TPC Benchmark™ C
Full Disclosure Report

Sun Starfire™ Enterprise™ 10000
Using Oracle8i™ RDBMS

Submitted for Review

March 24, 1999
Compliant with Revision 3.4 of the TPC-C specification

TPC Benchmark C Full Disclosure Report

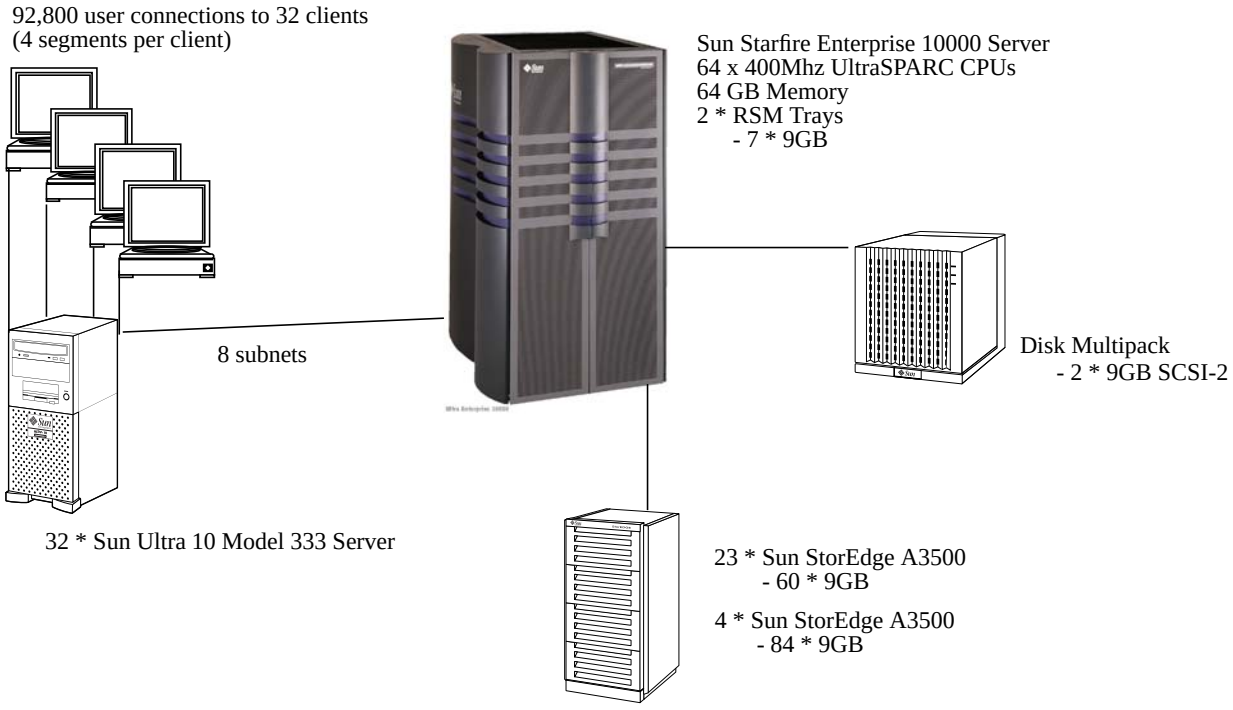
First Printing

Sun Starfire Enterprise 10000 using Oracle8i

TPC-C 3.4

Report Date:
March 24, 1999

Total System Cost	TPC-C Throughput	Price/Performance	Availability Date	
$12,189,298	**115,395.73 tpmC**	**$105.63 per tpmC**	**August 22, 1999**	
Processors	Database Manager	Operating System	Other Software	Number of Users
64 * 400MHz UltraSPARC II	**Oracle8i v 8.1.5.1**	**Solaris 7**	**BEA Tuxedo 6.3 Veritas Vol. Mgr. 3.0.1**	**92,800**



Configuration

	Server System	Front End Systems
Database Nodes:	1 Sun Enterprise 10000 Server	32 * Ultra 10 Model 333
Processors	64 * 400 MHz UltraSPARC II	1 * 333 MHz UltraSPARC II each
Cache memory	32KB (D+I), 4MB external	32KB (D+I), 512KB external, each
Main memory	64 GB	1 GB each
Disk controllers	46 Ultra SCSI, 3 SCSI-2	1 * SCSI-2 each
Disk Drives	1732 * 9GB SCSI-2	1 * 9GB SCSI-2 each
Total Disk Storage	15,588GB	9GB each
Terminals	1 Console	1 Console each
10 BaseT Hub	None	11616 x 8-Port Hubs
100 Base T Hubs	8 x 8-Port Hubs	None

Sun Starfire Enterprise 10000 using Oracle8i

TPC-C 3.4

Report Date: March 24, 1999

Pricing Summary

Description	Part Number	Source	Unit Price	Qty	Ext. Price	5 Yr. Maint.
Server Hardware						
E10000 Base Cabinet	E10000-3	2	165,000	1	165,000	344,688
System Board, unpopulated	2760A	2	48,750	16	780,000	592,896
CPU, 400MHz, 4MB L2$	2570A	2	12,750	64	816,000	
Memory Board, unpopulated	7025A	2	7,500	16	120,000	
1GB for Ex000	7023A	2	7,125	64	456,000	
Dual SBus I/O daughter card	2730A	2	5,625	16	90,000	
System Service Proc	2751A	2	7,500	1	7,500	3,264
AC input module	3875A	2	2,250	4	9,000	
48 volt power supply	9685A	2	3,000	8	24,000	
Power Control Module	9681A	2	750	1	750	
Fan tray	9671A	2	1,500	16	24,000	
Control Board w/ Enet Cable	2720A	2	15,000	1	15,000	
Power Cord for System	3850A	2	0	4	0	
12 Meter SCSI cable	979A	2	199	49	9,739	
SBus Diff Fast/Wide SCSI-2	1062A	2	971	3	2,914	
SBus Ultra Diff Fast/Wide SCSI	1065A	2	971	46	44,678	
Symmetra 16kva UPS	SX-SY16K	1	15,845	2	31,690	2,630
RSM Tray (7 X 9.1GB Disk)	6515AR4	2	13,950	2	27,900	
18.2GB Disk MultiPack	SG-XDSK020A-18G	2	2,657	1	2,657	
545GB StorEdge A3500	SG-XARY360A-545G	2	123,488	23	2,840,213	1,282,296
763GB StorEdge A3500	SG-XARY362A-763G	2	180,900	4	723,600	296,755
12-24GB 4mm DDS-3 Tape Drive	6283A	2	1,013	1	1,013	
Power Cord for A3500	3800A	2	0	27	0	
Sbus FastEthernet 2.0	1059A	2	596	8	4,770	
Subtotal					6,196,422	2,522,529
SunService Discount (10% Volume + 5% yearly prepayment)						(378,379)
Server Hardware Subtotal					6,196,422	2,144,150
Server Software						
Solaris 7 Media	SOLS-C	1	100	1	100	
S/W for SSP Version 3.1	SW-SSP-3.1	1	0	1	0	
SPARC Compiler C/C++ 5.0	WCC-5.0-P	1	995	1	995	1,020
Sun StorEdge Vol Mgr. 3.0.1	VFSTS-301-9999	1	150	1	150	
RTU for E10000	VVMGS-999-S999	1	42,995	1	42,995	57,060
Oracle8i License	Version 8.1.5.1	3	1,394,195	1	1,394,195	1,394,195
Subtotal					1,438,435	1,452,275
SunService Discount (10% Volume + 5% yearly prepayment)						(153)
Server Software Subtotal					1,438,435	1,452,122
Client Hardware						
Ultra 10 Model 333	A22UHC1A9P-B128CP	2	3,908	32	125,070	134,246
512 MB memory for Ultra 10	X7033A	2	1,633	64	104,541	
Quad Fast Ethernet Controller	1049A	2	1,496	32	47,880	
Wyse55 Terminal	WYSE-WY55-G	1	429	32	13,728	
Subtotal					291,219	134,246
SunService Discount (10% Volume + 5% yearly prepayment)						(20,137)
Server Software Subtotal					291,219	114,109
Client Software						
BEA Tuxedo CFS 6.3		4	3000	32	96,000	72,000
Client Software Subtotal					96,000	72,000
User Connectivity						
8-port 10/100 Mbps Fast Eth Hub	NX-SOHODH8	5	150	10	1,500	
8-port 10 Mbps Eth Hub	NX-H8EZ	5	30	12778	383,340	
User Connectivity Subtotal					384,840	0
			Total		8,406,916	3,782,381
Service for all Sun Products is from Sun Microsystems, Inc.			**5Yr. cost**		12,189,298	
Service for Oracle products is from Oracle, Inc.			**tpmC Rating**		115,395.73	
Service for Tuxedo is from BEA Systems, Inc.			**$/tpmC**		$105.63	

Audited by: Francois Raab, Information Paradigm, Inc.

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

Note: Hardware Available and Sun Software Available Now; Oracle Software Available May 18, 1999, Veritas available July 31, 1999.

Sun
ORACLE®

Sun Starfire Enterprise 10000 using Oracle8i

TPC-C 3.4

Report Date: March 24, 1999

Numerical Quantity Summary

MQTH, Computed Maximum Qualified Throughput **= 115,395.73 tpmC**

% throughput difference, reported & reproducibility runs = < 2%

Response Times (in secs)	90th Percentile	Average	Maximum
Menu	0.50	0.22	1.58
New-Order	1.00	0.39	9.67
Payment	0.60	0.38	8.59
Order-Status	0.40	0.32	3.73
Delivery(interactive)	0.74	0.29	1.56
Delivery(deferred)	2.00	0.31	11.00
Stock-level	1.00	0.38	5.06

Transaction Mix, in percent of total transactions

New-Order	44.93%
Payment	43.02%
Order-Status	4.02%
Delivery	4.02%
Stock-level	4.01%

Keying/Think Times (in secs)	Average.	Min.	Maximum
New-Order	18.015 / 12.082	18.01 / 0	18.062 / 120.80
Payment	3.016 / 12.080	3.01 / 0	3.056 / 120.80
Order-Status	2.016 / 10.056	2.01 / 0	2.040 / 100.80
Delivery	2.016 / 5.077	2.01 / 0	2.043 / 50.80
Stock-level	2.016 / 5.095	2.01 / 0	2.034 / 50.80

Test Duration	
Ramp-up time	25 minutes
Measurement Interval	30 minutes
Number of checkpoints	1
Checkpoint Interval	30 minutes
Number of transactions (all types) completed in measurement interval	7705325

Preface

This report documents the compliance of the Sun Microsystems TPC Benchmark ™C testing on the Sun Starfire Enterprise 10000 running Solaris 7, Oracle8i v 8.1.5.1 RDBMS and Tuxedo 6.3 with the *TPC Benchmark ™C Standard Revision 3.4*

Document Structure

The *TPC Benchmark ™C Full Disclosure Report* is organized as follows:

- The main body of the document lists each item in Clause 8 of the TPC Benchmark ™C Standard and explains how each specification is satisfied.
- Appendix A contains the application source code that implements the transactions and forms modules.
- Appendix B contains the code used to create and load the database.
- Appendix C contains the configuration information for the operating system, the RDBMS and Tuxedo.
- Appendix D contains the 180-day space calculations.
- Appendix E contains the code used to generate transactions and measure response times.
- Appendix F contains the screen layouts of all the forms.

Additional Copies

Additional copies of this report may be ordered from the administrator of the TPC:

Shanley P.R.
777 N First Street, Suite 600
San Jose, CA 95112-6311
(408) 295-8894
FAX (408) 295-2613

TPC Benchmark C Overview

The *TPC Benchmark ™C Standard Specification* requires test sponsors to publish, and make available to the public, a full disclosure report for the results to be considered compliant with the Standard. The required contents of the full disclosure report are specified in Clause 8.

This report is intended to satisfy the Standard's requirement for full disclosure. It documents the compliance of the benchmark tests reported in the *TPC Benchmark ™C* results for the Sun Starfire Enterprise 10000 running the Oracle8i v 8.1.5.1 RDBMS.

In the *Standard Specification*, the main headings in Clause 8 are keyed to the other clauses. The headings in this report use the same sequence, so that they correspond to the titles or subjects referred to in Clause 8.

Each section in this report begins with the text of the corresponding item from Clause 8 of the *Standard Specification*, printed in italic type. The plain type text that follows explains how the tests comply with the TPC Benchmark ™C requirement. In sections where Clause 8 requires extensive listings, the section refers to the appropriate appendix at the end of this report.

1. General Items

1.1 Application Code and Definition Statements

The application program (as defined in Clause 2.1.7) must be disclosed. This includes, but is not limited to, the code implementing the five transactions and the terminal input and output functions.

Appendix A., "Application Code" contains the application source code that implements the transactions and forms modules.

1.2 Benchmark Sponsor

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

Sun Microsystems and Oracle Corporation are the sponsors of this TPC-C benchmark.

1.3 Parameter Settings

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

- *Database Tuning Options*
- *Recovery/commit options*
- *Consistency/locking options*
- *Operating system and application configuration parameters*
- *Compilation and linkage options and run-time optimizations used to create/install applications, OS, and/or databases.*

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

Appendix C., "Tunable Parameters" contains the Solaris 7 and Oracle8i parameters used in this benchmark.

1.4 Configuration Diagrams

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

Figure 1 on page 10 is a diagram of the benchmark configuration. Figure 2 on page 11 is a configuration diagram of the priced system.

1.4.1 Configuration Items for the Sun Starfire Enterprise10000

For the priced configuration, the server machine was a Sun Starfire Enterprise 10000 that consisted of the following:

- 64 UltraSPARC II 400 MHz processors.

- 64GB of main memory.
- Two RSM trays (7 x 9GB disks each).
- 27 Sun StorEdgeArrays Model A3500 (60 x 9GB SCSI disks in 23 arrays and 84 x 9GB in 4 arrays).
- 46 Ultra SCSI host adaptors.
- 3 SCSI-2 host adaptors.
- 12 GB Backup Tape Device.
- 8 100BaseT networks for connecting to the client systems.

For the benchmark configuration, we used the same configuration as above. except that the disk multipack had 2 x 2.1GB drives, one RSM tray had 5 x 2.1GB drives, and the other RSM tray had 7 x 4.2GB drives.

- For both the priced and benchmark configurations, the client machines were 32 Sun Ultra 10 Model 333's each containing:
- One UltraSPARC II 333 MHz processor.
- 32KB (D+I), 512KB external cache.
- 1GB of main memory.
- One internal SCSI-2 controller.
- One internal 9GB SCSI disk.

The benchmark configuration used a Remote Terminal Emulator (RTE) to emulate TPC-C user sessions. The driver systems were directly connected through ethernet to the Ultra 10 Model 333's which emulated the database client sessions.

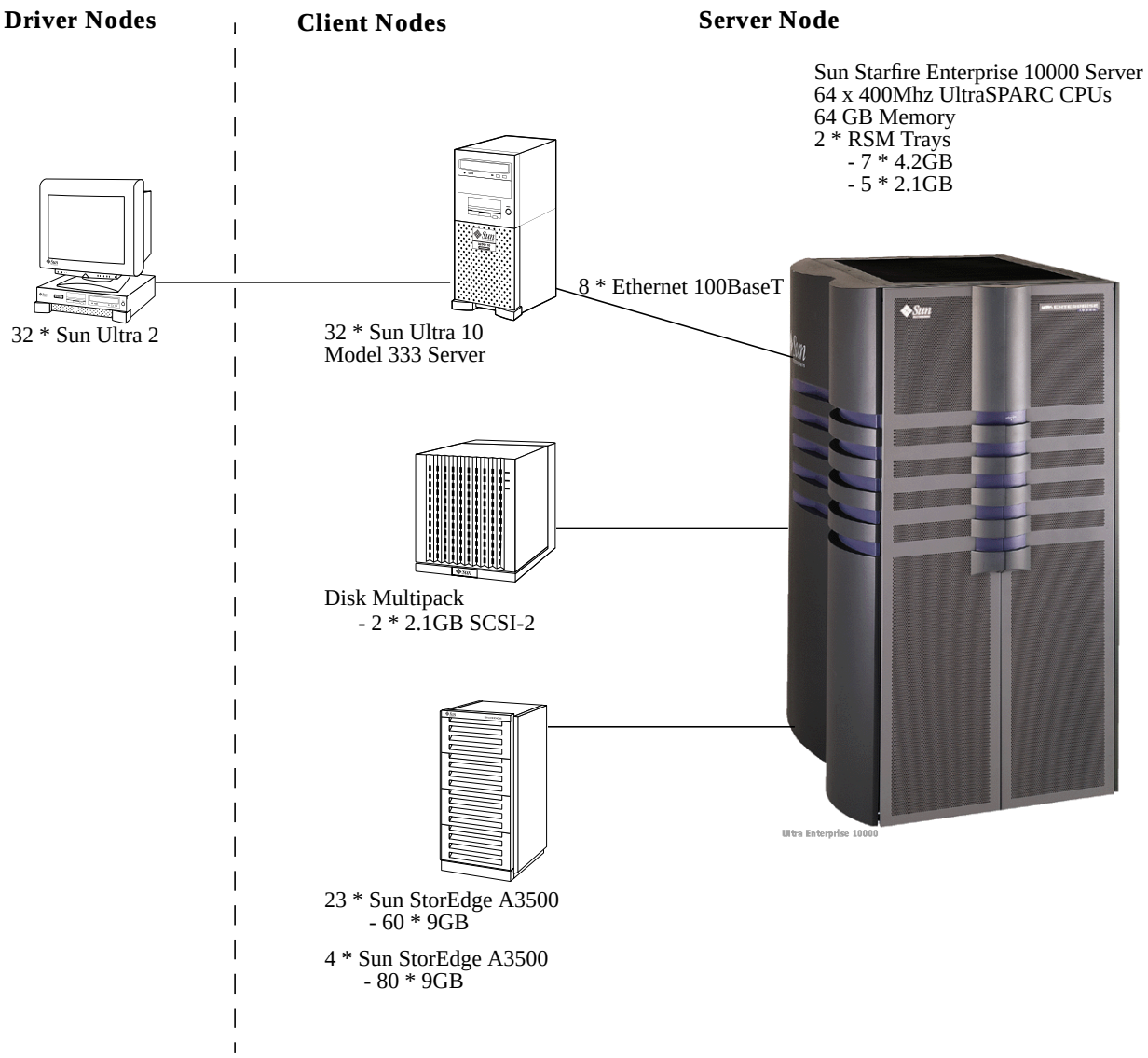


Figure 1 The Sun Starfire Enterprise 10000 Benchmark Configuration

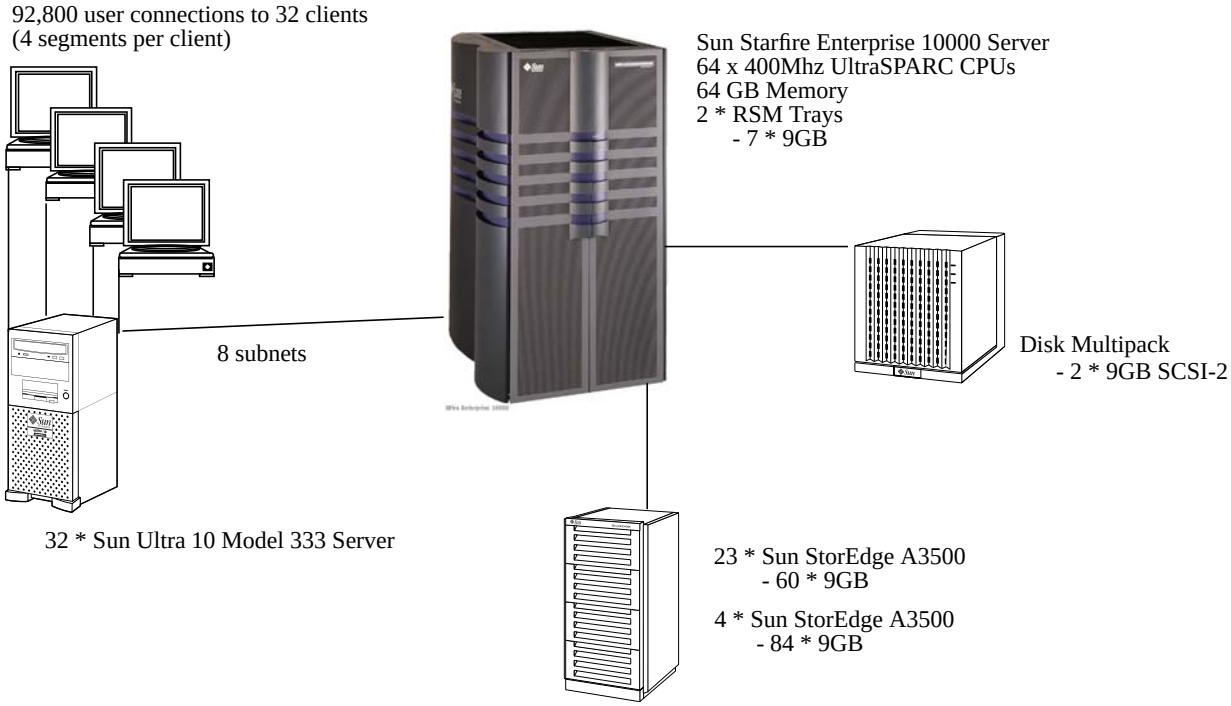


Figure 2 The Sun Starfire Enterprise 10000 Priced Configuration.

2. Clause 1 Related Items

2.1 Table Definitions

Listing must be provided for all table definition statements and all other statements used to set up the database.

Appendix B., "Database Design" describes the programs that define, create, and populate an Oracle8 database for TPC-C testing.

2.2 Physical Organization of Database

The physical organization of tables and indices, within the database, must be disclosed.

Space was allocated to Oracle8 on the server according to the data in section 5.2. The size of the database devices on each disk drive was calculated to provide even distribution of load across the disk drives.

2.3 Insert and Delete Operations

It must be ascertained that insert and/or delete operations to any of the tables can occur concurrently with the TPC-C transaction mix. Furthermore, any restrictions in the SUT database implementation that precludes inserts beyond the limits defined in Clause 1.4.11 must be disclosed. This includes the maximum number of rows that can be inserted and the maximum key value for these new rows.

There were no restrictions on insert and delete operations to any tables beyond the limits defined in Clause 1.4.11.

