnt.sh


========================================
```
runTPCHall_run1
```
========================================
#!/bin/ksh
. $KIT_DIR/env

ECHO=echo

sqlplus=$ORACLE_HOME/bin/sqlplus
GTIME=${KIT_DIR}/utils/gtime

RUN_ID_FILE=${KIT_DIR}/audit/r_id


RUN_ID=`cat $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
FIRST_TEN=${OUT_DIR}/firstten
LD1DBCRE=${OUT_DIR}/Ld1dbcre
LD2SCTSO=${OUT_DIR}/Ld2sctso
LD3DAPOP=${OUT_DIR}/Ld4dapop
LD4IXCRE=${OUT_DIR}/Ld5ixcre
LD5ANLYZ=${OUT_DIR}/Ld5anlyz
DAT_FILE=${TPCH}/bmc/schema/100g_84.dat


runTPCHpt ${SCALE_FACTOR} 1 ${RUN_ID}
```

```
tshut >>   $SCRIPT_LOG_FILE
tstart >>   $SCRIPT_LOG_FILE
ckpnt.sh


========================================
```

runTPCHpt

```
========================================
#!/bin/ksh
. $KIT_DIR/env
#set -x
# ECHOS=/bin/echo
SCRIPT_DIR=${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

TPCD_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}
if [ ! -d $OUT_DIR ]
then
        mkdir $OUT_DIR
fi

TPCD_LOG=${OUT_DIR}
TPCD_RPT=${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)*($NUM_STREA
MS+1)+2"
let
STOP_SET_UPDATE="$START_SET_UPDATE+$NU
M_STREAMS-1"

TPCD_LOG_FILE=${TPCD_LOG}/m${PARA}s0
TPCD_RPT_FILE=${TPCD_RPT}/m${PARA}s0inter
QRY_FILE=${TPCD_RPT}/qtemp.${PARA}s0
QUERY_PARAMETER=${TPCD_LOG}/qp${PARA}.0
SCRIPT_LOG_FILE=${TPCD_LOG}/m${PARA}timing
UF1_LOG=${TPCD_LOG}/m${PARA}s0rf1
UF2_LOG=${TPCD_LOG}/m${PARA}s0rf2
STREAM_COUNT_LOG=${TPCD_LOG}/m${PARA}tst
rcnt

echo "TPC-H Test - RUN:${PARA}
SEQUENCE:${RUN_ID} `date`" >
$SCRIPT_LOG_FILE
echo "TPC-H Test - RUN:${PARA}
SEQUENCE:${RUN_ID} `date`" > $TPCD_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}

##lm
$ECHOS mystartstat ${RUN_ID} pwr_${PARA}

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

${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 >>
${TPCD_RPT_FILE}
echo Start Time: $UF1_START, $SDATE >>
${TPCD_RPT_FILE}
echo End Time: $UF1_END, $E1DATE >>
${TPCD_RPT_FILE}
echo "" >> ${TPCD_RPT_FILE}

echo "End UF1 $UF1_END, ${E1DATE}" >>
$SCRIPT_LOG_FILE
echo UF1: Execution Time: $UF1_TIME >>
$SCRIPT_LOG_FILE
echo >> $SCRIPT_LOG_FILE

echo "Start Query Part `$GTIME`, `date` " >>
$SCRIPT_LOG_FILE

${QPROG} ${DATABASE_USER} q${QRY_FILE}
l${TPCD_LOG_FILE} r${TPCD_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    $UF2_START, `date`" >>
$SCRIPT_LOG_FILE
${UPD_SPT}/runuf2.sh ${UF_SET} >> $UF2_LOG
2>&1
UF2_END=`${GTIME}`
END=`${GTIME}`
EDATE=`date`