2.4 Partitioning

While there are a few restrictions placed upon horizontal or vertical partitioning of tables and rows in the TPC-C benchmark (see Clause 1.6), any such partitioning must be disclosed.

Partitioning was not used.

2.5 Table Replication

Replication of tables, if used, must be disclosed (see Clause 1.4.6).

No tables were replicated in this implementation.

2.6 Table Attributes

Additional and/or duplicated attributes in any table must be disclosed along with a statement on the impact on performance (see Clause 1.4.7).

No additional or duplicate attributes were added to any of the tables.

3. Clause 2 Related Items

3.1 Random Number Generation

The method of verification for the random number generation must be described.

The Random Number Generator used was the one that appeared in the article titled “Random Number Generators: Good Ones Are Hard To Find” in the communications of the ACM - October 1988, Volume 31, Number 10. The properties of this random number generator are well-known and are documented in the article as producing a uniformly distributed pseudo-random sequence. To generate a random number, the driver programs first use a seed based on the host address, current time and the process-id of the respective session. This guarantees that each emulated user on all the RTE machines is mathematically independent of others.

3.2 Input/Output Screen Layouts

The actual layout of the terminal input/output screens must be disclosed.

The screen layouts are shown in Appendix F., “Screen Layout”.

3.3 Terminal Feature Verification

The method used to verify that the emulated terminals provide all the features described in Clause 2.2.2.4 must be explained.

The terminal features were verified by manually exercising each specification on a representative Sun Ultra 10 Model 333 server.

3.4 Presentation Manager or Intelligent Terminal

Any usage of presentation managers or intelligent terminals must be explained.

The TPC-C forms module was implemented using the capabilities of an xterm terminal emulator.

3.5 Transaction Statistics

Table 1 lists the numerical quantities that Clauses 8.1.3.5 to 8.1.3.11 require.

TABLE 1. Transaction Statistics

Transaction Type	Statistics	Percentage
New Order	Home warehouse	99.00
	Remote warehouse	1.00
	Rolled-back transactions	1.009
	Average items per order	10.001

TABLE 1. Transaction Statistics

Transaction Type	Statistics	Percentage
Payment	Home warehouse	85.012
	Remote warehouse	14.988
	Non-primary key access	59.957
Order Status	Non-primary key access	60.001
Delivery	Skipped transactions	0.00
Transaction Mix	New order	44.93
	Payment	43.02
	Order status	4.02
	Delivery	4.02
	Stock level	4.01

3.6 Queuing Mechanism

The queuing mechanism used to defer the execution of the Delivery transaction must be disclosed.

Delivery transactions were submitted to servers using the same Tuxedo call mechanism that other transactions used. The only difference was that the call was asynchronous - i.e., control returned to the client process immediately and the deferred delivery completed asynchronously.

4. Clause 3 Related Items

4.1 Transaction System Properties (ACID)

The results of the ACID tests must be disclosed along with a description of how the ACID requirements were met. This includes disclosing which case was followed for the execution of Isolation Test 7.

The TPC Benchmark C Standard Specification defines a set of transaction processing system properties that a system under test (SUT) must support during the execution of the benchmark. Those properties are Atomicity, Consistency, Isolation, and Durability (ACID). This section defines each of these properties, describes the steps taken to ensure that they were present during the test and describes a series of tests done to demonstrate compliance with the standard.

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 Payment transaction for a randomly selected warehouse, district, and customer (by customer number as specified in Clause 2.5.1.2) and verify that the records in the CUSTOMER, DISTRICT, and WAREHOUSE tables have been changed appropriately.

The test was performed by first retrieving, through the sqlplus utility, the balances from a set of randomly picked warehouse, district, and customer rows (selected by customer number). Then a Payment transaction was submitted through the TPC Benchmark C application. Upon completion of the transaction, the balances of the selected warehouse, district, and customer rows were once again retrieved to verify that the changes had been made.

4.2.2 Aborted Transaction

Perform the Payment transaction for a randomly selected warehouse, district, and customer (by customer number as specified in Clause 2.5.1.2) and substitute a ROLLBACK of the transaction for the COMMIT of the transaction. Verify that the records in the CUSTOMER, DISTRICT, and WAREHOUSE tables have NOT been changed.

For this test, the same warehouse, district, and customer ids used above were used to issue a transaction to a modified version of the TPC Benchmark C application in which the COMMIT command had been replaced by a ROLLBACK command. After the transaction was aborted, the balances of the warehouse, district, and customer rows were retrieved to verify that no changes had been made to the database.

4.3 Consistency

Consistency is the property of the application that requires any execution of a database transaction to take the database from one consistent state to another, assuming that the database is initially in a consistent state.

The TPC Benchmark C standard requires System Under Test to meet the 12 consistency conditions listed in Clause 3.3.2.

The TPC Benchmark C Standard Specification requires explicit demonstration that the conditions are satisfied for the first four conditions only.

In order to demonstrate the consistency of the application, the following steps were taken:

1. Prior to the start of the benchmark run, the consistency of the database was verified by applying the consistency conditions 1-4 of Clause 3.2.2.
2. A fully-scaled run with a 30-minute steady state period was executed.
3. Upon the completion of the benchmark, the consistency of the database was determined by applying the same consistency conditions used in step 1.

4.4 Isolation

Isolation can be defined in terms of phenomena that can occur during the execution of concurrent transactions. These phenomena are P0 ("Dirty Write"), P1 ("Dirty Read"), P2 ("Non-repeatable Read") and P3 ("Phantom"). The table in Clause 3.4.1 of the TPC-C specifications defines the isolation requirements which must be met by the TPC-C transactions. Sufficient conditions must be enabled at either the system or application level to ensure the required isolation is maintained.

The TPC Benchmark C Standard Specification defines a set of required tests to be performed on the system under test to demonstrate that transaction isolation was present in the system configuration. These tests involve the execution of two transactions on the system and examining the interaction when the results of the transactions are committed to the database and when the results are aborted.

Because the database is shared between transaction processing nodes, each of the tests validating isolation between two transactions was performed on different nodes.

4.5 Isolation Test 1

This test demonstrates isolation for read-write conflicts of Order-Status and New-Order transactions.

1. At terminal 1, an Order-Status transaction was executed and the order returned was noted. The transaction was COMMITted.
2. At terminal 1, a New-Order transaction for the same customer used in step 1 was started but not COMMITted.
3. At terminal 2, an Order-Status transaction was started for the same customer used in step 1.
4. Terminal 2 transaction completed and was COMMITed without being blocked by terminal 1. The transaction returned the same order as returned by step 1.
5. COMMITted the transaction on terminal 1.
6. At terminal 2, an Order-Status transaction for the same customer used in step 1 was started, and it returned the order inserted by the New-order transaction in step 2.

4.6 Isolation Test 2

This test demonstrates isolation for read-write conflicts of Order-Status and New-Order transactions when the New-Order transaction is ROLLLED BACK.

1. At terminal 1, an Order-Status transaction was executed and the order returned was noted. The transaction was COMMITted.
2. At terminal 1, a New-Order transaction was started for the same customer used in step 1, but not COMMITted.
3. At terminal 2, an Order-Status transaction was started for the same customer used at terminal 1.
4. The terminal 2 transaction completed and was COMMITted without being blocked by terminal 1. The transaction returned the same order as in step 1.
5. A ROLLBACK was executed for the transaction at terminal 1.
6. At terminal 2, an Order-status transaction for the same customer used in step 1 was started, and it returned the same order returned in step 1.

4.7 Isolation Test 3

This test demonstrates isolation for write-write conflicts of two New-Order transactions.

1. At terminal 1, a New-Order transaction was started but not committed.
2. At terminal 2, another New-Order transaction was started for the same customer used at terminal 1.
3. The terminal 2 transaction waited for the terminal 1 transaction to complete.
4. COMMITted the transaction at terminal 1. The transaction at terminal 2 completed.
5. The order number for the terminal 2 transaction was one greater than the terminal 1 transaction. The Next Order Number for the district reflected the results from both transactions.

4.8 Isolation Test 4

This test demonstrates isolation for write-write conflicts of two New-Order transactions when one transaction is ROLLED BACK.

1. At terminal 1, a New-Order transaction was started but not COMMlTted.
2. At terminal 2, another New-Order transaction was started for the same customer used at terminal 1.
3. The terminal 2 transaction waited for the terminal 1 transaction to complete.
4. A ROLLBACK was executed for the transaction on terminal 1. The transaction on terminal 2 completed.
5. The order number for the terminal 2 transaction was one greater than the previous transaction. The Next Order Number for the district reflected the results from only the terminal 2 transaction. In other words, it had been incremented by one.

4.9 Isolation Test 5

This test demonstrates isolation for write-write conflicts of Payment and Delivery transactions.

1. At terminal 1, a Delivery transaction was started but not COMMITted.
2. At terminal 2, a Payment transaction was started for the same customer used at terminal 1.
3. Terminal 2 transaction waited for the terminal 1 transaction to complete.
4. COMMITted the transaction at terminal 1. The transaction at terminal 2 completed.
5. The customer balance reflected the results from both transactions.

4.10 Isolation Test 6

This test demonstrates isolation for write-write conflicts of Payment and Delivery transaction when the Delivery transaction is ROLLED BACK.

1. At terminal 1, a Delivery transaction was started but not COMMITed.
2. At terminal 2, a Payment transaction was started for the same customer used on terminal 1.
3. Terminal 2 transaction waited for terminal 1 transaction to complete.
4. A ROLLBACK was executed for the transaction on terminal 1. The transaction on terminal 2 completed.
5. The customer balance reflected the result of the Payment transaction only.

4.11 Isolation Test 7

This test demonstrates repatable reads for the New-Order transaction while an interactive transaction updates the price of an item.

1. At terminal 1, New-Order transaction Tl was started and was queried for the price of two items, item x and item y. The transaction completed.
2. At terminal 2, New-Order transaction T2 was started for a group of items including item x twice and item y. The transaction was stopped immediately after retrieving the prices of all items. The prices of items x and y retrieved matched those retrieved in step 1.
3. At terminal 1, an interactive SQL transaction,T3, was started to increase the price of items x and y by ten percent. The transaction completed.
4. Continued terminal 2 transaction, The prices of all items were retrieved again. The prices of x and y matched those retrieved in step 1.
5. At terminal 1, another transaction was started to query the prices of items x and y. Completed the transaction.
6. The prices read by the transaction in step 5 matched those set by transaction T3.

4.12 Isolation Test 8

This test demonstrates isolation for phantom protection between New-Order and Order-Status transactions.

1. At terminal 1, an Order-Status transaction Tl was started for a randomly selected customer.
2. T1 was stopped immediately after reading the order table for the selected customer. The most recent order for that customer was retrieved.
3. At terminal 2, a New-Order transaction T2 was started for the same customer. T2 completed and was committed without being blocked by T1.
4. At terminal 1, T1 was resumed and the order table was read again to determine the most recent order for the same customer. The order retrieved was the same as that retrieved in step 2.
5. T1 completed and was committed.

4.13 Isolation Test 9

This test demonstrates isolation for phantom protection between New-Order and Delivery transactions.

1. The NO_D_ID of all new_order rows for a randomly selected warehouse and district was changed to 11. The changes were committed.
2. At terminal 1, a delivery transaction T1 was started for the selected warehouse.
3. T1 was stopped immediately after reading the new-order table for the selected warehouse and district. No qualifying row was found.
4. At terminal 2, a New-Order transaction T2 was started for the same warehouse and district. T2 was completed and was committed without being blocked by T1.
5. At terminal 1, T1 was resumed and the new_order table was read again. No qualifying row was found. T1 was completed and committed.
6. The NO_D_ID of all new_order rows for the selected warehouse and district was restored to its original value.

4.14 Durability

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

List of single failures:

Permanent irrecoverable failure of any single durable medium containing TPC-C database tables or recovery log data.

Instantaneous interruption (system crash/system hang) in processing which requires system reboot to recover.

Failure of all or part of memory (loss of contents).

Sun Microsystems executed three durability tests to satisfy the durability requirements for this implementation of TPC Benchmark C. The combined test for loss of memory and instantaneous interruption was performed with a fully scaled database under the full load of terminals. The test for loss of data and the test for loss of log was performed with a 10 warehouse database and 100 terminals. To the best of our knowledge, a fully scaled test would also pass all durability tests.

4.14.1 Permanent Irrecoverable Failure

Two tests were performed in this case: one for loss of data disk, the other for loss of a recovery log disk. Consistency condition 3 as specified in Clause 3.3.2.3 was verified after these tests.

4.14.2 Loss of Data Disk

The following steps were taken to demonstrate durability in case of loss of a data disk:

1. The database was loaded with 10 warehouses.
2. The database was archived to disk.
3. The D_NEXT_O_ID fields for all rows in district table were summed up to determine the initial count of the total number of orders (count1).
4. A test was executed with 100 terminals. On the driver system, the committed and rolled back New-Order transactions were recorded in a “success” file.
5. After 5 minutes into the measurement period, one of the data disks was powered down.
6. The test was aborted on the driver.
7. The database was restored from the archive and recovered using the transaction log.
8. The contents of the “success” file on the driver and the ORDERS table were compared to verify that records in the “success” file for committed New-Order transaction had corresponding records in the ORDERS table.
9. Step 3 was repeated to determine the total number of orders (count2). Count2-count1 was the same as the number of committed records in the “success” file.

4.14.3 Loss of Log Disk

The following steps were taken to demonstrate durability in case of loss of a recovery log disk:

1. The D_NEXT_ O_ID fields for all rows in district table were added to determine the initial count of the total number of orders (count1).
2. A test was executed with 100 terminals. On the driver system, the committed and rolled back New-Order transactions were recorded in a “success” file.
3. After 5 minutes into the measurement period, one of the log disks was powered down.
4. Since the log disk is mirrored, the system continues to process transactions despite the missing disk.
5. The test was ended after another 5 minutes of execution.

6. The contents of the “success” file on the driver and the ORDERS table were compared to verify that records in the “success” file for committed New-Order transaction had corresponding records in the ORDERS table.
7. Step 1 was repeated to determine the total number of orders (count2). Count2-count1 was the same as the number of committed records in the “success” file.
8. The missing log disk was replaced and was successfully re-synchronized with the disk present during the run.

4.14.4 Instantaneous Interruption and Loss of Memory

Instantaneous interruption and loss of memory tests were combined because the loss of power erases the contents of memory. This failure was induced by removing the SUT’s primary power while the benchmark was running.

1. The D_NEXT_O_ID fields for all rows in district table were summed up to determine the initial count of the total number of orders (count1).
2. A fully-scaled test was executed. On the driver system, the committed and rolled back New-Order transactions were recorded in a “success” file.
3. After 5 minutes into the measurement period, boththe server nodes’ primary power was removed.
4. The test was aborted on the driver.
5. Power was restored to the SUT and a normal system recovery was done. A recovery was automatically performed by Oracle8 when the database was restarted and brought on-line. The recovery restored the database to the consistent point just after the last committed transaction had occurred before the induced failure.
6. The contents of the “success” file on the driver and the ORDERS table were compared to verify that records in the “success” file for committed New-Order transactions had corresponding records in the ORDERS table. The number of transactions missed “in flight” were less than the number of users.
7. Step 1 was repeated to determine the total number of orders (count2). Count2-count1 was compared with the number of committed records in the “success” file.

5. Clause 4 Related Items

5.1 Initial Cardinality of Tables

The Cardinality (e.g. number of rows) of each table, as it existed at the start of the benchmark run (see Clause 4.2), must be disclosed. If the database was over-scaled and inactive rows of the WAREHOUSE table were deleted (see Clause 4.2.2) the cardinality of the WAREHOUSE table as initially configured and the number of rows deleted must be disclosed.

This database was built with 9600 warehouses. Prior to running this test, inactive warehouse ids were deleted out of the warehouse table in accordance with clause 4.2.2.

TABLE 2. Cardinality of Tables

Table	Occurrences
Warehouse	9,280
District	96,000
Customer	288,000,000
History	288,000,000
Orders	288,000,000
New order	86,400,000
Order line	2,879,873,771
Stock	960,000,000
Item	100,000

5.2 Database Layout

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

Table 3 and Table 3 depict the layout of the database for the tested system. The priced system used 23 Sun StorEdge A3500 arrays with 60 9GB drives and 4 Sun StorEdge A3500 arrays with 84 9GB drives for the space required for the initial database and growth.

TABLE 3. Disk Layout

Log Device Name	No. of Devices	Physical Disks
Log Devices (8hr)	2	Each striped across 16 10-way Raid0 luns
Log Mirrors (8hr)	2	Each striped across 16 10-way Raid0 luns

TABLE 4. Disk Layout

Data Device Name	No. of Devices	Physical Disks
customer	140	Each striped across 23 5-way Raid0 luns
history	10	Each striped across 23 5-way Raid0 luns
stock	185	Each striped across 23 5-way Raid0 luns
order_line	162	Each striped across 23 5-way Raid0 luns
order	8	Each striped across 23 5-way Raid0 luns
master	1	Each striped across 23 5-way Raid0 luns
spares (overflow) (customer:5 cust1:1 cust2:1 stocks:8)	15	Each striped across 23 5-way Raid0 luns

The data was striped evenly across a total of 1380 disks in 23 A3500's with 60 drives each. 14 other 9.1gb disks in RSM trays were used for OS, swap and filesystems.

Logs and mirrors were located on 16 Raid0 luns with 10 9gb drives each. This is a total of 160 drives for the logs and 160 drives for the mirrors.

5.3 Type of Database

A statement must be provided that describes:

1. The data model implemented by the DBMS used (e.g., relational, network hierarchical).

2. The database interface (e.g., embedded, call level) and access language (e.g., SQL, DL/1, COBOL read/write) used to implement the TPC-C transactions. If more than one interface/access language is used to implement TPC-C, each interface/access language must be described and a list of which interface/access language is used with which transaction type must be disclosed.

Oracle8i is a relational database management system.The interface we used was PL*SQL and OCI.

5.4 Mapping of Database

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

No replication was done.

5.5 180 Day Space Computation

Details of the 180 day space computations along with proof that the database is configured to sustain 8 hours of growth for the dynamic tables (Order, Order-Line, and History) must be disclosed (see Clause 4.2.3).

The 180 day space computation is shown in Appendix D., "Disk Storage".

6. Clause 5 Related Items

6.1 Measured tpmC

Measured tpmC must be reported.

The measured tpmC was 115,395.73.

6.2 Response Times

Ninetieth percentile, maximum and average response times must reported for all transaction types as well as for the menu response time.

TABLE 5. Response Times

Type	Average	Maximum	90% percentile
New-Order	.391	9.668	1.00
Payment	.376	8.587	0.60
Order-Status	.317	3.733	0.40
Interactive Delivery	.293	1.561	0.74
Deferred Delivery	.311	11.00	2.00
Stock-Level	.383	5.063	1.00
Menu	.223	1.582	0.50

6.3 Keying and Think Times

The minimum, the average, and the maximum keying and think times must be reported for all transaction types.

TABLE 6. Keying Times

Type	Average	Maximum	Minimum
New-Order	18.015	18.062	18.01
Payment	3.016	3.056	3.01
Order-Status	2.016	2.040	2.01
Interactive Delivery	2.016	2.043	2.01
Stock-Level	2.016	2.034	2.01

TABLE 7. Think Times

Type	Average	Maximum	Minimum
New-Order	12.082	120.80	0.00
Payment	12.08	120.80	0.00
Order-Status	10.056	100.80	0.00
Interactive Delivery	5.077	50.80	0.00
Stock-Level	5.095	50.80	0.00

6.4 Response Time Frequency Distribution Curves

Response Time frequency distribution curves (see Clause 5.6.1) must be reported for each transaction type.

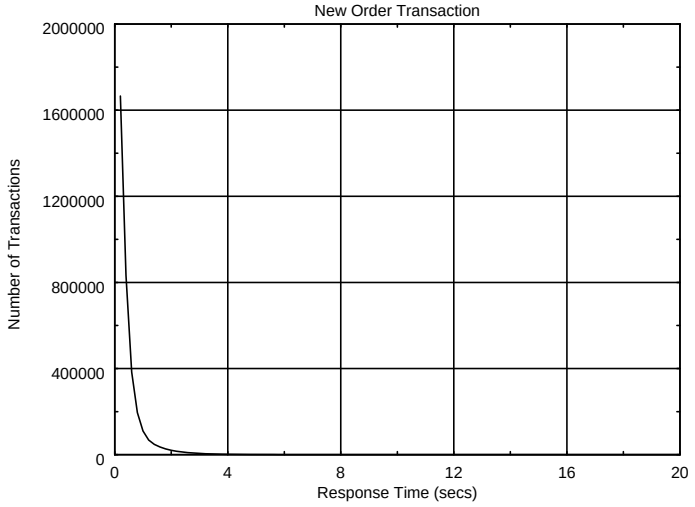


Figure 3 New Order Response Time Distribution

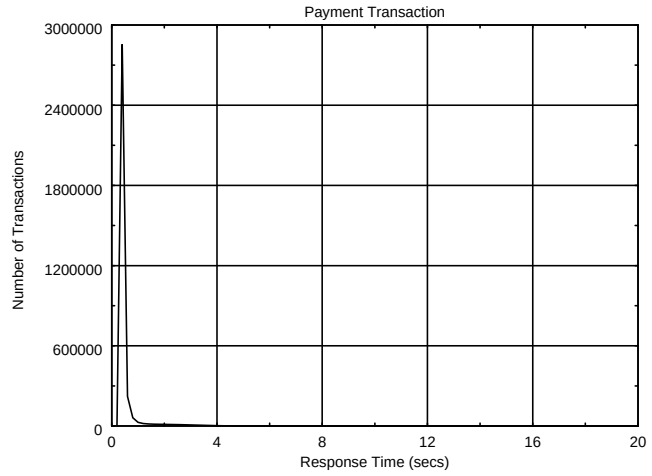


Figure 4 Payment Response Time Distribution

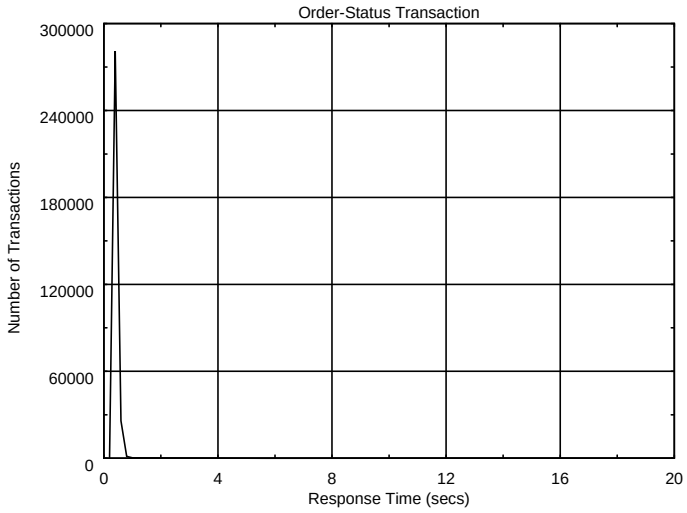


Figure 5 Order Status Response Time Distribution

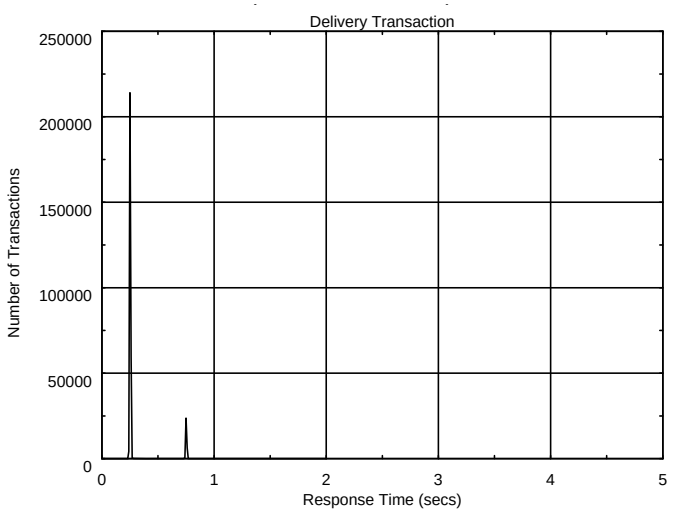


Figure 6 Delivery Response Time Distribution

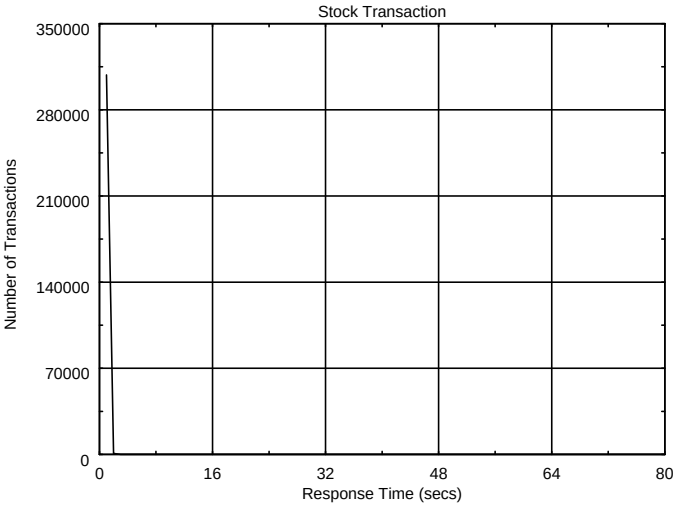


Figure 7 Stock Level Response Time Distribution

6.5 Response time versus throughput

The performance curve for response times versus throughput (see Clause 5.6.2) must be reported for the New Order transaction.

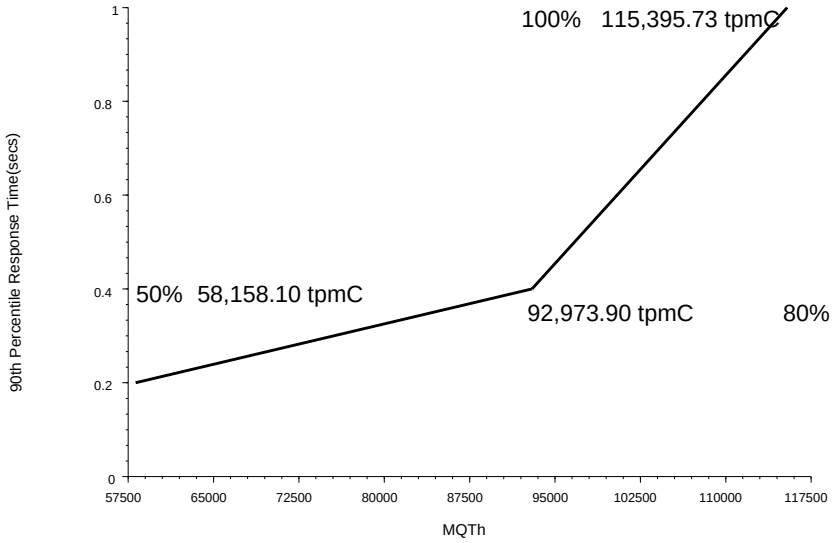


Figure 8 Response Time versus Throughput

6.6 Think Time distribution curves

Think Time frequency distribution curves (see Clause 5.6.3) must be reported for each transaction type.

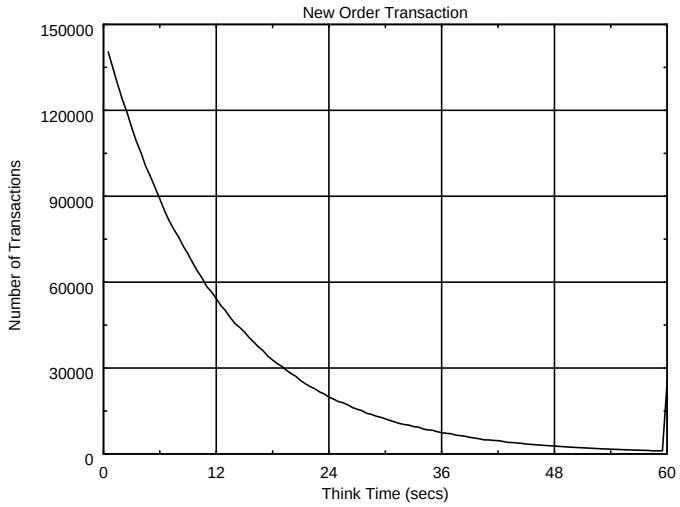


Figure 9 New Order Think Time Distribution

6.7 Throughput versus Elapsed Time

A graph of throughput versus elapsed time (see Clause 6.6.5) must be reported for the New-Order transaction.

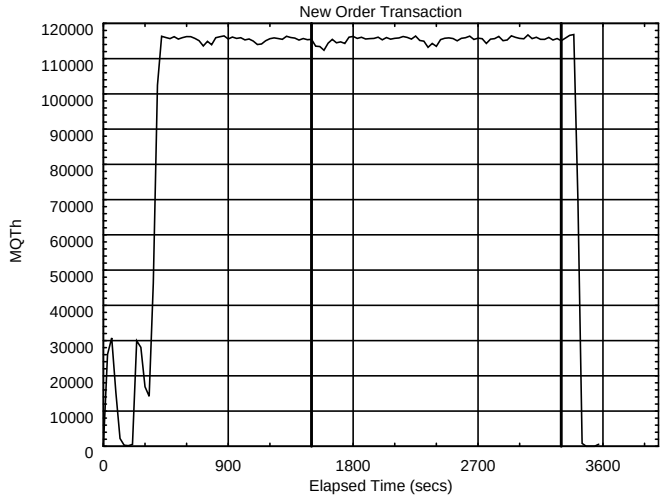


Figure 10 Throughput versus Time

6.8 Steady State Determination

The method used to determine that the SUT had reached a steady state prior to commencing the measurement interval (see Clause 5.5) must be described.

The transaction throughput rate (tpmC) and response times were relatively constant after the initial 'ramp up' period. The throughput and response time were verified by examining the throughput (tpmC) graph reported at 30 second intervals for the duration of the benchmark. Ramp up, steady state, and ramp down are clearly discernible in the graph in Figure 10.

6.9 Work Performed During Steady State

A description of how the work normally performed during a sustained test (for example checkpointing, writing redo/undo log records, etc.), actually occurred during the measurement interval must be reported.

Modified database buffers were migrated to disk on a least-recently-used (lru) basis independent of transaction commits. In addition, every block modification was protected by redo log records. These redo log records were written to the redo log buffer in memory and were flushed to a redo log file on disk when either the transaction was completed or when the redo log buffer became full. However, due to the rapid commits during this benchmark the redo log buffer was always flushed by a commit before it became full. Also, because many transactions were committing in a short period of time, a single flush of the redo log buffer resulted in the redo log data of multiple transactions being written to disk. This is called group commit.

6.9.1 Checkpoint

During an Oracle8i checkpoint, all modified blocks in the shared buffer cache which had not been written to disk since the last checkpoint are written to disk.

6.9.2 Checkpoint Conditions

Oracle8i performs a checkpoint under the following conditions:

1. A redo log switch occurs.
2. The amount of data written to a redo log reaches the log_checkpoint_interval.
3. The elapsed time since the last checkpoint reaches the log_checkpoint_timeout.

6.9.3 Checkpoint Implementation

During each benchmark measurement, a log switch was performed in the ramp-up period. After the initial checkpoint, a logswitch was performed every 30 minutes.

6.9.4 Serializable Transactions

Oracle supports serializable transaction isolation in full compliance with the SQL92 and TPC-C requirements. This is implemented by extending the multiversity concurrency control mechanism long support by Oracle.

Oracle queries take no read locks and see only data committed as of the beginning of the query's execution. This means that the readers and writers coexist without blocking one another, providing a high degree of concurrency and consistency. While this mode does prevent reading dirty data, Oracle's default isolation level also permits a transaction that issues a query twice to see non repeatable reads and phantoms, as defined in SQL92 and TPC-C.

Beginning with Oracle7 release 7.3, a transaction may request a high degree of isolation with the command SET TRANSACTION ISOLATION LEVEL SERIALIZABLE, as defined in SQL92. This transaction mode prevents read/write and write/write conflicts that would cause serializability failures. A session can establish this mode as its default mode, so the SET TRANSACTION command need not be issued in each transaction.

Oracle implements SERIALIZABLE mode by extending the scope of read consistency from individual query to the entire transaction. Instead of limiting a query to data committed at the time the query begins, in a serializable transaction all queries see data as of the beginning of the transaction. Thus, a serializable transaction sees a fixed snapshot of the database, established of the beginning of the transaction.

All reads within a serializable transaction sees only committed data as of the start of that transaction, plus new updates done by the transaction itself. All reads by a serializable transaction are therefore repeatable, as the transaction will access prior versions of data changed (or deleted) by other transactions after the start of the serializable transaction. This behaviour also results in phantom protection since new rows created by other transactions will be invisible to the serializable transaction.

To ensure proper isolation, a serializable transaction cannot modify rows that were changed by other transaction after the beginning of the serializable transaction. If a serializable transaction attempts to update (or delete) a row previously changed by another transaction (serializable or not) since the beginning of the serializable transaction, the update (or delete) statement will fail with error ORA-08177: "Can't serialize access", and the statement will rollback.

```
SET TRANSACTION ISOLATION LEVEL SERIALIZABLE ;
SELECT ..... ;
SELECT ..... ;
UPDATE ..... ;
IF "Can't serialize access"
 THEN ROLLBACK ; LOOP and retry
ELSE COMMIT ;
```

When a serializable transaction fails with this error, the application may either commit the work executed to that point, execute additional (but different) statements, or rollback the entire transaction. Repeated attempts to execute the same statement will always fail with the error "Can't serialize access", unless the other transaction has rolled back and released its lock. This error and these recovery options are similar to the treatment of deadlocks in systems that use read locks to ensure serializable execution. In both cases, conflicts between transactions cannot be resolved unless one of the transactions rolls back and restarts or commits without re-executing the statment receiving the error.

6.10 Reproducibility

A description of the method used to determine the reproducibility of the measurement results must be reported.

In a repeat run, a throughput of 115,031.17 tpmC was achieved.

6.11 Measurement Period Duration

A statement of the duration of the measurement interval for the reported Maximum Qualified Throughput (tpmC) must be included.

The measurement interval was 1,800 seconds. There was 1 checkpoint during the measurement interval.

6.12 Transaction Mix Regulation

The method of regulation of the transaction mix (e.g., card decks or weighted random distribution) must be described. If weighted distribution is used and the RTE adjusts the weights associated with each transaction type, the maximum adjustments to the weight from the initial value must be disclosed.

The weighted distribution algorithm as described in Clause 5.2.4.1 of the TPC-C specification was used to regulate the transaction mix. Weights for the various transactions were statically assigned.

6.13 Numerical Results

The percentage of the total mix for each transaction type must be disclosed.

See Table 1 on page 13 for results.

6.14 New-Orders Rolled-Back

The percentage of New-Order transactions rolled back as a result of invalid item number must be disclosed.

See Table 1 on page 13 for results.

6.15 Order-Line Average

The average number of order-lines entered per New-Order transaction must be disclosed.

See Table 1 on page 13 for results.

6.16 Remote Order-Lines

The percentage of remote order-lines entered per New-Order transaction must be disclosed.

See Table 1 on page 13 for results.

6.17 Remote Payments

The percentage of remote payment transactions must be disclosed.

See Table 1 on page 13 for results.

6.18 Customer Lastname

The percentage of customer selections by customer last name in the Payment and Order-Status transactions must be disclosed.

See Table 1 on page 13 for results.

6.19 Deliveries Skipped

The percentage of Delivery transactions skipped due to there being fewer than necessary orders in the New-Order table must be disclosed.

See Table 1 on page 13 for results.

6.20 Checkpoints

The number of checkpoints in the Measurement Interval, the time in seconds from the start of the Measurement Interval to the first checkpoint and the Checkpoint Interval must be disclosed.

One checkpoint occurred at 330 seconds after the start of ramp-up and one at 630 seconds after the start of the measurement interval. The interval between the two checkpoints was 30 minutes.

7. Clause 6 Related Items

7.1 RTE Description

If the RTE is commercially available, then its inputs must be specified. Otherwise, a description must be supplied of what inputs (e.g. scripts) to the RTE had been used.

The RTE used was developed by Sun Microsystems Computer Company and is proprietary. It consists of a *master_rte* program which forks off the individual RTE processes and controls the run. After the run completes, a separate report generator program collects all the log files and generates the final statistics of a run.

Inputs to the RTE include the names of the RTE machines to run on, client machines to attach to, the database scale, the ramp-up, measurement and ramp-down times. The script used to set these values is shown below:

```
setenv    ramp_up       1500    # ramp_up interval (secs)
setenv    stdy_state    1800    # steady-state/measurement interval (secs)
setenv    ramp_down     120     # ramp_down interval (secs)
setenv    trigger_time  1900    # Trigger time for users to login
setenv    scale         9280    # # of warehouses
setenv    comment       "Fully scaled run"
set users = ( 2900 2900 2900 2900 2900 2900 2900 2900 2900 2900 2900 2900 2900
2900 2900 2900 2900 2900 2900 2900 2900 2900 2900 2900 2900 2900 2900 2900
2900 2900 2900 )
set rte_machines = ( r1 r2 r3 r4 r5 r6 r7 r8 r9 r10 r11 r12 r13 r14 r15 r16 r17
r18 r19 r20 r21 r22 r23 r24 r25 r26 r27 r28 r29 r30 r31 r32)
set clnt_machines = ( c1 c2 c3 c4 c5 c6 c7 c8 c9 c10 c11 c12 c13 c14 c15 c16 c17
c18 c19 c20 c21 c22 c23 c24 c25 c26 c27 c28 c29 c30 c31 c32 )
```

The code used to generate the transactions and record response times is shown in Appendix E., "Driver Scripts".

7.2 Emulated Components

It must be demonstrated that the functionality and performance of the components being emulated in the Driver System are equivalent to that of the priced system. The results of the test described in Clause 6.6.3.4 must be disclosed.

In the priced configuration, workstations are connected to the clients via telnet in the same way as the emulated system. In the tested configuration, the driver system emulates both the terminal and terminal server by making a direct connection to the SUT for each terminal.

7.3 Configuration Diagrams

A complete functional diagram of both the benchmark configuration and the configuration of the proposed (target) system must be disclosed. A detailed list of all software and hardware functionality being performed on the Driver System, and its interface to the SUT must be disclosed (see Clause 6.6.3.6).

Figure 1 is a diagram of the benchmarked configuration and Figure 2 shows the configuration of the priced configuration. Section 1.4 of this Full Disclosure Report gives details on both configurations.

7.4 Network Configuration

The network configurations of both the tested services and the proposed (target) services which are being represented and a thorough explanation of exactly which parts of the proposed configuration are being replaced with the Driver System must be disclosed (see Clause 6.6.4).

The tested configuration used one 10BaseT LAN for each driver system, connecting the driver system to the corresponding client system, and eight 100BaseT LAN's connecting all the client systems to the server system.

The target system is also priced with eight LAN's. 32 clients are connected to the Sun Starfire Enterprise 10000; four clients per LAN. There are four LAN's between each client and the corresponding workstation "terminals". There are about 725 workstation "terminals" on each.

7.5 WAN/LAN Bandwidth

The bandwidth of the network(s) used in the tested/priced configuration must be disclosed.

Local area networks (LANs) with a bandwidth of hundred (100) megabits per second were used in the tested/priced system between the clients and the server. LANs with a bandwidth of ten (10) megabits per second were used between the clients and the workstation "terminals".

7.6 Operator Intervention

If the configuration requires operator intervention, the mechanism and the frequency of this intervention must be disclosed.

The Sun Starfire Enterprise 10000 configuration reported does not require any operator intervention to sustain the reported throughput.

8. Clause 7 Related Items

8.1 System Pricing

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

The Executive Summary lists pricing information for all components. All Sun hardware pricing is from CAT Technologies.

The 100 BaseT hubs pricing and the 10BaseT pricing are from NETLUX,inc.

8.2 Support Pricing

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

8.2.1 Sun Hardware and Software Support

The Gold/Silver Programs of the SunService Support Program were used in all Sun pricing calculations. This program provides complete service with both on-site and telephone assistance. Features of this program include telephone assistance from 8:00 am to 5:00 pm, Monday - Friday; and on-site service assistance from 8:00 am to 5:00 pm, Monday - Friday; and Solaris maintenance releases. This service provides live telephone transfer of software fixes and four-hour on-site response for urgent problems.

All Sun hardware except the Sun StorEdge Arrays has a one-year warranty. The Sun StorEdge Arrays have a 6-month warranty.

8.2.2 Oracle Bronze Customer Care

Oracle Bronze Customer Care includes :

- Real-time Telephone Technical Assistance from 5:00 a.m. to 6.00 p.m. PST.
- Product updates.
- Online Access to the Real Time Support System (RTSS).
- Online Access to the Oracle Worldwide Support's Mail Server.
- Subscription to Oracle Worldwide Support's newsletter, and
- Access to Oracle Worldwide Support's private forum on CompuServe.

8.3 Discounts

The following generally available discounts to any buyer with like conditions were applied to the priced configurations:

- a 10% Sun support 3 year contract discount
- a 5% Sun support pre-payment discount

8.4 Availability

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

All Sun Microsystems Computer Company hardware and software available now. Oracle Software Available May 18, 1999, Veritas available July 31, 1999

8.5 TpmC, Price/TpmC

A statement of the measured tpmC, as well as the respective calculations for 5-year pricing, price/performance (price/tpmC), and the availability date must be included.

The Maximum Qualified Throughput for the Sun Starfire Enterprise 10000 was 115,395.73 tpmC at $105.63 per tpmC. The availability date for the entire configuration is August 22, 1999.

9. Clause 8 Related Items

9.1 Auditor's Report

The auditor's name, address, phone number, and a copy of the auditor's attestation letter indicating compliance must be included in the Full Disclosure Report.

See attached attestation letter for the Sun report as well as the Auditor's name and address.

Information Paradigm

TPC TRANSACTION PROCESSI PERFORMANCE COUNC

Certified Auditor

Sponsors: Glenn Fawcett
Strategic Application Engineer
Sun Microsystems, Inc
8300 SW Creekside Pl.
Beaverton Or, 97008

Karl Haas
Director OLTP, performance
Oracle Corporation
500 Oracle Parkway
Redwood Shores, Ca 94065

March 19, 1999

I remotely verified the TPC Benchmark™ C performance of the following Client Server configuration:

Platform: Sun Starfire Enterprise 10000 Server c/s
Operating system: Solaris 7
Database Manager: Oracle8I v 8.1.5.2
Transaction Manager: BEA Tuxedo 6.3

The results were:

CPU's Speed	Memory	Disks	NewOrder 90% Response Time	tpmC
Server: Sun Starfire Enterprise 10000 Server				
64 x UltraSPARC II (400 MHz)	64 GB (4 MB cache per processor)	1700 x 9 GB 7 x 4.2 GB 7 x 2.1 GB	1.00 Seconds	115,395.73
Thirty two Clients: Ultra 10 Model 333 (Specification for each client)				
1 x UltraSPARC II (333 MHz)	1 GB	1 x 9 GB	n/a	n/a

In my opinion, these performance results were produced in compliance with the TPC requirements for Revision 3.4 of the benchmark. The following verification items were given special attention:

- The transactions were correctly implemented
- The database records were the proper size
- The database was properly scaled and populated
- The ACID properties were met
- Input data was generated according to the specified percentages

1373 North Franklin Street • Colorado Springs, CO 80903-2527 • **Office**: 719/473-7555 • **Fax**: 719/473-7554

- The transaction cycle times included the required keying and think times
- The reported response times were correctly measured.
- At least 90% of all delivery transactions met the 80 Second completion time limit
- All 90% response times were under the specified maximums
- The measurement interval was representative of steady state conditions
- The reported measurement interval was 30 minutes
- One checkpoint was taken during the measurement interval
- Measurement repeatability was verified
- The 180 day storage requirement was correctly computed
- The system pricing was verified for major components and maintenance

Additional Audit Notes:

The (7) 2.1 GB and (7) 4.2 GB disks used in the measured configuration were replaced by (14) 9 GB disks in the priced configuration. Based on data collected, it is my opinion that this substitution would have no material impact on the reported performance.