UF2_TIME=`echo $UF2_END - $UF2_START | bc`
echo UF2: Execution Time: $UF2_TIME >>
${TPCD_RPT_FILE}
echo Start Time: $UF2_START, $E2DATE >>
${TPCD_RPT_FILE}
echo End Time: $UF2_END, $EDATE >>
${TPCD_RPT_FILE}


echo "End UF2 $UF2_END, $EDATE" >>
$SCRIPT_LOG_FILE
echo UF2: Execution Time: $UF2_TIME >>
$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

##lm
$ECHOS mystopstat ${RUN_ID} pwr_${PARA}

${KIT_DIR}/audit/abridge.pl ${TPCD_LOG_FILE}

i=$START_SET
PSEED=`cat $SEED_FILE`

while [ $i -le $STOP_SET ]; do

TPCD_LOG_FILE=${TPCD_LOG}/mt${RUN_ID}_${i}.l
og

TPCD_RPT_FILE=${TPCD_RPT}/mt${RUN_ID}_${i}.r
pt
        QUERY_PARAMETER=${TPCD_LOG}/qp${P
ARA}.${i}
   QRY_FILE=${TPCD_RPT}/qtemp.${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

##lm
$ECHOS mystartstat ${RUN_ID} thr_${PARA}

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
throughtput run
(scnt.sh $PARA $RUN_ID > $STREAM_COUNT_LOG
&)

while [ $i -le $STOP_SET ]; do
   M_SDATE=`date`
   M_STIME=`${GTIME}`
        TPCD_LOG_FILE=${TPCD_LOG}/m${PARA}s
${i}
        TPCD_RPT_FILE=${TPCD_RPT}/m${PARA}s
${i}inter
   echo "Start Query Stream $i $M_STIME,
${M_SDATE}" >> $SCRIPT_LOG_FILE
        QRY_FILE=${TPCD_RPT}/qtemp.${PARA}s${i
}
   ${QPROG} ${DATABASE_USER} q${QRY_FILE}
l${TPCD_LOG_FILE} r${TPCD_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

##lm
$ECHOS mystopstat ${RUN_ID} thr_${PARA}

i=$START_SET
while [ $i -le $STOP_SET ]; do
        TPCD_LOG_FILE=${TPCD_LOG}/m${PARA}s
${i}
   ${KIT_DIR}/audit/abridge.pl ${TPCD_LOG_FILE}
        i=`expr $i + 1`
done
PIDS=`ps -fu oracle | grep scnt.sh | grep -v grep | awk
'{print $2}'`
kill -9 $PIDS
#calculate the metric
analyze_streams.pl -f p -n $RUN_ID >
${TPCD_RPT}/tpch_metric.${RUN_ID}.${HID}.rpt


========================================
```

runTPCHus

```
========================================
#!/bin/ksh
. $KIT_DIR/env

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}
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
. $KIT_DIR/env
O=${ORACLE_HOME}
UPDATE_DIR=${KIT_DIR}/update
```

```
SCRIPT_DIR=${UPDATE_DIR}/scripts
UTILS_DIR=${KIT_DIR}/utils
LOG_DIR=${UPDATE_DIR}/log
GTIME=${UTILS_DIR}/gtime
SF=${SCALE_FACTOR}
PAR_HINT=${UPDATE_DOP_INS} # is defined in env
file

LOGPATH=.
PASSWD=${DATABASE_USER}

if [ $# -lt 1 ];
then
    echo runuf1.sh setnum
    exit 1
fi
SETNUM=$1
i=1
PID=""


START=`$GTIME`


sqlplus /NOLOG << !