Respectfully Yours,

François Raab
President

Starfire Enterprise 10000

1373 North Franklin Street • Colorado Springs, CO 80903-2527 • **Office**: 719/473-7555 • **Fax**: 719/473-7554

Appendix A. Application Code

This Appendix contains the application source code that implements the transactions and Forms modules.

client/tpcc_client.c

```
/*************************************************************************
tpcc_client.c
*************************************************************************/
#include<stdio.h>
#include<string.h>
#include<unistd.h>
#include<sys/types.h>
#include<sys/time.h>
#include<sys/procset.h>
#include<sys/param.h>
#include<limits.h>
#include<errno.h>


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

#include "tpcc_client.h"
#include "tpcc_tux.h"



main()
{
int             menu_selection;
void            do_transaction(int);

initialize();
Send_Menu();

while ((menu_selection = sel_trans()) != 9) {
if ((menu_selection < 1) || (menu_selection > 5))
continue;
do_transaction(menu_selection - 1);
Send_Menu();
}
rundown();
}
initialize()
{
int             menu_selection, start, m, n;
char list[] = "0123456789abcdefghijklmnopqrstuvwxyzABCDEFGHIJKLMNOPQRSTUVWXYZ";
tty_in = 0;
tty_out = 1;

if (Init_Monitor()) {
fprintf(stderr, "\033[24;1H\033[mUnable to connect to TP Monitor\n\01");
exit(1);
}

get_wd();

set_display();


}

rundown()
{
restore_terminal();
Rundown_Monitor();
}

get_wd(int num)
{
num = 5 ;

setup_wd();
display_screen(num);
get_inputs(num);
}

void
do_transaction(int num)
{
int             status;
char c;

display_screen(num);
status = get_inputs(num);
if (status == 3)
return;
if ( Snd_Txn_To_Monitor(num) ){
 cleanup("\033[24;1H\033[mTransaction error occured");
}
else
display_output(num);
}
```

client/tpcc_client.h

```
/*************************************************************************
tpcc_client.h
*************************************************************************/
#include <time.h>
#include <sys/types.h>
#include <time.h>

#define BOOLEAN int
#define LINEMAX 256

#define FALSE 0
#define TRUE 1
#define NEWORDER 0
#define PAYMENT 1
#define ORDSTAT 2
#define DELIVERY 3
#define STOCKLEV 4
#define WD 5
#define MAX_OL 15
#define TPM_ERROR 1

char            date_field[80];
char            tty_name[11];
int             w_id;
int             d_id;
int             xact_type;

struct no_itm_struct {
int             ol_supply_w_id;
int             ol_i_id;
char            i_name[25];
int             ol_quantity;
int             s_quantity;
char            brand[2];
double          i_price;
doubleol_amount;
};
struct no_struct {
int             w_id;
int             d_id;
int             c_id;
int             o_id;
int             o_ol_cnt;
double          c_discount;
double          w_tax;
double          d_tax;
char            o_entry_d[20];
        char            c_credit[3];
char            c_last[17];
struct no_itm_struct o_ol[15];
       char     status[25];
double          total;
};
struct pay_struct {
int             w_id;
int             d_id;
int             c_id;
int             c_w_id;
int             c_d_id;
double          h_amount;
double          c_credit_lim;
double          c_balance;
double          c_discount;
char            h_date[20];
char            w_street_1[21];
char            w_street_2[21];
char            w_city[21];
char            w_state[3];
char            w_zip[11];
char            d_street_1[21];
char            d_street_2[21];
char            d_city[21];
char            d_state[3];
char            d_zip[11];
char            c_first[17];
char            c_middle[3];
       char     c_last[17];
char            c_street_1[21];
char            c_street_2[21];
char            c_city[21];
char            c_state[3];
char            c_zip[11];
char            c_phone[17];
char            c_since[11];
char            c_credit[3];
char c_data_1[51];
char c_data_2[51];
char c_data_3[51];
char c_data_4[51];


};

struct ord_itm_struct {
int             ol_supply_w_id;
int             ol_i_id;
int             ol_quantity;
double          ol_amount;
char            ol_delivery_d[11];
};

struct ord_struct {
int             ol_cnt;
int             w_id;
int             d_id;
int             c_id;
int             o_id;
int             o_carrier_id;
double          c_balance;
char            c_first[17];
char            c_middle[3];
char            c_last[17];
char            o_entry_d[20];
struct ord_itm_struct s_ol[MAX_OL];
};

struct del_struct {
```

```
int             w_id;
int             o_carrier_id;
time_t          queue_time;
};

struct stock_struct {
int             w_id;
int             d_id;
int             threshold;
int             low_stock;
};

struct menu_struct {
intw_id;
intd_id;
};
typedef union info {
struct no_struct neworder;
struct pay_struct payment;
struct ord_struct ordstat;
struct del_struct delivery;
struct stock_struct stocklev;
struct menu_struct wd;
}          info_t;
struct io_tpcc {
int             type;
info_tinfo;
};
```

client/tpcc_forms.c

```
/*******************************************************************************
tpcc_forms.c
*******************************************************************************/
#include <stdio.h>
#include <sys/termio.h>
#include <stdlib.h>
#include <sys/time.h>
#include <time.h>
#include "tpcc_client.h"
#include "tpcc_forms.h"
#include "tpcc_tux.h"

static intscreen_bufindex;
static char     screen_buf[SCRBUF_LEN];
extern void     Clog(char *,...);
extern void     SCREENlog(int, char *);
const charblanks[1802] = "                                        ";

void
setraw()
{
/** put screen in raw mode **/

extern struct tbufsave;
struct termio   tbuf;
int             status;
if (ioctl(tty_in, TCGETA, &tbuf) == -1)
return;
tbufsave = tbuf;
tbuf.c_iflag &= ~(INLCR | ICRNL | IUCLC | ISTRIP | IXON | BRKINT);
tbuf.c_oflag &= ~OPOST;
tbuf.c_lflag &= ~(ICANON | ISIG | ECHO);
tbuf.c_cc[VMIN] = LEAVE_SCREEN_MIN;
tbuf.c_cc[VTIME] = LEAVE_SCREEN_TIMEOUT;

if (ioctl(tty_out, TCSETAF, &tbuf) == -2)
syserr("ioctl_ERROR#2 - setting raw mode for STDIN error");
}
void
restore_terminal()
{/** restore terminal flags **/
extern struct tbufsave;

struct termio   tbuf;
int             status;

if (ioctl(tty_out, TCSETAF, &tbufsave) == -1)
syserr("ioctl_ERROR#3 - restoring original input terminal settings error");

tbuf = tbufsave;
if (ioctl(tty_out, TCSETAF, &tbuf) == -1)
syserr("ioctl_ERROR#4 - Forcing the original settings back for STDIN error");
}

int
sel_trans()
{
int             c, read_count;
static char     inbuf[2] = "\0\0";
int             i = 0;

read_count = read(tty_in, inbuf, 1);
if (read_count == 0)
syserr("TTY lost connection");
if (inbuf[0] == QUIT)
return 9;

switch (inbuf[0]) {
case 'n':
c = 1; break;
case 'p':
c = 2; break;
case 'o':
c = 3; break;
case 'd':
c = 4; break;
case 's':
c = 5; break;
case 'e':
c = 9; break;
}
return c;
}

int         newo_val(int *);
int         paym_val(int *);
int         ords_val(int *);
int         del_val(int *);
int         stock_val(int *);
int         wd_val(int *);
int(*p_check_function[]) () = {
&newo_val,
&paym_val,
&ords_val,
&del_val,
&stock_val,
&wd_val
};

int
get_inputs(int txn_type)
{
int         done = FALSE;
int             i, returned_key;
io_elem        *ioptr;
int             last_input;
floatfloat_h_amount = 0.0;

memset(tuxibuf, '\0', sizeof(info_t ));
int_h_amount = 0;

last_input = Forms[txn_type].num_input_elems - 1;
i = 0;
while (done == FALSE) {

ioptr = &Forms[txn_type].input_elems[i];

if (txn_type == PAYMENT){
if (i == 5)
payment_input = TRUE;
else
payment_input = FALSE;
}

returned_key = (ioptr->fptr) (ioptr->x, ioptr->y, ioptr->len,ioptr->flags, ioptr-
>dptr);


switch (returned_key) {
case BACKTAB:
if (i == 0)
i = last_input;
else
i--;
break;
case TAB:
if (i == last_input)
i = 0;
else
i++;
break;
case QUIT:
done = TRUE;
break;
case SUBMIT:
case LF:
if (screen_bufindex) {
PAINTSCRLEN(screen_buf, screen_bufindex);
screen_bufindex = 0;
}
payment_input = FALSE;
done = (p_check_function[txn_type]) (&i);
break;
}
}
return returned_key;
}
int
newo_val(int *pos)
{
int         done = FALSE;
struct no_itm_struct *ol_ptr, *ol_ptr2;
intblank_line = 0, i, j;
intblank_array[MAX_OL];
char*bufp;

iNO->w_id = w_id;

for (i=0; i<MAX_OL; i++)
blank_array[i] = 0;

if (iNO->d_id <= 0) {
*pos = 0;
message = TRUE;
PAINTSCR(MANDATORY_MSG);

} else if (iNO->c_id <= 0) {
*pos = 1;
message = TRUE;
PAINTSCR(MANDATORY_MSG);

} else {

ol_ptr = iNO->o_ol;

for (i = 0; i < MAX_OL; i++, ol_ptr++) {

if (ol_ptr->ol_i_id || ol_ptr->ol_supply_w_id
    || ol_ptr->ol_quantity)
{
/* and is that data complete */
if (ol_ptr->ol_i_id && ol_ptr->ol_supply_w_id
    && ol_ptr->ol_quantity)
```

```
{
iNO->o_ol_cnt++;
if (blank_line != 0) {
ol_ptr2 = iNO->o_ol;
for (j=0; j < i; j++) {
if (blank_array[j]) {
blank_array[j] = 0;
break;
}
ol_ptr2++;
}
ol_ptr2->ol_i_id =
ol_ptr->ol_i_id;
ol_ptr2->ol_supply_w_id =
ol_ptr->ol_supply_w_id;
ol_ptr2->ol_quantity =
ol_ptr->ol_quantity;
ol_ptr->ol_i_id = 0;
ol_ptr->ol_supply_w_id = 0;
ol_ptr->ol_quantity = 0;
blank_array[i] = 1;
bufp = output_screen;
bufp += DISPLAY_INT(bufp, 4, 3, j+FIRST_OL_ROW, ol_ptr2->ol_supply_w_id);
bufp += DISPLAY_INT(bufp, 5, 11, j+FIRST_OL_ROW, ol_ptr2->ol_i_id);
bufp += DISPLAY_INT(bufp, 2, 45, j+FIRST_OL_ROW, ol_ptr2->ol_quantity);
bufp += DISPLAY(bufp, 3, i+FIRST_OL_ROW, "    ");
bufp += DISPLAY(bufp, 11, i+FIRST_OL_ROW, "     ");
bufp += DISPLAY(bufp, 45, i+FIRST_OL_ROW, "  ");
*bufp++ = '\0';
        PAINTSCRLEN(output_screen, bufp - output_screen);
}
} else {
*pos = 2 + 3 * i;
PAINTSCR(INCOMPLINE_MSG);
message = TRUE;
iNO->o_ol_cnt = 0;
return FALSE;
}

} else {
blank_line++;
blank_array[i] = 1;
}
}

if (!iNO->o_ol_cnt) {
*pos = 2;
PAINTSCR(MANDATORY_MSG);
message = TRUE;
iNO->o_ol_cnt = 0;
return FALSE;
}
done = TRUE;
}
return done;
}

int paym_val(int *pos)
{
int         done = FALSE;
iPT->w_id = w_id;
if (iPT->d_id <= 0) {
*pos = 0;
message = TRUE;
PAINTSCR(MANDATORY_MSG);
} else if (iPT->c_w_id <= 0) {
*pos = 2;
message = TRUE;
PAINTSCR(MANDATORY_MSG);
} else if (iPT->c_d_id <= 0) {
*pos = 3;
message = TRUE;
PAINTSCR(MANDATORY_MSG);
} else if (int_h_amount <= 0) {
*pos = 5;
message = TRUE;
PAINTSCR(MANDATORY_MSG);
} else if (iPT->c_id <= 0) {
if (iPT->c_last[0] == '\0') {
message = TRUE;
PAINTSCR(ID_OR_LAST_MSG);
*pos = 1;
} else {
done = TRUE;
}
} else
done = TRUE;
iPT->h_amount = ((float)int_h_amount)/100.0 ;
return done;
}

int ords_val(int *pos)
{
int         done = FALSE;
iOS->w_id = w_id;
if (iOS->d_id <= 0) {
*pos = 0;
message = TRUE;
PAINTSCR(MANDATORY_MSG);
} else if (iOS->c_id <= 0) {
if (iOS->c_last[0] == '\0') {
message = TRUE;
PAINTSCR(ID_OR_LAST_MSG);
*pos = 1;
} else {
done = TRUE;
}
} else
done = TRUE;
return done;
}

int del_val(int *pos)
{
int         done = FALSE;
iDY->w_id = w_id;
if (iDY->o_carrier_id <= 0) {
message = TRUE;
PAINTSCR(MANDATORY_MSG);
} else {
time(&iDY->queue_time);
done = TRUE;
}
return done;
}

int stock_val(int *pos)
{
int         done = FALSE;
iSL->w_id = w_id;
iSL->d_id = d_id;
if (iSL->threshold <= 0) {
message = TRUE;
PAINTSCR(MANDATORY_MSG);
} else
done = TRUE;
return done;
}

int wd_val(int *pos)
{
int         done = FALSE;

if (iWD->w_id == 0 || iWD->d_id == 0) {
message = TRUE;
PAINTSCR(MANDATORY_MSG);
} else {
w_id = iWD->w_id ;
d_id = iWD->d_id;
done = TRUE;
}
return done;
}
void setup_wd()
{
io_elem        *p;
        char            buf[128];
        void            setup_io_elems();
        setraw();
        setup_screen_buffer(&Forms[5], 5);

p = Forms[WD].input_elems;
        p++->dptr = &iWD->w_id;
        p++->dptr = &iWD->d_id;

CLRSCN(buf);
PAINTSCR(buf);
}

void set_display()
{
int             i;
char            buf[128];
void            setup_io_elems();
for (i = 0; i < MAX_FORMS; i++)
setup_screen_buffer(&Forms[i], i);

setup_io_elems();

CLRSCN(buf);
PAINTSCR(buf);
}

void display_screen(int screen_num)
{
if (PAINTSCRLEN(Forms[screen_num].blank_form,
    Forms[screen_num].blank_formlen) == -1)
syserr("Can't write out form");
}

void Send_Menu()
{
if (PAINTSCRLEN(menu_buf, menu_buflen) == -1)
syserr("Can't send menu");
}

void setup_io_elems()
{
io_elem        *p;
int             i;
p = Forms[NEWORDER].input_elems;
p++->dptr = &iNO->d_id;
p++->dptr = &iNO->c_id;
for (i = 0; i < 15; i++) {
p++->dptr = &iNO->o_ol[i].ol_supply_w_id;
p++->dptr = &iNO->o_ol[i].ol_i_id;
p++->dptr = &iNO->o_ol[i].ol_quantity;
}
p = Forms[PAYMENT].input_elems;
p++->dptr = &iPT->d_id;
p++->dptr = &iPT->c_id;
p++->dptr = &iPT->c_w_id;
p++->dptr = &iPT->c_d_id;
p++->dptr = (int *) &iPT->c_last[0];
p->dptr = &int_h_amount;

p = Forms[ORDSTAT].input_elems;
p++->dptr = &iOS->d_id;
p++->dptr = &iOS->c_id;
p->dptr = (int *) &iOS->c_last[0];
p = Forms[DELIVERY].input_elems;
p->dptr = &iDY->o_carrier_id;
p = Forms[STOCKLEV].input_elems;
p->dptr = &iSL->threshold;
}
int
setup_screen_buffer(struct form_info * form_ptr, int txn_type)
{
```

```
FILE           *ifile;
const text_elem      *tbuf;
char           *bufp;
int             ct;
char            input_display_buf[64];
io_elem        *io_ptr;

bufp = screen_buf;
bufp += CLRSCN(bufp);
tbuf = form_ptr->tp;
while (tbuf->text) {
bufp += DISPLAY(bufp, tbuf->y, tbuf->x, tbuf->text);
tbuf++;
}
bufp += SWITCH_TO_UNDERL(bufp);

ct = 0;
for (io_ptr = form_ptr->input_elems; io_ptr->y != 999; io_ptr++) {

strncpy(input_display_buf, blanks, io_ptr->len);
input_display_buf[io_ptr->len] = '\0';
bufp += DISPLAY(bufp, io_ptr->x, io_ptr->y, input_display_buf);
ct++;

}

form_ptr->num_input_elems = ct;
bufp += SWITCH_TO_NORMAL(bufp);

if (txn_type == PAYMENT)
bufp += DISPLAY_INT(bufp, 4, 12, 4, w_id);
else if (txn_type != 5)
bufp += DISPLAY_INT(bufp, 4, 12, 2, w_id);
if (txn_type == STOCKLEV)
bufp += DISPLAY_INT(bufp, 2, 29, 2, d_id);
bufp += SWITCH_TO_UNDERL(bufp);
*bufp++ = '\1';
*bufp = '\0';
form_ptr->blank_formlen = bufp - screen_buf + 1;
if (!form_ptr->blank_form &&
    ((form_ptr->blank_form = malloc(form_ptr->blank_formlen)) == NULL)) {
Clog("setup_screen_buffer: malloc failed\n");
exit(1);
}
memcpy(form_ptr->blank_form, screen_buf, form_ptr->blank_formlen);
memset(screen_buf, '\0', form_ptr->blank_formlen);

}
int
read_integer(col, row, size, flags, data)
int             col, row, size, flags, *data;
{
int         exit_read_function = FALSE, previous_data_exists = FALSE;
int             return_status = TAB, bytes_read = 0, i = 0, j = 0, k = 0,
                size1 = 0, cur_col = col;
char           *bufp, temp[50];
float           q;

char            erase_field[20];

strncpy(temp, " " , 1);
bufp = screen_buf + screen_bufindex;
/* Position cursor at start of field */

if (curbuf_read == read_count || curbuf_read == 0) {
screen_buf[0] = '\0';
bufp += GOTOXY(bufp, col + size - 1, row);
PAINTSCRLEN(screen_buf, bufp - screen_buf);
bufp = screen_buf;
}
size1 = size;

if (*data > 0)
previous_data_exists = TRUE;

while (exit_read_function == FALSE) {

/*
 * Below we read from standard input into the array curbuf.
 * curbuf_read is the pointer to the array curbuf indicating
 * the position upto which the curbuf has been parsed.
 * curbuf_consumed is the number of elements in the buffer
 * temp that holds the array that is to be displayed.
 * Elements of curbuf_consumed is selectively copied from
 * curbuf Note:read_count is the total number of characters
 * in the buffer curbuf. curbuf_read is always less than or
 * equal to read_count.
 */

if (curbuf_read == read_count || curbuf_read == 0) {
curbuf_read = 0;
read_count = read(tty_in, curbuf, sizeof(curbuf));
if (read_count == 0)
syserr("TTY lost connection");
}
/*
 * int message prevents unnecessary display of warning
 * messages
 */

if (message == TRUE) {
bufp += DISPLAY(bufp, MESSAGE_COL, MESSAGE_ROW, ERASE_MSG);
message = FALSE;
}
if (previous_data_exists == TRUE) {

if (curbuf[curbuf_read] == DELETE) {
previous_data_exists = FALSE;
strncpy(erase_field, blanks, size);
erase_field[size] = '\0';
bufp += DISPLAY(bufp, col, row, erase_field);
bufp += GOTOXY(bufp, col + size - 1, row);
} else {
if (curbuf[curbuf_read] < '0' || curbuf[curbuf_read] > '9') {
exit_read_function = TRUE;
previous_data_exists = FALSE;
return_status = curbuf[curbuf_read];
curbuf[curbuf_read] = '\0';
} else {
previous_data_exists = FALSE;
strncpy(erase_field, blanks, size);
erase_field[size] = '\0';
bufp += DISPLAY(bufp, col, row, erase_field);
/*
 * bufp = screen_buf;
 */
}
}
}/* if previous_data_exists */
while ((curbuf_read < read_count) && (exit_read_function == FALSE)) {
/*
 * intermediate variable size1 for cases when
 * floating point field whose size is less than
 * actual size by 1 because of decimal.
 */
if (payment_input == TRUE)
size1 = size - 1;
/*
 * Test for integer
 */
if ((curbuf[curbuf_read] >= '0' && curbuf[curbuf_read] <= '9') ||
(curbuf[curbuf_read] == '.')) {
/*
 * Consume all integers in buffer
 */
for (; curbuf_read < read_count &&
     ((curbuf[curbuf_read] >= '0'
     && curbuf[curbuf_read] <= '9') || curbuf[curbuf_read] == '.'); curbuf_read++) {
/*
 * below we fill up temp making sure
 * the size limit is not exceeded
 */
if (curbuf_consumed < size1) {
temp[curbuf_consumed] = curbuf[curbuf_read];
curbuf_consumed++;
}
/*
 * number of elements typed in is
 * more than the size of the field
 */
else
OVERFLOW = TRUE;
/*
 * ensure the character is removed
 * after it is read
 */
curbuf[curbuf_read] = '\0';
}/* end of for curbuf is legitimate
 * number */
temp[curbuf_consumed] = '\0';/* terminate temp string */
if (payment_input == TRUE) {/* floating point field */
/* convert the ascii to float */
q = (atof(temp)) ;
bufp += DISPLAY_FLOAT(bufp, 2, (col + size - 4), row, q);
/*
if (curbuf_consumed < 3)
else
bufp += DISPLAY_FLOAT(bufp, 2, (col + size - curbuf_consumed - 1), row, q);
*/
} else {
if (curbuf_consumed < size + 1)
bufp += DISPLAY(bufp, (col + size -
      curbuf_consumed), row,
temp);
return_status = curbuf[curbuf_read];
cur_col++;
}
}
/* if curbuf[] between "0" and "9" */
/*
 * if not integer, then test for movement character
 */
else if (curbuf[curbuf_read] == TAB
 || curbuf[curbuf_read] == LF
 || curbuf[curbuf_read] == BACKTAB
 || curbuf[curbuf_read] == SUBMIT) {
if (message == TRUE) {
bufp += DISPLAY(bufp, MESSAGE_COL, MESSAGE_ROW, ERASE_MSG);
message = FALSE;
}
temp[curbuf_consumed] = '\0';
if (payment_input == TRUE) {
q = atof(temp);
*data = q*100;
}
else {
*data = atoi(temp);
}
exit_read_function = TRUE;
return_status = curbuf[curbuf_read];
curbuf[curbuf_read] = '\0';
curbuf_read++;
curbuf_consumed = 0;
}
/* if curbuf[] a movement character */
/*
 * if not integer of movement, test for DELETE
 */
else if (curbuf[curbuf_read] == DELETE) {
if (payment_input == TRUE) {/* for floating point
 * field */
if (curbuf_consumed != 0)
curbuf_consumed--;
if (message == TRUE) {
bufp += DISPLAY(bufp, MESSAGE_COL,
MESSAGE_ROW,
ERASE_MSG);
message = FALSE;
```

```
}
OVERFLOW = FALSE;
PAINTSCR(screen_buf);
temp[curbuf_consumed] = '\0';
q = atof(temp);
curbuf[curbuf_read] = '\0';
strncpy(erase_field, blanks, size);
erase_field[size] = '\0';
bufp = screen_buf;
screen_bufindex = 0;
bufp += DISPLAY(bufp, col, row, erase_field);
if (curbuf_consumed < 3)
bufp += DISPLAY_FLOAT(bufp, 2,
  (col + size - 4), row, q);
else
bufp += DISPLAY_FLOAT(bufp, 2,
      (col + size - curbuf_consumed - 1), row, q);
if (cur_col != 0)
cur_col--;
if (curbuf_read < 40)
curbuf_read++;/* pressed key overflow
 * situations */
bufp += GOTOXY(bufp, col + size, row);
} else {
if (curbuf_consumed != 0)
curbuf_consumed--;
curbuf[curbuf_read] = '\0';
curbuf_read++;
if (message == TRUE) {
bufp += DISPLAY(bufp, MESSAGE_COL,
MESSAGE_ROW,
ERASE_MSG);
message = FALSE;
}
OVERFLOW = FALSE;
PAINTSCR(screen_buf);
temp[curbuf_consumed] = '\0';
strncpy(erase_field, blanks, size);
erase_field[size] = '\0';
bufp = screen_buf;
screen_bufindex = 0;
bufp += DISPLAY(bufp, col, row, erase_field);
bufp += DISPLAY(bufp, (col + size -
       curbuf_consumed), row, temp);
if (cur_col != 0)
cur_col--;
bufp += GOTOXY(bufp, col + size, row);
}
}
/* end of if DELETE */
 /* could be a ^C */
else if (curbuf[curbuf_read] == QUIT) {
temp[0] = '\0';
return_status = QUIT;
curbuf[curbuf_read] = '\0';
exit_read_function = TRUE;
} else {
/** Any other character entered at the keyboard ... **/
if (message == FALSE) {
bufp += DISPLAY(bufp, MESSAGE_COL, MESSAGE_ROW, INVALID_MSG);
bufp += GOTOXY(bufp, col + size, row);
PAINTSCR(screen_buf);
bufp = screen_buf;
screen_bufindex = 0;
message = TRUE;
}
curbuf_read++;
}
}/** End of the WHILE loop **/
if (OVERFLOW == TRUE && exit_read_function == FALSE) {
/*
 * if number of characters are exceeding the field
 * limit beep and warning message is necessary
 */
if (message == FALSE) {
bufp += DISPLAY(bufp, MESSAGE_COL,
     MESSAGE_ROW, EXC_FLD_LIM_MSG);
PAINTSCR(screen_buf);
bufp = screen_buf;
screen_bufindex = 0;
message = TRUE;
}
*data = atoi(temp);
return_status = curbuf[curbuf_read];
curbuf[curbuf_read] = '\0';
curbuf_read = 0;
OVERFLOW = FALSE;
} else {
screen_bufindex = bufp - screen_buf;
if ((curbuf_read == read_count) || (curbuf_read == 0)
    || (screen_bufindex > SCRBUF_LEN - CURBUFLEN)) {
PAINTSCRLEN(screen_buf, screen_bufindex);
screen_bufindex = 0;
bufp = screen_buf;
}
}
}
/* ensuring unnecessary warning messages are removed */
if (message == TRUE) {
bufp += DISPLAY(bufp, MESSAGE_COL,
MESSAGE_ROW, ERASE_MSG);
message = FALSE;
PAINTSCR(screen_buf);
bufp = screen_buf;
screen_bufindex = 0;
}
return (return_status);
}
int
read_string(col, row, size, flags, data)
int             col, row, size, flags;
char           *data;
{
int         exit_read_function = FALSE, previous_data_exists = FALSE, data_full =
FALSE;
int             return_status = TAB, bytes_read = 0, i = 0, j = 0,
                size_tot = 0;
char           *bufp, temp[80];
char            erase_field[20];

strncpy(temp, "\0", 1);
curbuf_consumed = 0;
bufp = screen_buf + screen_bufindex;
/* Position cursor at start of field */

if (curbuf_read == read_count || curbuf_read == 0) {
screen_buf[0] = '\0';
bufp += GOTOXY(bufp, col, row);/* Goto input area */
PAINTSCRLEN(screen_buf, bufp - screen_buf);
bufp = screen_buf;
}
if ((*(char *) data) != '\0')
previous_data_exists = TRUE;
while (exit_read_function == FALSE) {
/*
 * Below we read from standard input into the array curbuf.
 * curbuf_read is the pointer to the array curbuf indicating
 * the position upto which the curbuf has been parsed.
 * curbuf_consumed is the number of elements in the buffer
 * temp that holds the array that is to be displayed.
 * Elements of curbuf_consumed is selectively copied from
 * curbuf Note:read_count is the total number of characters
 * in the buffer curbuf. curbuf_read is always less than or
 * equal to read_count.
 */
if (curbuf_read == read_count) {
curbuf_read = 0;
read_count = read(tty_in, curbuf, size - size_tot);
if (read_count == 0)
syserr("TTY lost connection");
}
if (message == TRUE) {
bufp += DISPLAY(bufp, MESSAGE_COL,
MESSAGE_ROW, ERASE_MSG);
message = FALSE;
}
if (previous_data_exists == TRUE) {
if (curbuf[curbuf_read] == DELETE) {
previous_data_exists = FALSE;
strncpy(erase_field, blanks, size);
erase_field[size] = '\0';
bufp += DISPLAY(bufp, col, row, erase_field);
bufp += GOTOXY(bufp, col, row);
} else {
if (curbuf[curbuf_read] < ' ' || curbuf[curbuf_read] > '~') {
exit_read_function = TRUE;
previous_data_exists = FALSE;
return_status = curbuf[curbuf_read];
curbuf[curbuf_read] = '\0';

} else {
previous_data_exists = FALSE;
strncpy(erase_field, blanks, size);
erase_field[size] = '\0';
bufp += DISPLAY(bufp, col, row, erase_field);
bufp += GOTOXY(bufp, col, row);
}
}
}
while ((curbuf_read < read_count) && (exit_read_function == FALSE)) {
if (curbuf[curbuf_read] >= ' ' && curbuf[curbuf_read] <= '~') {/** if between ASCII
space (040) through ~ (0176) **/
for (; curbuf[curbuf_read] >= ' '
     && curbuf[curbuf_read] <= '~'; curbuf_read++) {
/*
 * ensuring the curbuf_consumed is
 * not more than field size
 */
if (curbuf_consumed < size) {
temp[curbuf_consumed] = curbuf[curbuf_read];
curbuf_consumed++;
}
/* else overflow condition */
else
OVERFLOW = TRUE;
curbuf[curbuf_read] = '\0';/* erasing characters
 * already read from the
 * buffer */
}
temp[curbuf_consumed] = '\0';/* terminate temp string */
bufp += DISPLAY(bufp, col, row, temp);
return_status = curbuf[curbuf_read];
} else if (curbuf[curbuf_read] == TAB
   || curbuf[curbuf_read] == LF
   || curbuf[curbuf_read] == BACKTAB
   || curbuf[curbuf_read] == SUBMIT) {
if (curbuf_consumed > 0) {
if (message == TRUE) {
bufp += DISPLAY(bufp, MESSAGE_COL,
MESSAGE_ROW,
ERASE_MSG);
message = FALSE;
}
temp[curbuf_consumed] = '\0';
strcpy(data, temp);
exit_read_function = TRUE;
return_status = curbuf[curbuf_read];
curbuf[curbuf_read] = '\0';
curbuf_read++;
curbuf_consumed = 0;
} else {
if (message == TRUE) {
bufp += DISPLAY(bufp, MESSAGE_COL,
MESSAGE_ROW,
ERASE_MSG);
message = FALSE;
}
```

```
temp[curbuf_consumed] = '\0';
strcpy(data, temp);
exit_read_function = TRUE;
return_status = curbuf[curbuf_read];
curbuf[curbuf_read] = '\0';
curbuf_read++;
}
} else if (curbuf[curbuf_read] == DELETE) {
for (curbuf_read = curbuf_read; curbuf[curbuf_read] ==
     DELETE
     ; curbuf_read++) {
curbuf[curbuf_read] = '\0';
temp[curbuf_consumed - 1] = '\0';

if (curbuf_consumed != 0)
curbuf_consumed--;
}
if (curbuf_consumed >= 0) {
bufp += BLANK_UNDERLINE(bufp, col, row, " ");
bufp += DISPLAY(bufp, col, row, temp);
PAINTSCR(screen_buf);
bufp = screen_buf;
screen_bufindex = 0;
} else {
if (message == FALSE) {
bufp += DISPLAY(bufp, MESSAGE_COL,
MESSAGE_ROW,
   EXC_FLD_LIM_MSG);
bufp += BEEP(bufp);
PAINTSCR(screen_buf);
bufp = screen_buf;
screen_bufindex = 0;
message = TRUE;
}
curbuf[curbuf_read] = '\0';
curbuf_read = 0;
}
} else if (curbuf[curbuf_read] == QUIT) {
temp[0] = '\0';
return_status = QUIT;
curbuf[curbuf_read] = '\0';
exit_read_function = TRUE;
} else {/** Any other character entered at the keyboard ... **/
if (message == FALSE) {
bufp += DISPLAY(bufp, MESSAGE_COL, MESSAGE_ROW, INVALID_MSG);
bufp += GOTOXY(bufp, col, row);
message = TRUE;
}
curbuf_read++;
}
}/** End of the WHILE loop **/
if (OVERFLOW == TRUE && exit_read_function == FALSE)
/** If read enough to fill the size already **/
{
if (message == FALSE) {
bufp += DISPLAY(bufp, MESSAGE_COL,
      MESSAGE_ROW, EXC_FLD_LIM_MSG);
PAINTSCR(screen_buf);
bufp = screen_buf;
screen_bufindex = 0;
message = TRUE;
}
OVERFLOW = FALSE;
temp[curbuf_consumed] = '\0';
strcpy(data, temp);
curbuf_consumed--;
return_status = curbuf[curbuf_read];
} else {
screen_bufindex = bufp - screen_buf;
if ((curbuf_read == read_count) || (curbuf_read == 0)
    || (screen_bufindex > SCRBUF_LEN - CURBUFLEN)) {
PAINTSCRLEN(screen_buf, screen_bufindex);
screen_bufindex = 0;
bufp = screen_buf;
}
}
}
if (message == TRUE) {
bufp += DISPLAY(bufp, MESSAGE_COL, MESSAGE_ROW,
ERASE_MSG);
message = FALSE;
PAINTSCR(screen_buf);
screen_bufindex = 0;
}
return (return_status);
}
voiddisplay_newo();
voiddisplay_paym();
voiddisplay_ords();
voiddisplay_del();
voiddisplay_stock();
void(*p_print_function[]) () = {
&display_newo,
&display_paym,
&display_ords,
&display_del,
&display_stock
};
display_output(int txn_type)
{
charc;

(p_print_function[txn_type]) ();
read(tty_in, &c, 1);
}
void
display_newo()
{
struct no_itm_struct *ol_ptr, *ool;

char           *bufp;
int             i, r;
double total = 0.0;

bufp = output_screen;

if (oNO->status == '\0') {

PAINTSCR(EXECUTION_STATUS_MSG);
return;

} else {

bufp += SWITCH_TO_NORMAL(bufp);
bufp += DISPLAY(bufp, 61, 2, oNO->o_entry_d);
bufp += DISPLAY(bufp, 25, 3, oNO->c_last);
bufp += DISPLAY(bufp, 52, 3, oNO->c_credit);
bufp += DISPLAY_FLOAT(bufp, 5, 64, 3, oNO->c_discount);
bufp += DISPLAY_INT(bufp, 8, 15, 4, oNO->o_id);
bufp += DISPLAY_INT(bufp, 2, 42, 4, oNO->o_ol_cnt);
bufp += DISPLAY_FLOAT(bufp, 5, 59, 4, oNO->w_tax);
bufp += DISPLAY_FLOAT(bufp, 5, 74, 4, oNO->d_tax);
ol_ptr = iNO->o_ol;
ool = oNO->o_ol;

for (i = 0, r = FIRST_OL_ROW; i < iNO->o_ol_cnt;
    r++, i++, ol_ptr++, ool++) {
bufp += DISPLAY(bufp, 19, r, ool->i_name);
bufp += DISPLAY_INT(bufp, 3, 51, r, ool->s_quantity);
bufp += DISPLAY(bufp, 58, r, ool->brand);
bufp += DISPLAY_MONEY(bufp, 6, 62, r, ool->i_price);
bufp += DISPLAY_MONEY(bufp, 7, 71, r, ool->ol_amount);
}

bufp += DISPLAY_MONEY(bufp, 8, 70, 22, oNO->total);
bufp += DISPLAY(bufp, 19, 22, oNO->status);
bufp += DISPLAY(bufp, 23, 75, "**((");
*bufp++ = '\0';
PAINTSCRLEN(output_screen, bufp - output_screen);
}
#ifdef DEBUG
Clog("DBG: Screen output chars = %d\n", (bufp - &output_screen[0]));
#endif
}
void
display_paym()
{
char           *bufp, temp[51], tempbuf2[201];
char           *make_phone(char *), *make_zip(char *);
bufp = output_screen;
bufp += SWITCH_TO_NORMAL(bufp);/* jr */
bufp += DISPLAY(bufp, 7, 2, oPT->h_date);
bufp += DISPLAY(bufp, 1, 5, oPT->w_street_1);
bufp += DISPLAY(bufp, 1, 6, oPT->w_street_2);
bufp += DISPLAY(bufp, 1, 7, oPT->w_city);
bufp += DISPLAY(bufp, 22, 7, oPT->w_state);
bufp += DISPLAY(bufp, 25, 7, make_zip(oPT->w_zip));
bufp += DISPLAY(bufp, 42, 5, oPT->d_street_1);
bufp += DISPLAY(bufp, 42, 6, oPT->d_street_2);
bufp += DISPLAY(bufp, 42, 7, oPT->d_city);
bufp += DISPLAY(bufp, 63, 7, oPT->d_state);
bufp += DISPLAY(bufp, 66, 7, make_zip(oPT->d_zip));
bufp += DISPLAY_INT(bufp, 4, 11, 9, oPT->c_id);
bufp += DISPLAY(bufp, 29, 10, oPT->c_last);
bufp += DISPLAY(bufp, 9, 10, oPT->c_first);
bufp += DISPLAY(bufp, 26, 10, oPT->c_middle);
bufp += DISPLAY(bufp, 9, 11, oPT->c_street_1);
bufp += DISPLAY(bufp, 9, 12, oPT->c_street_2);
bufp += DISPLAY(bufp, 9, 13, oPT->c_city);
bufp += DISPLAY(bufp, 30, 13, oPT->c_state);
bufp += DISPLAY(bufp, 33, 13, make_zip(oPT->c_zip));
bufp += DISPLAY(bufp, 58, 10, oPT->c_since);
bufp += DISPLAY(bufp, 58, 11, oPT->c_credit);
bufp += DISPLAY_FLOAT(bufp, 5, 58, 12, oPT->c_discount);
bufp += DISPLAY(bufp, 58, 13, make_phone(oPT->c_phone));
bufp += DISPLAY_MONEY(bufp, 14, 55, 15, oPT->c_balance);
bufp += DISPLAY_MONEY(bufp, 13, 17, 16, oPT->c_credit_lim);

/*
if (oPT->c_data_1[0] != ' ') {
*/
if (strncmp(oPT->c_credit,"BC",2) == 0) {
bufp += DISPLAY50(bufp, 12, 18, oPT->c_data_1);
bufp += DISPLAY50(bufp, 12, 19, oPT->c_data_2);
bufp += DISPLAY50(bufp, 12, 20, oPT->c_data_3);
bufp += DISPLAY50(bufp, 12, 21, oPT->c_data_4);
}
if (!oPT->h_date)
bufp += DISPLAY(bufp, MESSAGE_COL, MESSAGE_ROW - 2, BAD_INPUTS);
bufp += DISPLAY(bufp, 23, 75, "**((");
*bufp++ = '\0';
PAINTSCRLEN(output_screen, bufp - output_screen);
#ifdef DEBUG
Clog("DBG: Screen output chars = %d\n", (bufp - &output_screen[0]));
#endif
}
void
display_ords()
{
struct ord_itm_struct *sol;
char           *bufp;
int             i = 0, r = 8;

bufp = output_screen;
bufp += SWITCH_TO_NORMAL(bufp);
bufp += DISPLAY_INT(bufp, 4, 11, 3, oOS->c_id);
bufp += DISPLAY(bufp, 44, 3, oOS->c_last);
bufp += DISPLAY(bufp, 24, 3, oOS->c_first);
bufp += DISPLAY(bufp, 41, 3, oOS->c_middle);
bufp += DISPLAY_MONEY(bufp, 9, 15, 4, oOS->c_balance);
bufp += DISPLAY_INT(bufp, 8, 15, 6, oOS->o_id);
bufp += DISPLAY(bufp, 38, 6, oOS->o_entry_d);
bufp += DISPLAY_INT(bufp, 2, 76, 6, oOS->o_carrier_id);


for (i = 0; i < oOS->ol_cnt; i++) {

sol = &oOS->s_ol[i];
```

```
if (sol->ol_supply_w_id > 0) {
bufp += DISPLAY_INT(bufp, 4, 3, r, sol->ol_supply_w_id);
bufp += DISPLAY_INT(bufp, 6, 14, r, sol->ol_i_id);
bufp += DISPLAY_INT(bufp, 2, 25, r, sol->ol_quantity);
bufp += DISPLAY_MONEY(bufp, 8, 32, r, sol->ol_amount);
bufp += DISPLAY(bufp, 47, r, sol->ol_delivery_d);
r++;
}
}
if (!oOS->ol_cnt)
bufp += DISPLAY(bufp, MESSAGE_COL, MESSAGE_ROW - 2, BAD_INPUTS);

bufp += DISPLAY(bufp, 23, 75, "**((");
*bufp++ = '\0';
PAINTSCRLEN(output_screen, bufp - output_screen);
#ifdef DEBUG
Clog("DBG: Screen output chars = %d\n", (bufp - &output_screen[0]));
#endif
}
void
display_del()
{
char           *bufp;

bufp = output_screen;
/*PAINTSCR(DELIVERY_QUEUED_MSG);*/
bufp += sprintf(bufp,"%s",DELIVERY_QUEUED_MSG);
bufp += DISPLAY(bufp, 23, 75, "**((");
*bufp++ = '\0';
PAINTSCRLEN(output_screen, bufp - output_screen);
#ifdef DEBUG
Clog("DBG: Screen output chars = %d\n", (bufp -
 &output_screen[0]));
#endif
}
void
display_stock()
{
char           *bufp;
bufp = output_screen;
bufp += SWITCH_TO_NORMAL(bufp);/* jr */

bufp += DISPLAY_INT(bufp, 3, 12, 6, oSL->low_stock);
bufp += DISPLAY(bufp, 23, 75, "**((");
*bufp++ = '\0';
PAINTSCRLEN(output_screen, bufp - output_screen);
#ifdef DEBUG
Clog("DBG: low stock:%d\n", oSL->low_stock);
Clog("DBG: Screen output chars = %d\n", (bufp -
 &output_screen[0]));
#endif
}
char           *
make_phone(char *data)
{
static char     tempphone[20];
strncpy(tempphone, data, 6);
tempphone[6] = '-';
strncpy(&tempphone[7], &data[6], 3);
tempphone[10] = '-';
strncpy(&tempphone[11], &data[9], 3);
tempphone[14] = '-';
strncpy(&tempphone[15], &data[12], 4);
tempphone[19] = '\0';
return tempphone;
}
char           *
make_zip(char *data)
{
static char     temp[10];
strncpy(temp, data, 5);
temp[5] = '-';
strncpy(&temp[6], &data[5], 4);
temp[10] = '\0';
return temp;
}
```