connect $PASSWD;
set timing on
set serveroutput on
set echo on

drop directory data_dir;
create directory data_dir as '/flat';

drop table temp_l_et;
create table temp_l_et(
      l_orderkey                number ,
      l_partkey                 number ,
      l_suppkey                 number ,
      l_linenumber              number ,
      l_quantity                number ,
      l_extendedprice           number ,
      l_discount                number ,
      l_tax                     number ,
      l_returnflag              char(1) ,
      l_linestatus              char(1) ,
      l_shipdate                date ,
      l_commitdate              date ,
      l_receiptdate             date ,
      l_shipinstruct            char(25) ,
      l_shipmode                char(10) ,
      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_orderkey                number ,
      o_custkey                 number ,
      o_orderstatus             char(1) ,
      o_totalprice              number ,
      o_orderdate               date ,
      o_orderpriority           char(15) ,
      o_clerk                   char(15) ,
      o_shippriority            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    ${PAR_HINT};
alter session set isolation_level = serializable;
alter session set optimizer_index_cost_adj=10;
commit;

insert into orders (
   select
      o_orderdate               ,
      o_orderkey                ,
      o_custkey                 ,
      o_orderpriority           ,
      o_shippriority            ,
      o_clerk                   ,
      o_orderstatus             ,
      o_totalprice              ,
      o_comment
from temp_o_et);

insert into lineitem (
   select
      l_shipdate                ,
      l_orderkey                ,
      l_discount                ,
      l_extendedprice           ,
      l_suppkey                 ,
      l_quantity                ,
      l_returnflag              ,
      l_partkey                 ,
      l_linestatus              ,
      l_tax                     ,
      l_commitdate              ,
      l_receiptdate             ,
      l_shipmode                ,
      l_linenumber              ,
      l_shipinstruct            ,
      l_comment
from temp_l_et);

commit;

drop table temp_l_et;
drop table temp_o_et;

exit;
!
```

```
END=`$GTIME`


echo ""
echo "Update Function 1 Set $SETNUM done!"
echo "Elapsed Time is `echo $END - $START | bc`"
echo ""
```

==========

runuf2.sh

==========

```
#!/bin/ksh
. $KIT_DIR/env
UPDATE_DIR=${KIT_DIR}/update
SCRIPT_DIR=${UPDATE_DIR}/scripts
UTILS_DIR=${KIT_DIR}/utils
GTIME=${UTILS_DIR}/gtime
LOG_DIR=${UPDATE_DIR}/log
PAR_HINT=${UPDATE_DOP_DEL} #defined in env
file
SF=${SCALE_FACTOR}
PASSWD=${DATABASE_USER}

if [ $# -lt 1 ]
then
    usage
    exit 1
fi

SETNUM=$1

i=1
PID=""

START=`$GTIME`

sqlplus /NOLOG << !

connect $PASSWD;
set timing    on
set serveroutput on
set echo on

drop directory data_dir;
create directory data_dir as '/flat';

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};
alter table temp_okey_et parallel 16;

--create table temp_okey parallel ${PAR_HINT}
nologging as select * from temp_okey_et;
create table temp_okey parallel 16 nologging as select
* from temp_okey_et;

--create unique index i_temp_okey on temp_okey
(t_orderkey) parallel ${PAR_HINT} nologging compute
statistics;
create unique index i_temp_okey on temp_okey
(t_orderkey) parallel 16 nologging compute statistics;

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=10;

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`


echo ""
echo "Update Function 2 Set $SETNUM done!"
echo "Elapsed Time is `echo $END - $START | bc`"
echo ""
```

==========

qexecpl.c

==========

```
#ifdef RCSID
static char *RCSid =
#endif /* RCSID */

/* Copyright (c) Oracle Corporation 1999. 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)

*/

#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 "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 cmnt[81];                 /* 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;
   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));

    /* 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;
            }
            fprintf(logfile, "%s", stmt);
            fprintf(rep, "%s", 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();

            s_tr_end = gettime();
            stmt_cnt++;

            /*
            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));
            break;

            /* Should never reach here */
        default:
            fprintf(stderr, "Invalid statement type!!\n");
            SQLexit();
            break;
        }
    }