client/tpcc_cforms.h

```
/*****************************************************************************
tpcc_forms.h
*****************************************************************************/

#include <sys/termio.h>
extern int      tty_in;
extern int      tty_out;
#define MAX_FORMS 6
#define MESSAGE_ROW 24
#define MESSAGE_COL 1
#define RTE_SYNCH_CHARACTER '\1'
#define SCRBUF_LEN 1536
#define FIRST_OL_ROW 7
#define CLRSCN(buf) sprintf(buf,"\033[H\033[2J")
#define DISPLAY_INT(buf,wid,x,y,ip) sprintf(buf,"\033[%d;%dH%*.1d", y, x,wid,ip)
#define DISPLAY_MONEY(buf,wid,x,y,fp) sprintf(buf,"\033[%d;%dH$%#*.2f",y,x,wid,fp)
#define DISPLAY_FLOAT(buf,wid,x,y,fp) sprintf(buf,"\033[%d;%dH%#*.2f", y, x,wid,fp)
#define DISPLAY(buf,x,y,txt) sprintf(buf,"\033[%d;%dH%s", y, x,txt)
#define DISPLAY50(buf,x,y,txt) sprintf(buf,"\033[%d;%dH%50.50s", y, x,txt)
#define PAINTSCR(buf) write(tty_out,buf,strlen(buf))
#define PAINTSCRLEN(buf, len) write(tty_out,buf,len)
#define SWITCH_TO_NORMAL(buf) sprintf(buf,"\033[m")
#define SWITCH_TO_UNDERL(buf) sprintf(buf,"\033[4m")
#define GOTOXY(buf,x,y) sprintf(buf,"\033[%d;%dH", y, x)
#define BEEP(buf) sprintf(buf,"\007")
#define BLANK_UNDERLINE(buf,x,y,txt) sprintf(buf,"\033[4m;\033[%d;%dH%s",y,x,txt);

#define CLRSCN_STR "'\033[H\033[2J'
#define DISPLAY_STR(x,y,txt) '\033[/**/y;/**/xH/**/txt'

/** Possible status values returned by read functions **/

#define CANCELLED 3
#define PREVIOUS_FIELD 4

#define BACKTAB 2/** CTRL B **/
#define DELETE 8
#define ESCAPE 27
#define LF 10
#define QUIT 3/** CNTRL-C Key **/
#define SPACE 32
#define SUBMIT 13/** CR Submit **/

#define TAB 9
#define UNDERLINE 95
#define LEAVE_SCREEN_MIN 300/** Minimum # of characters to leave screen **/
#define LEAVE_SCREEN_TIMEOUT 2/** Minimum time to leave screen, 10=1sec **/
static int      curbuf_consumed = 0;
static int      curbuf_read = 0;
static int      read_count = 0;
#defineCURBUFLEN300
static char     curbuf[CURBUFLEN];
static BOOLEAN  OVERFLOW = FALSE;
static BOOLEAN  message;
BOOLEAN         payment_input = FALSE;
static struct termio tbufsave;
extern void     syserr();
void            Init_Screen();
void            display_screen_array(int);
void            Send_Menu();
int             Get_Menu_Input();

typedef struct {
int             y;
int             x;
int             len;
int             flags;
int            *dptr;
int             (*fptr) ();
}               io_elem;

int             int_h_amount;
/* All the possible messages to print out */
const static char     MANDATORY_MSG[] =
"\033[24;1H\033[mMandatory data field! Please enter data.";
const static char     INVALID_MSG[] =
"\007\033[24;1HAn invalid character was entered. Please enter again.";
const static char     ERASE_MSG[] = "\033[24;1H\033[K\033[4m";
const static char     MIN1DIGIT_MSG[] = "\033[24;1H\033[mYou must enter atleast 1
digit. Please reenter.\033[4m\1";
const static char     BAD_INPUTS[] = " #### Bad input data was entered -- Select
again #### \1";
const static char     INCOMPLINE_MSG[] = "\033[24;1H\033[mOrder line is incomplete.
Please complete the whole line.\033[4m\1";
const static char     ID_OR_LAST_MSG[] = "\033[24;1H\033[mYou must enter either the
Last Name or the Customer Number.\033[4m\1";
const static char     EXC_MAX_LFT_DEC_DGT_MSG[] = "\033[24;1H\033[mMaximum digits
left of decimal point already entered. '.' expected\033[4m\1";
const static char     EXC_FLD_LIM_MSG[] = "\007\033[24;1H\033[mMaximum digits already
entered. Tab or <CR> expected\033[4m\1";/* jr */
const static char     EXECUTION_STATUS_MSG[] = "\033[m\033[22;18HItem number is not
valid";
const static char     DELIVERY_QUEUED_MSG[] = "\033[m\033[6;19HDelivery has been
queued";
int             read_integer(int, int, int, int, int *);
int             read_money(int, int, int, int, float *);
int             read_string(int, int, int, int, char *);
char            menu_buf[] = "\033[H\033[J\033[mNew-Order(n)  Payment(p)  Order-
Status(o)  Delivery(d)  Stock-Level(s)  Exit(e)";

intmenu_buflen = sizeof (menu_buf);
io_elem         neworder_inputs[] = {
/* y x len flags ptr to data ptr to read function */
/* - - --- ----- ----------- ------------------- */
2, 29, 2, 0, 0, &read_integer,
3, 12, 4, 0, 0, &read_integer,
7, 3, 5, 0, 0, &read_integer,
7, 10, 6, 0, 0, &read_integer,
7, 45, 2, 0, 0, &read_integer,
8, 3, 5, 0, 0, &read_integer,
8, 10, 6, 0, 0, &read_integer,
8, 45, 2, 0, 0, &read_integer,
9, 3, 5, 0, 0, &read_integer,
9, 10, 6, 0, 0, &read_integer,
9, 45, 2, 0, 0, &read_integer,
10, 3, 5, 0, 0, &read_integer,
10, 10, 6, 0, 0, &read_integer,
10, 45, 2, 0, 0, &read_integer,
11, 3, 5, 0, 0, &read_integer,
11, 10, 6, 0, 0, &read_integer,
11, 45, 2, 0, 0, &read_integer,
12, 3, 5, 0, 0, &read_integer,
12, 10, 6, 0, 0, &read_integer,
12, 45, 2, 0, 0, &read_integer,
13, 3, 5, 0, 0, &read_integer,
13, 10, 6, 0, 0, &read_integer,
13, 45, 2, 0, 0, &read_integer,
14, 3, 5, 0, 0, &read_integer,
14, 10, 6, 0, 0, &read_integer,
14, 45, 2, 0, 0, &read_integer,
15, 3, 5, 0, 0, &read_integer,
15, 10, 6, 0, 0, &read_integer,
15, 45, 2, 0, 0, &read_integer,
16, 3, 5, 0, 0, &read_integer,
16, 10, 6, 0, 0, &read_integer,
16, 45, 2, 0, 0, &read_integer,
17, 3, 5, 0, 0, &read_integer,
17, 10, 6, 0, 0, &read_integer,
17, 45, 2, 0, 0, &read_integer,
18, 3, 5, 0, 0, &read_integer,
18, 10, 6, 0, 0, &read_integer,
18, 45, 2, 0, 0, &read_integer,
19, 3, 5, 0, 0, &read_integer,
19, 10, 6, 0, 0, &read_integer,
```

```
19, 45, 2, 0, 0, &read_integer,
20, 3, 5, 0, 0, &read_integer,
20, 10, 6, 0, 0, &read_integer,
20, 45, 2, 0, 0, &read_integer,
21, 3, 5, 0, 0, &read_integer,
21, 10, 6, 0, 0, &read_integer,
21, 45, 2, 0, 0, &read_integer,
999
};
io_elem         payment_inputs[] = {
/* y x len flags ptr to data ptr to read function */
/* - - --- ----- ----------- ------------------- */
4, 52, 2, 0, 0, &read_integer,
9, 11, 4, 0, 0, &read_integer,
9, 33, 5, 0, 0, &read_integer,
9, 54, 2, 0, 0, &read_integer,
10, 29, 16, 0, 0, &read_string,
15, 24, 7, 0, 0, &read_integer,
999
};
io_elem         ordstat_inputs[] = {
/* y x len flags ptr to data ptr to read function */
/* - - --- ----- ----------- ------------------- */
2, 29, 2, 0, 0, &read_integer,
3, 11, 4, 0, 0, &read_integer,
3, 44, 16, 0, 0, &read_string,
999
};
io_elem         delivery_inputs[] = {
/* y x len flags ptr to data ptr to read function */
/* - - --- ----- ----------- ------------------- */
4, 17, 2, 0, 0, &read_integer,
999
};
io_elem         stocklev_inputs[] = {
/* y x len flags ptr to data ptr to read function */
/* - - --- ----- ----------- ------------------- */
4, 24, 2, 0, 0, &read_integer,
999
};
io_elem         wd_inputs[] = {
/* y x len flags ptr to data ptr to read function */
/* - - --- ----- ----------- ------------------- */
2, 16, 5, 0, 0, &read_integer,
2, 43, 4, 0, 0, &read_integer,
999
};

typedef struct {
int             x;
int             y;
char           *text;
}               text_elem;

const text_elem       NO_text_elem[] = {
1, 36, "New Order",
2, 1, "Warehouse:",
2, 19, "District:",
2, 55, "Date:",
3, 1, "Customer:",
3, 19, "Name:",
3, 44, "Credit:",
3, 57, "%Disc:",
4, 1, "Order Number:",
4, 25, "Number of Lines:",
4, 52, "W_tax:",
4, 67, "D_tax:",
6, 2, "Supp_W Item_Id Item Name",
6, 45, "Qty Stock B/G Price Amount",
22, 1, "Execution Status:",
22, 62, "Total:",
0
};
const text_elem       PT_text_elem[] = {
1, 38, "Payment",
2, 1, "Date:",
4, 1, "Warehouse:",
4, 42, "District:",
9, 1, "Customer:",
9, 17, "Cust-Warehouse:",
9, 39, "Cust-District:",
10, 1, "Name:",
10, 50, "Since:",
11, 50, "Credit:",
12, 50, "%Disc:",
13, 50, "Phone:",
15, 1, "Amount Paid:",
15, 23, "$",
15, 37, "New Cust-Balance:",
16, 1, "Credit Limit:",
18, 1, "Cust-Data:",
0
};
const text_elem       OS_text_elem[] = {
1, 35, "Order-Status",
2, 1, "Warehouse:",
2, 19, "District:",
3, 1, "Customer:",
3, 18, "Name:",
4, 1, "Cust-Balance:",
6, 1, "Order-Number:",
6, 26, "Entry-Date:",
6, 60, "Carrier_Number:",
7, 1, "Supply-W",
7, 14, "Item-Id",
7, 25, "Qty",
7, 33, "Amount",
7, 45, "Delivery-Date",
0
};
const text_elem       DY_text_elem[] = {
1, 38, "Delivery",
2, 1, "Warehouse:",
4, 1, "Carrier Number:",
6, 1, "Execution Status:",
0
};
const text_elem       SL_text_elem[] = {
1, 38, "Stock-Level",
2, 1, "Warehouse:",
2, 19, "District:",
4, 1, "Stock Level Threshold:",
6, 1, "low stock:",
0
};
const text_elem       WD_text_elem[] = {
2, 1, "Warehouse:",
2, 26, "District:",
0
};
#ifdefMultiple_blank_form
const char WD_blank_form[SCRBUF_LEN] =
CLRSCN_STR/**/DISPLAY_STR(2,1,'Warehouse:')/**/DISPLAY_STR(2,26,'District:')";
#endif
struct form_info {
const text_elem      *tp;
char            *blank_form;
intblank_formlen;
io_elem        *input_elems;
int             num_input_elems;
};

char            output_screen[SCRBUF_LEN];

struct form_info Forms[MAX_FORMS] = {
{NO_text_elem, 0, 0, neworder_inputs, 0},
{PT_text_elem, 0, 0, payment_inputs, 0},
{OS_text_elem, 0, 0, ordstat_inputs, 0},
{DY_text_elem, 0, 0, delivery_inputs, 0},
{SL_text_elem, 0, 0, stocklev_inputs, 0},
{WD_text_elem, 0, 0, wd_inputs, 0}
};
```

client/tpcc_log.c

```
/*****************************************************************************
clientlog.c
*****************************************************************************/
/*
 * ** clientlog.c -- Routine for writing out messages form client processes - *
 * useful for detailed error reporting and for debugging
 */

#include <stdio.h>
#include <stdarg.h>
#define BACKTAB 2/** CTRL B **/
#define DELETE 127
#define ESCAPE 27
#define LF 10
#define QUIT 3/** CNTRL-C **/
#define SPACE 32
#define SUBMIT 13/** CR **/
#define TAB 9
#define RTE_SYNCH_CHARACTER '\1'

static FILE    *clientlog;
static int      Clog_open = 0;
void
Clog(char *fmt,...)
{
}
void
SCREENlog(int *flag, char *screen)
{
char            fname[100];
int             i, char_ct;
if (!Clog_open) {
sprintf(fname, "%s/%s.%d", getenv("TMPDIR"), "CLIENTLOG",
getpid());
clientlog = fopen(fname, "w");
Clog_open = 1;
}
fprintf(clientlog, "** %d **\n", flag);
char_ct = 0;
fprintf(clientlog, "SCR: ");
for (i = 0; screen[i] != 0; char_ct++, i++) {
switch (screen[i]) {
case BACKTAB:
fprintf(clientlog, "<BACKTAB>");
break;
case DELETE:
fprintf(clientlog, "<DEL>");
break;
case ESCAPE:
fprintf(clientlog, "<ESC>");
break;
case LF:
fprintf(clientlog, "<LF>");
break;
case QUIT:
fprintf(clientlog, "<^C>");
break;
case SUBMIT:
fprintf(clientlog, "<CR>");
break;
case TAB:
fprintf(clientlog, "<TAB>");
break;
case RTE_SYNCH_CHARACTER:
fprintf(clientlog, "<^A>");
break;
default:
fprintf(clientlog, "%c", screen[i]);
}
```

```
if (char_ct > 192) {
char_ct = 0;
/* fprintf(screenlog,"\n"); */

}
}
fprintf(clientlog, "\n");
fflush(clientlog);
}

void
syserr(msg)/* print system call error message and
 * terminate */
char           *msg;
{
extern int      errno, sys_nerr;
extern char    *sys_errlist[];
extern char     tty_name[];
fprintf(stderr, "\007ERROR: (%s) %s (%d", tty_name, msg, errno);
if (errno > 0 && errno < sys_nerr)
fprintf(stderr, ";%s)\n", sys_errlist[errno]);
else
fprintf(stderr, ")\n");
exit(1);
}


void
cleanup(msg)                    /* print system call error message and
                                * terminate */
        char           *msg;
{
extern int      tty_out;
extern int      tty_in;
char c;
                write(tty_out,msg,strlen(msg));
        read(tty_in, &c, 1);
}
```

client/tpcc_tux.c

```
/*****************************************************************************
tpcc_tux.c
*****************************************************************************/
/* ** monitor.c -- All functions for Tuxedo call and return */
#include <stdio.h>
#include <stdarg.h>
#include "tpcc_client.h"
#include <atmi.h>
#include "tpcc_tux.h"

const char           *svc_names[] = {"NEWO", "PAYM", "ORDS", "DEL", "STOCK"};
int
Snd_Txn_To_Monitor(int txn_type)
{
int             status;

#if DEBUG
Clog("DBG: In Snd_Txn_To_Monitor\n");
print_input_data(txn_type);
#endif

if (txn_type == DELIVERY) {
if ( tpacall((char *)svc_names[txn_type], tuxibuf, ilen, TPNOREPLY) == -1){
/****
Clog("ERR: Tuxedo tpcall(%s) failed \n\t%s",
     svc_names[txn_type], tpstrerror(tperrno));
****/
return (TPM_ERROR);
}
return(0);
} else {
if ( tpcall((char *)svc_names[txn_type], (char *)tuxibuf, ilen, &tuxobuf, &olen, 0)
== -1){
/******
Clog("ERR: Tuxedo tpcall(%s) failed \n\t%s",
     svc_names[txn_type], tpstrerror(tperrno));
*****/
return (TPM_ERROR);
}
/* return user-defined failures */
return (0);
}
}

int Init_Monitor()
{
char           *text;
ilen = sizeof(struct io_tpcc);
olen = sizeof(struct io_tpcc);
if (tpinit(NULL) == -1) {
tpmerror("tpinit", tperrno);
return -1;
}
if ((tuxibuf = tpalloc("CARRAY", NULL, ilen)) == NULL) {
tpmerror("tpalloc", tperrno);
return (-1);
}
if ((tuxobuf = tpalloc("CARRAY", NULL, ilen)) == NULL) {
tpmerror("tpalloc", tperrno);
return (-1);
}
return (NULL);
}
Rundown_Monitor()
{
int             status;

tpfree(tuxibuf);
status = tpterm();

#ifdef DEBUG
Clog("terminated Tuxedo connection with status %d\n", status);
#endif
}
tpmerror(char *service_called, int errnum)
{
char            errmsg[256];
fprintf(stderr, "\033[24;1H\033[mTUXEDO: Failed %s with error: %s\n",
service_called, tpstrerror(errnum));
fprintf(stderr, "\n");
}
#ifdef DEBUG
print_input_data(int type)
{
int             i;
time_t          the_time;
the_time = time(&the_time);
Clog("DBG:============TIME: %s == == == == == == ==\n",ctime(&the_time));
     switch (type) {
case NEWORDER:
Clog("DBG: NEWORDER INPUTS at %s\n", ctime(&the_time));
Clog("DBG: w_id: %d, d_id: %d, c_id: %d o_ol_cnt: %d\n",
     iNO->w_id, iNO->d_id, iNO->c_id, iNO->o_ol_cnt);
for (i = 0; i < iNO->o_ol_cnt; i++)
Clog("DBG: ol_i_id: %d, ol_supply_w_id: %d, ol_quantity: %d \n ",iNO-
>o_ol[i].ol_i_id, iNO->o_ol[i].ol_supply_w_id,iNO->o_ol[i].ol_quantity);
break;
case PAYMENT:
Clog("DBG: PAYMENT INPUTS at %s \n ",ctime(&the_time));
     Clog("DBG: w_id: %d, d_id: %d\n", iPT->w_id, iPT->d_id);
Clog("DBG: c_last: %s ", iPT->c_last);
Clog(" c_id: %d", iPT->c_id);
Clog(" c_w_id: %d, c_d_id: %d\n", iPT->c_w_id, iPT->c_d_id);
Clog("DBG: h_amount: %f\n", iPT->h_amount);
break;
case ORDSTAT:
Clog("DBG: ORDER STATUS INPUTS at %s \n ",ctime(&the_time));
     Clog("DBG: w_id: %d, d_id: %d\n", iOS->w_id, iOS->d_id);
Clog("DBG: c_id: %d, c_last: %s\n",
     iOS->c_id, iOS->c_last);
break;
case DELIVERY:
Clog("DBG: DELIVERY INPUTS at %s\n", ctime(&the_time));
Clog("DBG: w_id: %d, o_carrier_id: %d\n", iDY->w_id, iDY ->o_carrier_id);
break;
case STOCKLEV:
Clog("DBG: STOCK LEVEL INPUTS at %s \n ",ctime(&the_time));
Clog("DBG: w_id: %d, d_id: %d, threshold: %d\n", iSL ->w_id, iSL->d_id,iSL-
>threshold);
break;
other:
Clog("DBG: Txn_type = %d is illegal at %s \n",type,ctime(&the_time));
     }
return;
}
#endif/* ifdef DEBUG */
```

client/tpcc_tux.h

```
/*****************************************************************************
tpcc_tux.h
*****************************************************************************/
long            ilen;
long            olen;
int tty_in;
int tty_out;

char           *tuxibuf;
char           *tuxobuf;
extern void     Clog(char *,...);
#define oNO (&((info_t *) tuxobuf)->neworder)
#define oPT (&((info_t *) tuxobuf)->payment)
#define oOS (&((info_t *) tuxobuf)->ordstat)
#define oDY (&((info_t *) tuxobuf)->delivery)
#define oSL (&((info_t *) tuxobuf)->stocklev)
#define iNO (&((info_t *) tuxibuf)->neworder)
#define iPT (&((info_t *) tuxibuf)->payment)
#define iOS (&((info_t *) tuxibuf)->ordstat)
#define iDY (&((info_t *) tuxibuf)->delivery)
#define iSL (&((info_t *) tuxibuf)->stocklev)
#define iWD (&((info_t *) tuxibuf)->wd)
```

tuxserver/ora_err.h

```
/*
 * Copyright (c) 1994 by Sun Microsystems, Inc.
 */

#ifndef ORA_ERR_H
#define ORA_ERR_H

#pragma ident "@(#)ora_err.h1.495/09/14SMI"
/*
 * this kludge is required because Oracle does not provide
 *symbolic constants in a header file
 */

#defineEDEADLOK60
#defineSQLNOTFOUND1403
#defineCOLUMN_NULL-1405
#defineEDUPLICATE-1
#defineRECOVERR-10
#defineIRRECERR-20
```

```
#defineNOERR111
#defineDEL_ERROR-666
#defineDEL_DATE_LEN7
#defineSQL_BUF_SIZE8192

#endif ORA_ERR_H
```

tuxserver/ora_errpt.c

```
/*
 * Copyright (c) 1995 by Sun Microsystems, Inc.
 */

#pragma ident "@(#)ora_errrpt.c1.195/09/14SMI"

/*
 * these functions actually belong in ~dbbench/generic/c/msgh_log.c.  We put them
 * here because they have database specific statements.
 */

#include "ora_err.h"
#include "ora_oci.h"

errrpt(lda, cur, sqlvar)
ldadef *lda;
csrdef *cur;
text*sqlvar;
{
text msg[2048];
/*if (cur->rc) { */
oerhms(lda, (sb2) cur->rc, msg, 2048);
userlog("%s sql_variable %s\n", msg, sqlvar);

                if (cur->rc == DEADLOCK || (cur->rc == SNAPSHOT_TOO_OLD))
                        return(RECOVERR);
                else
                        return(IRRECERR);

/*} */
}

/* vmm313 void ocierror(fname, lineno, errhp, status)  */
int ocierror(fname, lineno, errhp, status)
char *fname;
int lineno;
OCIError *errhp;
sword status;
{
  text errbuf[512];
  ub4 buflen;
  sb4 errcode;
  sb4 lstat ;
  ub4 recno=2 ;

  switch (status) {
  case OCI_SUCCESS:
    break;
  case OCI_SUCCESS_WITH_INFO:
    (void) userlog("Module %s Line %d\n", fname, lineno);
    (void) userlog("Error - OCI_SUCCESS_WITH_INFO\n");
  break;
  case OCI_NEED_DATA:
    (void) userlog("Module %s Line %d\n", fname, lineno);
    (void) userlog("Error - OCI_NEED_DATA\n");
return (IRRECERR);
  case OCI_NO_DATA:
    /*
      (void) userlog("Module %s Line %d\n", fname, lineno);
      (void) userlog("Error - OCI_NO_DATA\n");
    */
    return IRRECERR;        /* for 8.1.4 */
  break;
  case OCI_ERROR:
    lstat = OCIErrorGet (errhp, (ub4) 1,
                  (text *) NULL, &errcode, errbuf,
                       (ub4) sizeof(errbuf), OCI_HTYPE_ERR);
if (errcode == NOT_SERIALIZABLE) return (errcode);
    while (lstat != OCI_NO_DATA)
    {
    (void) userlog("Module %s Line %d\n", fname, lineno);
    (void) userlog("Error - %s\n", errbuf);
    lstat = OCIErrorGet (errhp, recno++, (text *) NULL, &errcode, errbuf,
                         (ub4) sizeof(errbuf), OCI_HTYPE_ERROR);
    }
    return (errcode);
  break;
  case OCI_INVALID_HANDLE:
    (void) userlog("Module %s Line %d\n", fname, lineno);
    (void) userlog("Error - OCI_INVALID_HANDLE\n");
  break;
  case OCI_STILL_EXECUTING:
    (void) userlog("Module %s Line %d\n", fname, lineno);
    (void) userlog("Error - OCI_STILL_EXECUTE\n");
   return (IRRECERR);
  case OCI_CONTINUE:
    (void) userlog("Module %s Line %d\n", fname, lineno);
    (void) userlog("Error - OCI_CONTINUE\n");
  return (IRRECERR);
  default:
    (void) userlog("Module %s Line %d\n", fname, lineno);
    (void) userlog("Error - \n");
    return (IRRECERR);
  }
  return RECOVERR;
}
```

tuxserver/ora_oci.h

```
#pragma ident "@(#)oci.h1.195/09/14SMI"

/*+============================================================+
 |        Copyright (c) 1994  Oracle Corp, Redwood Shores, CA       |
 |                    OPEN SYSTEMS PERFORMANCE GROUP                |
 |                         All Rights Reserved                      |
 +============================================================+
 | FILENAME
 |    tpccpl.h
 | DESCRIPTION
 |    Header file for TPC-C transactions in PL/SQL.
 +============================================================*/

#ifndef TPCCPL_H
#define TPCCPL_H

#include <stdio.h>
#include <ctype.h>
#include <string.h>

#include <oratypes.h>
#include <oci.h>
/****
#if __STDC__
#include <ociapr.h>
#else
#include <ocikpr.h>
#endif
*****/

typedef struct cda_def csrdef;
typedef struct cda_def ldadef;


#ifndef DISCARD
# define DISCARD (void)
#endif

#ifndef sword
# define sword int
#endif

#define VER7            2

#define NA              -1      /* ANSI SQL NULL */
#define NLT             1       /* length for string null terminator */
#define DEADLOCK        60      /* ORA-00060: deadlock */
#define NO_DATA_FOUND   1403    /* ORA-01403: no data found */
#define NOT_SERIALIZABLE  8177  /* ORA-08177: transaction not serializable */
#defineSNAPSHOT_TOO_OLD 1555

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

#define ADR(object) ((ub1 *)&(object))
#define SIZ(object) ((sword)sizeof(object))

typedef char date[24+NLT];
typedef char varchar2;

#define OCIERROR(errp,function)\
        ocierror(__FILE__,__LINE__,(errp),(function));

#define OCIBND(stmp, bndp, errp, sqlvar, progv, progvl, ftype)\
       ocierror(__FILE__,__LINE__,(errp), \
            OCIHandleAlloc((stmp),(dvoid**)&(bndp),OCI_HTYPE_BIND,0,(dvoid**)0)); \
       ocierror(__FILE__,__LINE__, (errp), \
             OCIBindByName((stmp), &(bndp), (errp), \
     (text *)(sqlvar), strlen((sqlvar)),\
     (progv), (progvl), (ftype),0,0,0,0,0,OCI_DEFAULT));

#define OCIBNDRAD(stmp,bndp,errp,sqlvar,progvl,ftype,indp,ctxp,cbf_nodata,cbf_data) \
       ocierror(__FILE__,__LINE__,(errp), \
            OCIBindByName((stmp),&(bndp),(errp),(text *)(sqlvar), \
                          strlen((sqlvar)),0,(progvl),(ftype), \
                          indp,0,0,0,0,OCI_DATA_AT_EXEC)); \
            ocierror("yufei",__LINE__,(errp), \
            OCIBindDynamic((bndp),(errp),(ctxp),(cbf_nodata),(ctxp),(cbf_data)));


#define OCIBNDRA(stmp,bndp,errp,sqlvar,progv,progvl,ftype,indp,alen,arcode) \
       ocierror(__FILE__,__LINE__,(errp), \
            OCIHandleAlloc((stmp),(dvoid**)&(bndp),OCI_HTYPE_BIND,0,(dvoid**)0)); \
       ocierror(__FILE__,__LINE__,(errp), \
            OCIBindByName((stmp),&(bndp),(errp),(text *)(sqlvar),strlen((sqlvar)),\
     (progv),(progvl),(ftype),(indp),(alen),(arcode),0,0,OCI_DEFAULT));
/*       ocierror(__FILE__,__LINE__,(errp), \
             OCIBindArrayOfStruct((bndp),(errp),(progvl),sizeof((indp)[0]),\
    sizeof((alen)[0]),sizeof((arcode)[0]))); */

#define OCIBNDR(stmp,bndp,errp,sqlvar,progv,progvl,ftype,indp,alen,arcode) \
       ocierror(__FILE__,__LINE__,(errp), \
          OCIHandleAlloc((stmp),(dvoid**)&(bndp),OCI_HTYPE_BIND,0,(dvoid**)0)); \
       ocierror(__FILE__,__LINE__,(errp), \
          OCIBindByName((stmp),&(bndp),(errp),(text *)(sqlvar),strlen((sqlvar)),\
     (progv),(progvl),(ftype),(indp),(alen),(arcode),0,0,OCI_DEFAULT));

#define OCIBNDRAA(stmp,bndp,errp,sqlvar,progv,progvl,ftype,indp,alen,arcode,ms,cu) \
       ocierror(__FILE__,__LINE__, (errp), \
          OCIHandleAlloc((stmp),(dvoid**)&(bndp),OCI_HTYPE_BIND,0,(dvoid**)0)); \
       ocierror(__FILE__,__LINE__,(errp),\
         OCIBindByName((stmp),&(bndp),(errp),(text *)(sqlvar),strlen((sqlvar)),\
       (progv),(progvl),(ftype),(indp),(alen),(arcode),(ms),(cu),OCI_DEFAULT));
/*       ocierror(__FILE__,__LINE__,(errp),
              OCIBindArrayOfStruct((bndp),(errp),(progvl),sizeof((indp)[0]),\
    sizeof((alen)[0]),sizeof((arcode)[0]))); */

#define OCIDEFINE(stmp,dfnp,errp,pos,progv,progvl,ftype)\
       OCIDefineByPos((stmp),&(dfnp),(errp),(pos),(progv),(progvl),(ftype),\
```

```
      0,0,0,OCI_DEFAULT)

#define OCIDEF(stmp,dfnp,errp,pos,progv,progvl,ftype) \
       OCIHandleAlloc((stmp),(dvoid**)&(dfnp),OCI_HTYPE_DEFINE,0,\
                                    (dvoid**)0);\
       OCIDefineByPos((stmp),&(dfnp),(errp),(pos),(progv),(progvl),\
                           (ftype),NULL,NULL,NULL,OCI_DEFAULT); \


#define OCIDFNRA(stmp,dfnp,errp,pos,progv,progvl,ftype,indp,alen,arcode) \
       OCIHandleAlloc(tpcenv,(dvoid**)&(dfnp),OCI_HTYPE_DEFINE,0,\
      (dvoid**)0);\
       OCIDefineByPos((stmp),&(dfnp),(errp),(pos),(progv),\
      (progvl),(ftype),(indp),(alen),\
      (arcode),OCI_DEFAULT);\

#define OBNDRV(lda,cursor,sqlvar,progv,progvl,ftype)\
    if (obndrv((cursor),(text*)(sqlvar),NA,(ub1*)(progv),(progvl),(ftype),NA,\
       (sb2 *)0, (text *)0, NA, NA))\
       {errrpt(lda,cursor,sqlvar);return(-1);}\
    else\
       DISCARD 0

#define OBNDRA(lda,cursor,sqlvar,progv,progvl,ftype,indp,alen,arcode)\
    if (obndra((cursor),(text*)(sqlvar),NA,(ub1*)(progv),(progvl),(ftype),NA,\
       (indp),(alen),(arcode),(ub4)0,(ub4*)0,(text*)0,NA,NA))\
       {errrpt(lda,cursor,sqlvar);return(-1);}\
    else\
       DISCARD 0

#define OBNDRAA(lda,cursor,sqlvar,progv,progvl,ftype,indp,alen,arcode,ms,cs)\
    if (obndra((cursor),(text*)(sqlvar),NA,(ub1*)(progv),(progvl),(ftype),NA,\
       (indp),(alen),(arcode),(ub4)(ms),(ub4*)(cs),(text*)0,NA,NA))\
       {errrpt(lda,cursor,sqlvar);return(-1);}\
    else\
       DISCARD 0

#define ODEFIN(lda,cursor,pos,buf,bufl,ftype,scale,indp,fmt,fmtl,fmtt,rlen,rcode)\
    if (odefin((cursor),(pos),(ub1*)(buf),(bufl),(ftype),(scale),(indp),\
       (text*)(fmt),(fmtl),(fmtt),(rlen),(rcode)))\
       {errrpt(lda,cursor,(text *)ftype);return(-1);}\
    else\
       DISCARD 0

#define OEXFET(lda,cursor,nrows,cancel,exact)\
    if (oexfet((cursor),(nrows),(cancel),(exact)))\
       {if ((cursor)->rc == 1403) DISCARD 0; \
        else if (errrpt(lda,cursor,(text *)"OEXFET")==RECOVERR) \
           {orol(lda);return(RECOVERR);} \
        else{orol(lda);return(-1);}}\
    else\
       DISCARD 0

#define OOPEN(lda,cursor)\
    if (oopen((cursor),(lda),(text*)0,NA,NA,(text*)0,NA))\
       {errrpt(lda,cursor,(text *)"OOPEN");return(-1);}\
    else\
       DISCARD 0

#define OPARSE(lda,cursor,sqlstm,sql1,defflg,lngflg)\
    if (oparse((cursor),(sqlstm),(sb4)(sql1),(defflg),(ub4)(lngflg)))\
       {errrpt(lda,cursor,sqlstm);return(-1);}\
    else\
       DISCARD 0

#define OFEN(lda,cursor,nrows)\
    if (ofen((cursor),(nrows)))\
       {if (errrpt(lda,cursor,(text *)"OFEN")==RECOVERR) \
           {orol(lda);return(RECOVERR);} \
        else{orol(lda);return(-1);}}\
    else\
       DISCARD 0

#define OEXEC(lda,cursor)\
    if (oexec((cursor)))\
       {if (errrpt(lda,cursor,(text *)"OEXEC")==RECOVERR) \
           {orol(lda);return(RECOVERR);} \
        else{orol(lda);return(-1);}}\
    else\
       DISCARD 0


#define OCOM(lda,cursor)\
    if (ocom((lda))) \
       {errrpt(lda,cursor,(text *)"OCOM");orol(lda);return(-1);}\
    else\
       DISCARD 0


#define OEXN(lda,cursor,iters,rowoff)\
    if (oexn((cursor),(iters),(rowoff))) \
       {if (errrpt(lda,cursor,(text *)"OEXN")==RECOVERR) \
           {orol(lda);return(RECOVERR);} \
        else{orol(lda);return(-1);}}\
    else\
       DISCARD 0

#endif

/* additions done for 814 -shishir */
#define OCI_ATTR_SRVRCTXT OCI_ATTR_SERVER
#define OCI_ATTR_USERCTXT OCI_ATTR_SESSION
#define OCI_ATTR_ROWCNT OCI_ATTR_ROW_COUNT
#define OCI_HTYPE_ERR OCI_HTYPE_ERROR
#define OCI_HTYPE_STM OCI_HTYPE_STMT
```