    /* Get Timing for the last query */

    tr_end = gettime();

    time(&tim);
    fprintf(logfile,"\nEnded Executing this Query at %s\n",
ctime(&tim));
    fprintf(logfile,"\nQuery Started at %.2f\n", tr_start);
    fprintf(logfile,"Query Ended at %.2f\n", tr_end);
    fprintf(logfile,"Query Processed in %.2f seconds\n\n",
            (tr_end - tr_start));

    fprintf(rep, "%.2f\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_DEFIN
E); */
        }
        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,strle
n(logname),OCI_ATTR_USERNAME,
            errhp);

OCIaset(tpcusr,OCI_HTYPE_SESSION,passwd,strlen
(passwd),OCI_ATTR_PASSWORD,
            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 *) stmt, PDMLTXT);

   OCIStmtPrepare(cur_dml,errhp,(text
*)stmt,strlen((char *)stmt),

OCI_NTV_SYNTAX,OCI_DEFAULT);
   OCIsexec(tpcsvc,cur_dml,errhp,1);

   /* Enable session parallel ddl */

   sprintf((char *) stmt, PDDLTXT);

   OCIStmtPrepare(cur_ddl,errhp,(text
*)stmt,strlen((char *)stmt),

OCI_NTV_SYNTAX,OCI_DEFAULT);
   OCIsexec(tpcsvc,cur_ddl,errhp,1);

   /* set serializable level */

   sprintf((char *) stmt, ISOTXT);
   OCIStmtPrepare(cur_ddl,errhp,(text
*)stmt,strlen((char *)stmt),

OCI_NTV_SYNTAX,OCI_DEFAULT);
   OCIsexec(tpcsvc,cur_ddl,errhp,1);

/*
   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 */

   if (!end_flag) {

      /* 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.    */

      tr_end = gettime();

      if (qry_cnt) {
         time(&tim);
         fprintf(logfile,"\nEnded Executing this Query
at %s\n", ctime(&tim));
         fprintf(logfile,"\nQuery Started at %.2f\n",
tr_start);
         fprintf(logfile,"Query Ended at %.2f\n", tr_end);
         fprintf(logfile,"Query Processed in %.2f
seconds.\n\n",
                  (tr_end - tr_start));


fprintf(logfile,"-------------------------------------------------\n\n
");

         /* print comments for this query that we have
saved */

         fprintf(logfile, "%s\n", cmnt);

         fprintf(rep, "%.2f\n", (tr_end - tr_start));
         fprintf(rep, "%s", cmnt);

         fprintf(logfile,"\nBegan Executing this Query
at %s\n", ctime(&tim));

         /* Let's fflush stuff so that we can see what's
going on */

         fflush(logfile);
```

```
            fflush(rep);

        }

        tr_start = tr_end;
        qry_cnt++;

        end_flag = 1;
    }

    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 to the logfile */

    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,errhp);

    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,O
CI_ATTR_ROW_COUNT,errhp);

    /* 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,O
CI_ATTR_ROW_COUNT,errhp);

      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_f
ar,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_f
ar,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,O
CI_ATTR_ROW_COUNT,errhp);
        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");
    }
}


void remove_newline(str)
        char *str;
{

    char *p;

    while ((p = strchr(str,'\n')) != NULL)
        *p = ' ';
}
```

==========

qexecpl.h

==========

```
/*
 */

/* 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)

*/

/*
# 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 */


==========
```

gtime.c

```
==========
/* Copyright (c) 2001, 2002, Oracle Corporation.    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)

*/
#include<stdio.h>
#include<stdlib.h>

# include <sys/time.h>

main ()
{

   struct timeval tv;

           (void) gettimeofday (&tv, (struct timezone *)
0);

   printf ("%.2f\n", ((double) tv.tv_sec + (1.0e-6 *
(double) tv.tv_usec)) ) ;

}

/* end of file gtime.c */
```

Appendix F. Misc database scripts

Activity between Database Load and Run1. When the load finished, the runTPCHall script automatically selected a seed value and saved it.

The database was restarted.

Then the 2 auditor scripts count.sql and dbtables.sql were run to validate that the database structure was correct.

==========

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;
```

==========

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_ORDE
RKEY)
FROM LINEITEM ;

INSERT INTO MINMAX
SELECT
'LINEITEM_NBR',MIN(L_LINENUMBER),MAX(L_LINE
NUMBER)
FROM LINEITEM;

INSERT INTO MINMAX
SELECT
'ORDERTBL',MIN(O_ORDERKEY),MAX(O_ORDERK
EY)
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_PA
RTKEY)
FROM PARTSUPP;

INSERT INTO MINMAX
SELECT
'PARTSUPP_SUPP',MIN(PS_SUPPKEY),MAX(PS_S
UPPKEY)
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;
```

==========

tshut

```
==========
#!/bin/ksh

if [ "$2" != "" -a "$2" != "1" ]; then
   INUM=$2
   if [ -f $ORACLE_HOME/work/t_init$INUM.ora ]; then
      export ORACLE_SID="$ORACLE_SID"$INUM
   fi
fi

if [ "$1" = "abort" ]; then
sqlplus /NOLOG << !
connect / as sysdba
shutdown abort
exit
!
else
sqlplus /NOLOG << !
connect / as sysdba
shutdown immediate
exit
!
fi
```

==========

tstart

```
==========
#!/bin/ksh
#
# $Header: ostart.sh 17-aug-99.16:20:43 mpoess Exp
$
# ostart.sh
#   Copyright (c) Oracle Corporation 1999. All Rights
Reserved.
#
#       NAME
#         ostart.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         08/17/99 - Creation
#       mpoess         08/17/99 - Creation
#

cd $TPCH/admin

if [ "$1" = "-p" ]; then
. ./pgenv
fi

echo "booting oracle"
pwd
#exit

sqlplus /nolog << !
connect / as sysdba
shutdown immediate
startup pfile=init.ora
exit
!
```

Appendix G. Pricing Information

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Sales Quotation213031

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		Email	elizabeth.ewing@veritas.com	Nicole.Zakhari@Veritas.com	

I am pleased to accommodate your request for quotation. If you have any questions related to the products listed or require more information, please contact me at my direct telephone listed above. Thank you for your interest in VERITAS Software and I look forward to serving you in the future.

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Line	Qty	Part Number	Description	List Price	Ext Price
License					
1	1	A08974F-M00000	Volume Manager,Solaris,v3.5,License Tier 4C	60,195.00	60,195.00
			CommentsPRIMEPOWER 2500		
				Subtotal	60,195.00
Technical Support					
2	1	W08974F-M00236	Volume Manager,Solaris,v3.5 Tier 4C Extended Support, 3 Yr 24x7	41,535.00	41,535.00
			CommentsSupport for line 1.		
				Subtotal	41,535.00
Finished Good					
3	1	N09665F	Storage Solutions,Solaris,v3.5 Maintenance Pack 1,English,Media Kit	100.00	100.00
			CommentsPart number valid until 9/1/2003		
4	1	N08836F	Volume Manager,Solaris,Administrator's Guide,v3.5,English,Manual	50.00	50.00
				Subtotal	150.00
		Subtotal Information	**License** 60,195.00	**Total**	101,880.0
			Support 41,535.00		
			Finished Good 150.00		

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Quotation

Storage

	Partnumber	Description	Quantity	Unit Price	Extended Price	Maintenance 3 years
1	D:S80-Base	FC-S80 Basis Shelf	64	3.650,00	233.600	225.000
2	D:S80FC-RDM	S80 RAID Controller 2 Gbit/s	64	9.675,00	619.200	80.000
3	D:S80-HD7310	S80 Disk, 73GB 10.000rpm	800	1.700,00	1.360.000	
4	D:GPRAC-BG52	PRIMECENTER Rack 38 HE	6	2.350,00	14.100	
				Total list	2.226.900	305.000
				Discount	1.002.105	
				Total	1.224.795	305.000

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Jürgen Binder
Sr. Product Manager Online Systems