tuxserver/tpcc_srv_del.c

```
/*
 * Copyright (c) 1994 by Sun Microsystems, Inc.
 */

#pragma ident "@(#)tpcso_srv_del.pc1.594/12/07SMI"

/*+============================================================+
 |        Copyright (c) 1996  Oracle Corp, Redwood Shores, CA       |
 |                   OPEN SYSTEMS PERFORMANCE GROUP                 |
 |                        All Rights Reserved                       |
 +============================================================+
 | FILENAME
 |    pldel.c
 | DESCRIPTION
 |    OCI version of DELIVERY transaction in TPC-C benchmark.
 +============================================================*/

/*
 * File: delivery.pc
 * Delivery transaction code for Oracle using Message Handler
 * This program is different from the other servers, in that it
 * records transaction info in a results file.
 * Author : Shanti S
 * Date   : 4/18/94
 */

#include <sys/signal.h>
#include <sys/types.h>
#include <sys/ipc.h>
#include <sys/msg.h>
#include <sys/utsname.h>
#include <errno.h>
#include <stdio.h>
#include "ora_err.h"

/* Tuxedo */
#include "atmi.h"
#include "userlog.h"


#define MOVETO(element, struct_name) element = struct_name -> element
#define MOVEBACK(element, struct_name) struct_name -> element = element

static int w_id;
static int o_carrier_id;

/*static struct msgh_req message;*/         /* Transaction message */
int my_qid, my_id;
char my_name[] = "Del";

static int tx_count = 0;/* Transaction counter */
static FILE *delfile;

static char outbuf[2048];/* Buffer for results file */


get_del_tx_cnt()
{
return tx_count;
}

#include "ora_oci.h"

unsigned char cr_date[7];

#defineSQLTXT"alter session set isolation_level = serializable"

#if defined(ISO) || defined(ISO5) || defined(ISO6) || defined(ISO8)
#define SQLTXT0 "SELECT substr(value,1,5) FROM v$parameter \
   WHERE name = 'instance_number'"
#endif

# ifdef DMLRETDEL
#define SQLTXT1 "DELETE FROM new_order WHERE no_d_id = :d_id \
                 AND no_w_id = :w_id and rownum <= 1 \
                RETURNING no_o_id into :o_id "
#endif
#ifdef DMLRETDEL
#define SQLTXT3 "UPDATE orders SET o_carrier_id = :carrier_id \
                 WHERE o_id = :o_id and o_d_id = :d_id and o_w_id = :w_id \
                 returning o_c_id into :o_c_id"
#else
#define SQLTXT3 "UPDATE orders SET o_carrier_id = :carrier_id \
   WHERE rowid = :o_rowid"
#endif

#ifdef DMLRETDEL
#define SQLTXT4 "UPDATE /*+ buffer */ order_line SET ol_delivery_d = :cr_date \
   WHERE ol_w_id = :w_id AND ol_d_id = :d_id AND ol_o_id = :o_id \
   RETURNING ol_amount into :ol_amount "
#endif

#define SQLTXT6 "UPDATE customer SET c_balance = c_balance + :amt, \
   c_delivery_cnt = c_delivery_cnt + 1 WHERE c_w_id = :w_id AND \
   c_d_id = :d_id AND c_id = :c_id"

#define NITEMS 15 /* .... Added by Ravi. */

#define NDISTS 10
#define ROWIDLEN 20
#defineDEL_DATE_LEN7


struct delctx {
   sb2 del_o_id_ind[NDISTS];
   sb2 cons_ind[NDISTS];
   sb2 w_id_ind[NDISTS];
   sb2 d_id_ind[NDISTS];
   sb2 c_id_ind[NDISTS];
   sb2 del_date_ind[NDISTS];
   sb2 carrier_id_ind[NDISTS];
   sb2 amt_ind[NDISTS];
   sb2 no_rowid_ind[NDISTS];
   sb2 o_rowid_ind[NDISTS];
#if defined(ISO) || defined(ISO5) || defined(ISO6) || defined(ISO8)
   sb2 inum_ind;
```

```
#endif

#ifdef DMLRETDEL
   ub4 del_o_id_len[NDISTS];
   ub4 c_id_len[NDISTS];
   int oid_ctx;
   int cid_ctx;
   OCIBind *olamt_bp;
#endif

   ub2 cons_len[NDISTS];
   ub2 w_id_len[NDISTS];
   ub2 d_id_len[NDISTS];
/*
   ub4 del_o_id_len[NDISTS];
   ub2 c_id_len[NDISTS];
*/
   ub2 del_date_len[NDISTS];
   ub2 carrier_id_len[NDISTS];
   ub2 amt_len[NDISTS];
   ub2 no_rowid_len[NDISTS];
   ub2 no_rowid_ptr_len[NDISTS];
   ub2 o_rowid_len[NDISTS];
   ub2 o_rowid_ptr_len[NDISTS];
#if defined(ISO) || defined(ISO5) || defined(ISO6) || defined(ISO8)
   ub2 inum_len;
#endif

   ub2 del_o_id_rcode[NDISTS];
   ub2 cons_rcode[NDISTS];
   ub2 w_id_rcode[NDISTS];
   ub2 d_id_rcode[NDISTS];
   ub2 c_id_rcode[NDISTS];
   ub2 del_date_rcode[NDISTS];
   ub2 carrier_id_rcode[NDISTS];
   ub2 amt_rcode[NDISTS];
   ub2 no_rowid_rcode[NDISTS];
   ub2 o_rowid_rcode[NDISTS];
#if defined(ISO) || defined(ISO5) || defined(ISO6) || defined(ISO8)
   ub2 inum_rcode;
#endif

   int del_o_id[NDISTS];
   int cons[NDISTS];
   int w_id[NDISTS];
   int d_id[NDISTS];
   int c_id[NDISTS];
   int carrier_id[NDISTS];
   /* float amt[NDISTS]; Changed to int */
   int amt[NDISTS];
   OCIRowid *no_rowid_ptr[NDISTS];
   OCIRowid *o_rowid_ptr[NDISTS];
   unsigned char del_date[NDISTS][DEL_DATE_LEN];
#if defined(ISO) || defined(ISO5) || defined(ISO6) || defined(ISO8)
   char inum[10];
#endif
   OCIStmt *curd0;
   OCIStmt *curd1;
   OCIStmt *curd2;
   OCIStmt *curd3;
   OCIStmt *curd4;
   OCIStmt *curd5;
   OCIStmt *curd6;
   OCIStmt *curdtest;

   OCIBind *w_id_bp;
   OCIBind *w_id_bp3 ;
   OCIBind *w_id_bp4 ;
   OCIBind *w_id_bp5 ;
   OCIBind *w_id_bp6 ;
   OCIBind *d_id_bp;
   OCIBind *d_id_bp3 ;
   OCIBind *d_id_bp4 ;
   OCIBind *d_id_bp5 ;
   OCIBind *d_id_bp6 ;
   OCIBind *o_id_bp;
   OCIBind *cr_date_bp;
   OCIBind *c_id_bp;
   OCIBind *c_id_bp3;
   OCIBind *no_rowid_bp;
   OCIBind *carrier_id_bp;
   OCIBind *o_rowid_bp;
   OCIBind *del_o_id_bp;
   OCIBind *del_o_id_bp3;
   OCIBind *amt_bp;
   OCIBind *bstr1_bp[10];
   OCIBind *bstr2_bp[10];
   OCIDefine *inum_dp;
   OCIDefine *d_id_dp;
   OCIDefine *del_o_id_dp;
   OCIDefine *no_rowid_dp;
   OCIDefine *c_id_dp;
   OCIDefine *o_rowid_dp;
   OCIDefine *cons_dp;
   OCIDefine *amt_dp;

   int norow;
};

typedef struct delctx delctx;
delctx *dctx;

static int proc_no ;


OCIEnv *tpcenv;
OCIServer *tpcsrv;
OCIError *errhp;
OCISvcCtx *tpcsvc;
OCISession *tpcusr;
char *uid = "dbbench";
char *pwd = "dbbench";

#ifdef DMLRETDEL

typedef struct amtctx {
  int ol_amt[NDISTS][NITEMS];
  sb2 ol_amt_ind[NDISTS][NITEMS];
  ub4 ol_amt_len[NDISTS][NITEMS];
  ub2 ol_amt_rcode[NDISTS][NITEMS];
  int ol_cnt[NDISTS];
} amtctx ;
amtctx *actx;

#endif

#ifdef DMLRETDEL

sb4 no_data(dvoid *ctxp, OCIBind *bp, ub4 iter, ub4 index,
              dvoid **bufpp, ub4 *alenp, ub1 *piecep,
              dvoid **indpp)
{
  *bufpp = (dvoid*)0;
  *alenp =0;
  *indpp = (dvoid*)0;
  *piecep =OCI_ONE_PIECE;
  return (OCI_CONTINUE);
}
sb4 TPC_oid_data(dvoid *ctxp, OCIBind *bp, ub4 iter, ub4 index,
              dvoid **bufpp, ub4 **alenp, ub1 *piecep,
              dvoid **indpp, ub2 **rcodepp)
{
  *bufpp = &dctx->del_o_id[iter];
  *indpp= &dctx->del_o_id_ind[iter];
  dctx->del_o_id_len[iter]=sizeof(dctx->del_o_id[0]);
  *alenp= &dctx->del_o_id_len[iter];
  *rcodepp = &dctx->del_o_id_rcode[iter];
  *piecep =OCI_ONE_PIECE;
  return (OCI_CONTINUE);
}
sb4 cid_data(dvoid *ctxp, OCIBind *bp, ub4 iter, ub4 index,
              dvoid **bufpp, ub4 **alenp, ub1 *piecep,
              dvoid **indpp, ub2 **rcodepp)
{
  *bufpp = &dctx->c_id[iter];
  *indpp= &dctx->c_id_ind[iter];
  dctx->c_id_len[iter]=sizeof(dctx->c_id[0]);
  *alenp= &dctx->c_id_len[iter];
  *rcodepp = &dctx->c_id_rcode[iter];
  *piecep =OCI_ONE_PIECE;
  return (OCI_CONTINUE);
}

sb4 amt_data(dvoid *ctxp, OCIBind *bp, ub4 iter, ub4 index,
              dvoid **bufpp, ub4 **alenp, ub1 *piecep,
              dvoid **indpp, ub2 **rcodepp)
{
  amtctx *actx;
  actx =(amtctx*)ctxp;
  actx->ol_cnt[iter]=actx->ol_cnt[iter]+1;
  *bufpp = &actx->ol_amt[iter][index];
  *indpp= &actx->ol_amt_ind[iter][index];
  actx->ol_amt_len[iter][index]=sizeof(actx->ol_amt[0][0]);
  *alenp= &actx->ol_amt_len[iter][index];
  *rcodepp = &actx->ol_amt_rcode[iter][index];
  *piecep =OCI_ONE_PIECE;
  return (OCI_CONTINUE);
}

#endif

int
init_del_tx()
{
/*****************************
 * BEGIN BLOCK OF COMMON CODE
 *****************************/

text  stmbuf[SQL_BUF_SIZE];
char bstr1[10], bstr2[10];
int i;

OCIStmt *curi;

   OCIInitialize(OCI_DEFAULT,(dvoid *)0,0,0,0);
   OCIEnvInit(&tpcenv, OCI_DEFAULT, 0, (dvoid **)0);
   OCIHandleAlloc((dvoid *)tpcenv, (dvoid **)&tpcsrv, OCI_HTYPE_SERVER, 0 , (dvoid
**)0);
   OCIHandleAlloc((dvoid *)tpcenv, (dvoid **)&errhp, OCI_HTYPE_ERROR, 0 , (dvoid
**)0);
   OCIHandleAlloc((dvoid *)tpcenv, (dvoid **)&tpcsvc, OCI_HTYPE_SVCCTX, 0 , (dvoid
**)0);
   OCIServerAttach(tpcsrv, errhp, (text *)0,0,OCI_DEFAULT);
   OCIAttrSet((dvoid *)tpcsvc, OCI_HTYPE_SVCCTX, (dvoid *)tpcsrv,
(ub4)0,OCI_ATTR_SRVRCTXT, errhp);
   OCIHandleAlloc((dvoid *)tpcenv, (dvoid **)&tpcusr, OCI_HTYPE_SESSION, 0 , (dvoid
**)0);
   OCIAttrSet((dvoid *)tpcusr, OCI_HTYPE_SESSION, (dvoid *)uid,
(ub4)strlen(uid),OCI_ATTR_USERNAME, errhp);
   OCIAttrSet((dvoid *)tpcusr, OCI_HTYPE_SESSION, (dvoid *)pwd, (ub4)strlen(pwd),
      OCI_ATTR_PASSWORD, errhp);
   OCIERROR(errhp, OCISessionBegin(tpcsvc, errhp, tpcusr, OCI_CRED_RDBMS,
OCI_DEFAULT));

   OCIAttrSet(tpcsvc, OCI_HTYPE_SVCCTX, tpcusr, 0, OCI_ATTR_USERCTXT, errhp);

   /* run all transaction in serializable mode */

   OCIHandleAlloc(tpcenv, (dvoid **)&curi, OCI_HTYPE_STMT, 0, (dvoid**)0);
   sprintf ((char *) stmbuf, SQLTXT);
   OCIStmtPrepare(curi, errhp, stmbuf, strlen((char *)stmbuf), OCI_NTV_SYNTAX,
OCI_DEFAULT);
   OCIERROR(errhp,OCIStmtExecute(tpcsvc, curi, errhp,1,0,0,0,OCI_DEFAULT));
   OCIHandleFree(curi, OCI_HTYPE_STMT);


#ifdef SQL_TRACE
   /* Turn on the SQL_TRACE */
   OCIHandleAlloc(tpcenv, (dvoid **)&curi, OCI_HTYPE_STMT, 0, &xmem);
```

```
   sprintf ((char *) stmbuf, SQLTXT1);
   OCIStmtPrepare(curi, errhp, stmbuf, strlen((char *)stmbuf), OCI_NTV_SYNTAX,
OCI_DEFAULT);
   OCIERROR(errhp, OCIStmtExecute(tpcsvc, curi, errhp,1,0,0,0,OCI_DEFAULT));
   OCIHandleFree((dvoid *)curi, OCI_HTYPE_STMT);
#endif /* End SQL_TRACE */


dctx = (delctx *) malloc(sizeof(delctx));
memset(dctx, (char)0, sizeof(delctx));
dctx->norow = 0;

#ifdef DMLRETDEL
   actx = (amtctx *) malloc (sizeof(amtctx));
   memset(actx,(char)0,sizeof(amtctx));
#endif

   for(i=0;i<NDISTS;i++) {
/*
     dctx->o_rowid_ptr[i] = &(dctx->o_rowid[i][0]);
     dctx->no_rowid_ptr[i] = &(dctx->no_rowid[i][0]);
*/
    OCIERROR(errhp, OCIDescriptorAlloc(tpcenv,(dvoid **)&dctx->o_rowid_ptr[i],
             OCI_DTYPE_ROWID,0,(dvoid**)0));
    OCIERROR(errhp, OCIDescriptorAlloc(tpcenv,(dvoid **)&dctx->no_rowid_ptr[i],
             OCI_DTYPE_ROWID,0,(dvoid**)0));
   }

#if defined(ISO) || defined(ISO5) || defined(ISO6) || defined(ISO8)
   OCIHandleAlloc(tpcenv, (dvoid **)(&dctx->curd0), OCI_HTYPE_STMT, 0, (dvoid**)0);
   sprintf ((uchar *) stmbuf, SQLTXT0);
   OCIStmtPrepare(dctx->curd0, errhp, stmbuf, strlen((char *)stmbuf),OCI_NTV_SYNTAX,
OCI_DEFAULT);

   OCIDFNRA(dctx->curd0, dctx->inum_dp,errhp,1,dctx->inum,SIZ(dctx->inum),SQLT_STR,
         &(dctx->inum_ind),&(dctx->inum_len),&(dctx->inum_rcode));
#endif

   /* open first cursor */

# ifdef DMLRETDEL
   OCIERROR(errhp,OCIHandleAlloc(tpcenv, (dvoid **)(&dctx->curd1), OCI_HTYPE_STMT, 0,
(dvoid**)0));
   sprintf ((char *) stmbuf, "%s",    SQLTXT1);
   OCIStmtPrepare(dctx->curd1, errhp, stmbuf, strlen((char *)stmbuf),OCI_NTV_SYNTAX,
OCI_DEFAULT);

   OCIBND(dctx->curd1, dctx->w_id_bp,errhp,":w_id",dctx->w_id,SIZ(int),
          SQLT_INT);
   OCIBNDRA(dctx->curd1, dctx->d_id_bp,errhp,":d_id",dctx->d_id,SIZ(int),
          SQLT_INT,NULL,NULL,NULL);

   OCIBNDRAD(dctx->curd1, dctx->del_o_id_bp, errhp, ":o_id",
             SIZ(int),SQLT_INT,NULL,
             &dctx->oid_ctx,no_data,TPC_oid_data);
# endif

   /* open third cursor */

   OCIHandleAlloc(tpcenv, (dvoid **)(&dctx->curd3), OCI_HTYPE_STMT, 0, (dvoid**)0);
   sprintf ((char *) stmbuf, SQLTXT3);
   OCIStmtPrepare(dctx->curd3, errhp, stmbuf, strlen((char *)stmbuf),
  OCI_NTV_SYNTAX, OCI_DEFAULT);


   /* bind variables */

   OCIBNDRA(dctx->curd3, dctx->carrier_id_bp,errhp,":carrier_id",dctx->carrier_id,
         SIZ(dctx->carrier_id[0]),SQLT_INT,dctx->carrier_id_ind,
         dctx->carrier_id_len,dctx->carrier_id_rcode);

# ifdef DMLRETDEL
   OCIBNDRA(dctx->curd3, dctx->w_id_bp3, errhp, ":w_id", dctx->w_id,SIZ(dctx-
>w_id[0]),
            SQLT_INT, dctx->w_id_ind,dctx->w_id_len,dctx->w_id_rcode);
   OCIBNDRA(dctx->curd3, dctx->d_id_bp3, errhp, ":d_id", dctx->d_id,SIZ(int),
            SQLT_INT,NULL, NULL, NULL);
   OCIBNDRA(dctx->curd3, dctx->del_o_id_bp3, errhp, ":o_id", dctx->del_o_id,
            SIZ(int), SQLT_INT,NULL,NULL,NULL);
   OCIBNDRAD(dctx->curd3, dctx->c_id_bp3, errhp, ":o_c_id", SIZ(int),
            SQLT_INT,NULL,&dctx->cid_ctx,no_data, cid_data);
# endif


   /* open fourth cursor */

   OCIHandleAlloc(tpcenv, (dvoid **)(&dctx->curd4), OCI_HTYPE_STMT, 0, (dvoid**)0);
   sprintf ((char *) stmbuf, SQLTXT4);
   OCIStmtPrepare(dctx->curd4, errhp, stmbuf, strlen((char *)stmbuf),
  OCI_NTV_SYNTAX, OCI_DEFAULT);

   /* bind variables */
   OCIBND(dctx->curd4, dctx->w_id_bp4,errhp,":w_id",dctx->w_id,
          SIZ(int), SQLT_INT);
   OCIBND(dctx->curd4, dctx->d_id_bp4,errhp,":d_id",dctx->d_id,
          SIZ(int), SQLT_INT);
   OCIBND(dctx->curd4, dctx->o_id_bp,errhp,":o_id",dctx->del_o_id,
            SIZ(int),SQLT_INT);
   OCIBND(dctx->curd4, dctx->cr_date_bp,errhp,":cr_date", dctx->del_date,
            SIZ(cr_date), SQLT_DAT);
/*
   OCIBND(dctx->curd4, dctx->cr_date_bp,errhp,":cr_date", dctx->del_date,
            SIZ(OCIDate), SQLT_ODT);
*/
# ifdef DMLRETDEL
   OCIBNDRAD(dctx->curd4, dctx->olamt_bp, errhp, ":ol_amount",
             SIZ(int), SQLT_INT,NULL, actx,no_data,amt_data);
# endif


   /* open sixth cursor */

   OCIHandleAlloc(tpcenv, (dvoid **)(&dctx->curd6), OCI_HTYPE_STMT, 0, (dvoid**)0);
   sprintf ((char *) stmbuf, SQLTXT6);
   OCIStmtPrepare(dctx->curd6, errhp, stmbuf, strlen((char *)stmbuf),
  OCI_NTV_SYNTAX, OCI_DEFAULT);

   /* bind variables */


   OCIBND(dctx->curd6,dctx->amt_bp,errhp,":amt",dctx->amt,SIZ(int),
          SQLT_INT);
   OCIBND(dctx->curd6,dctx->w_id_bp6,errhp,":w_id",dctx->w_id,SIZ(int),
            SQLT_INT);
   OCIBND(dctx->curd6,dctx->d_id_bp6,errhp,":d_id",dctx->d_id,SIZ(int),
            SQLT_INT);
   OCIBND(dctx->curd6,dctx->c_id_bp,errhp,":c_id",dctx->c_id,SIZ(int),
            SQLT_INT);

#ifdef TKPROF
EXEC SQL ALTER SESSION SET SQL_TRACE = TRUE;
#endif/* TKPROF */

/****************************
 * END BLOCK OF COMMON CODE
 ****************************/

/*proc_stat_msg("init_del_tx()\n");
proc_stat(); */

return(0);
}


        /* Structure used to queue delivery transaction */
        struct req_struct {
        int w_id;
        int o_carrier_id;
        time_t qtime;           /* Time transaction was queued */
        } ;

delivery_tx(rqst)
TPSVCINFO *rqst;
{
   int i, j,v;
   int invalid;
   int tmp_id;
   int rpc, rcount, errcode, execstatus;
   int count ;

   /* float tmp_amt; changed form float to int */
   int tmp_amt;
   int del_o_id[10];
   ub4 attr_size;

intlen;
intretries=0, err = 0;

struct req_struct *delp;
        delp = (struct req_struct *)(rqst->data);

/****************************
 * BEGIN BLOCK OF COMMON CODE
 ****************************/

   /*int rpc, rcount, errcode, execstatus;*/
MOVETO(w_id, delp);
MOVETO(o_carrier_id, delp);
vgetdate(cr_date);

tx_count++;
sprintf(outbuf, "Starting transaction %d queued at %d\n",
tx_count, delp->qtime);

#if defined(ISO) || defined(ISO5) || defined(ISO6) || defined(ISO8)
   int hasno;
   int reread;
   char sdate[30];

   OCIStmtExecute(tpcsvc, dctx->curd0, errhp, 1,0,0,0, OCI_DEFAULT);
   sysdate (sdate);
   userlog ("Delivery started at %s on node %s\n", sdate, dctx->inum);
#endif

retry:

#if defined(ISO) || defined(ISO5) || defined(ISO6) || defined(ISO8)
   reread = 1;
#endif

iso:
   invalid = 0;
   /* initialization for array operations */

   for (i = 0; i < NDISTS; i++) {
      dctx->del_o_id_ind[i] = TRUE;
      dctx->cons_ind[i] = TRUE;
      dctx->w_id_ind[i] = TRUE;
      dctx->d_id_ind[i] = TRUE;
      dctx->c_id_ind[i] = TRUE;
      dctx->del_date_ind[i] = TRUE;
      dctx->carrier_id_ind[i] = TRUE;
      dctx->amt_ind[i] = TRUE;
      dctx->no_rowid_ind[i] = TRUE;
      dctx->o_rowid_ind[i] = TRUE;

      dctx->del_o_id_len[i] = SIZ(dctx->del_o_id[0]);
      dctx->cons_len[i] = SIZ(dctx->cons[0]);
      dctx->w_id_len[i] = SIZ(dctx->w_id[0]);
      dctx->d_id_len[i] = SIZ(dctx->d_id[0]);
      dctx->c_id_len[i] = SIZ(dctx->c_id[0]);
      dctx->del_date_len[i] = DEL_DATE_LEN;
      dctx->carrier_id_len[i] = SIZ(dctx->carrier_id[0]);
      dctx->amt_len[i] = SIZ(dctx->amt[0]);
      dctx->no_rowid_len[i] = ROWIDLEN;
      dctx->o_rowid_len[i] = ROWIDLEN;
      dctx->no_rowid_ptr_len[i] = SIZ(dctx->no_rowid_ptr[0]);
      dctx->o_rowid_ptr_len[i] = SIZ(dctx->o_rowid_ptr[0]);
```

```
      dctx->w_id[i] = w_id;
      dctx->d_id[i] = i+1; /* Added new by Ravi.... */
      dctx->carrier_id[i] = o_carrier_id;
      memcpy(dctx->del_date[i],cr_date,DEL_DATE_LEN);
   }

#ifdef DMLRETDEL /* VMM 1/13/98 */
   memset(actx,(char)0,sizeof(amtctx));
#endif /* DMLRETDEL */

   /* array select from new_order and orders tables */

   execstatus=OCIStmtExecute(tpcsvc,dctx->curd1,errhp,NDISTS,0,0,0,OCI_DEFAULT);
   if((execstatus != OCI_SUCCESS) && (execstatus != OCI_NO_DATA)) {
     OCITransRollback(tpcsvc,errhp,OCI_DEFAULT);
     errcode = OCIERROR(errhp,execstatus);
     if(errcode == NOT_SERIALIZABLE) {
        retries++;
        goto retry;
     } else if (errcode == RECOVERR) {
        retries++;
        goto retry;
     } else {
        return -1;
     }
   }

   /* mark districts with no new order */
   attr_size = sizeof(int);
   OCIAttrGet(dctx->curd1,OCI_HTYPE_STMT,&rcount,&attr_size,OCI_ATTR_ROWCNT,errhp);
   rpc = rcount;

/* Code not present in TPCSO ---- Ravi
   invalid = NDISTS - rcount;
   for (i = rpc; i < NDISTS; i++) {
      dctx->del_o_id_ind[i] = NA;
      dctx->w_id_ind[i] = NA;
      dctx->d_id_ind[i] = NA;
      dctx->c_id_ind[i] = NA;
      dctx->carrier_id_ind[i] = NA;
      dctx->no_rowid_ind[i] = NA;
      dctx->o_rowid_ind[i] = NA;
   }
*/

#if defined(ISO) || defined(ISO5) || defined(ISO6) || defined(ISO8)
   if (invalid) {
      sysdate (sdate);
      for (i = 1; i <= NDISTS; i++) {
         hasno = 0;
         for (j = 0; j < rpc; j++) {
            if (dctx->d_id[j] == i) {
               hasno = 1;
               break;
            }
         }
         if (!hasno)
            userlog ("Delivery [dist %d] found no new order at %s\n", i, sdate);
      }
      if (reread) {
         sleep (60);
         sysdate (sdate);
         userlog ("Delivery wake up at %s\n", sdate);
         reread = 0;
         goto iso;
      }
   }
#endif

   /* array delete of new_order table */

   execstatus=OCIStmtExecute(tpcsvc,dctx->curd3,errhp,rpc,0,0,0,OCI_DEFAULT);
   if(execstatus != OCI_SUCCESS) {
     OCITransRollback(tpcsvc,errhp,OCI_DEFAULT);
     errcode = OCIERROR(errhp,execstatus);
     if(errcode == NOT_SERIALIZABLE) {
        retries++;
        goto retry;
     } else if (errcode == RECOVERR) {
        retries++;
        goto retry;
     } else {
        return -1;
     }
   }

   /* mark districts with no new order */

   OCIAttrGet(dctx->curd3,OCI_HTYPE_STMT,&rcount,0,OCI_ATTR_ROW_COUNT,errhp);

   if (rcount != rpc) {
#ifdef TPCSO
      write_log ("Del %d: %d rows selected, %d ords updated\n",
                 my_id, rpc, rcount);
#else
      fprintf (stderr,
               "Error in TPC-C server %d: %d rows selected, %d ords updated\n",
               proc_no, rpc, rcount);
#endif
      OCITransRollback(tpcsvc,errhp,OCI_DEFAULT);
      return (-1);
   }

   /* array update of order_line table */

   execstatus=OCIStmtExecute(tpcsvc,dctx->curd4,errhp,rpc,0,0,0,OCI_DEFAULT);
   if(execstatus != OCI_SUCCESS) {
     OCITransRollback(tpcsvc,errhp,OCI_DEFAULT);
     errcode = OCIERROR(errhp,execstatus);
     if(errcode == NOT_SERIALIZABLE) {
        retries++;
        goto retry;
     } else if (errcode == RECOVERR) {
        retries++;
        goto retry;
     } else {
        return -1;
     }
   }

#ifdef DMLRETDEL
  OCIAttrGet(dctx->curd4,OCI_HTYPE_STMT,&rcount,NULL,OCI_ATTR_ROW_COUNT,errhp);
/* add up amounts */
   count=0;
   for (i=0;i<rpc;i++)
   {
     dctx->amt[i]=0;
     for (j=0;j<actx->ol_cnt[i];j++)
       if ( actx->ol_amt_rcode[i][j] == 0)
       {
         dctx->amt[i] = dctx->amt[i] + actx->ol_amt[i][j];
         count = count+1;
       }
   }
   if (rcount > rpc*NITEMS) {
#ifdef TPCSO
      write_log ("Del %d: %d ordnrs updated, %d ordl updated\n",
                 my_id, rpc, rcount);
#endif
   }
#endif

#if defined(ISO5) || defined(ISO6)
   userlog ("d_id:amount\n");
   for (i = 0; i < rpc; i++)
      userlog ("%d:%.2f ", dctx->d_id[i], dctx->amt[i]);
   userlog ("\n");
#endif

   /* array update of customer table */
#if defined(ISO5) || defined (ISO6)
   execstatus=OCIStmtExecute(tpcsvc,dctx->curd6,errhp,rpc,0,0,0,
                             OCI_DEFAULT);
#else
   execstatus=OCIStmtExecute(tpcsvc,dctx->curd6,errhp,rpc,0,0,0,
OCI_COMMIT_ON_SUCCESS | OCI_DEFAULT);
#endif
   if(execstatus != OCI_SUCCESS) {
     OCITransRollback(tpcsvc,errhp,OCI_DEFAULT);
     errcode = OCIERROR(errhp,execstatus);
     if(errcode == NOT_SERIALIZABLE) {
        retries++;
        goto retry;
     } else if (errcode == RECOVERR) {
        retries++;
        goto retry;
     } else {
        return -1;
     }
   }

   attr_size = sizeof(int);
   OCIAttrGet(dctx->curd6,OCI_HTYPE_STMT,&rcount,&attr_size,OCI_ATTR_ROWCNT,errhp);

   if (rcount != rpc) {
/*******
#ifdef TPCSO
      write_log ("Del %d: %d rows selected, %d cust updated\n",
                 my_id, rpc, curd6.rpc);
#else
      userlog ("%d rows selected, %d cust updated\n", rpc, curd6.rpc);
#endif
*******/
     OCITransRollback(tpcsvc,errhp,OCI_DEFAULT);
      return (-1);
   }

#if defined(ISO5) || defined(ISO6)
   sysdate (sdate);
#ifdef ISO5
   userlog ("Delivery sleep before commit at %s\n", sdate);
#else
   userlog ("Delivery sleep before abort at %s\n", sdate);
#endif
   sleep (60);
   sysdate (sdate);
   userlog ("Delivery wake up at %s\n", sdate);
#endif

#ifdef ISO6
     OCITransRollback(tpcsvc,errhp,OCI_DEFAULT);
#endif
#ifdef ISO5
     OCITransCommit(tpcsvc,errhp,OCI_DEFAULT);
#endif
#if defined(ISO5) || defined(ISO6)
   sysdate (sdate);
   userlog ("Delivery completed at: %s\n", sdate);
#endif

   /* return o_id's in district id order */

   for (i = 0; i < NDISTS; i++)
      del_o_id[i] = 0;
   for (i = 0; i < rpc; i++)
      del_o_id[dctx->d_id[i] - 1] = dctx->del_o_id[i];

for (i = 0; i < 10; i++) {
if (del_o_id[i] == 0) {
/* No order found for this district */
sprintf(outbuf+strlen(outbuf),
"Delivery for District %d skipped\n", i+1);
}
else {
sprintf(outbuf+strlen(outbuf),
"Delivered order %d for district %d, warehouse %d, carrier %d\n",
del_o_id[i], i+1, w_id, o_carrier_id);
}
```

```
}

sprintf(outbuf+strlen(outbuf), "Transaction completed at %d\n", time(0));
fwrite(outbuf, strlen(outbuf), 1, delfile);
fflush(delfile);

/****************************
 * END BLOCK OF COMMON CODE
 ****************************/
return(0);
}


void
cleanup(code)
{
   if (dctx)
      free (dctx);

#if defined(ISO) || defined(ISO5) || defined(ISO6) || defined(ISO8)
   OCIHandleFree((dvoid *)dctx->curd0,OCI_HTYPE_STMT);
#endif
   OCIHandleFree((dvoid *)dctx->curd1,OCI_HTYPE_STMT);
   OCIHandleFree((dvoid *)dctx->curd2,OCI_HTYPE_STMT);
   OCIHandleFree((dvoid *)dctx->curd3,OCI_HTYPE_STMT);
   OCIHandleFree((dvoid *)dctx->curd4,OCI_HTYPE_STMT);
   OCIHandleFree((dvoid *)dctx->curd5,OCI_HTYPE_STMT);
   OCIHandleFree((dvoid *)dctx->curd6,OCI_HTYPE_STMT);

   /* log off */

   OCIHandleFree((dvoid *)tpcusr, OCI_HTYPE_SESSION);
   OCIHandleFree((dvoid *)tpcsvc, OCI_HTYPE_SVCCTX);
   OCIHandleFree((dvoid *)errhp, OCI_HTYPE_ERROR);
   OCIHandleFree((dvoid *)tpcsrv, OCI_HTYPE_SERVER);
   OCIHandleFree((dvoid *)tpcenv, OCI_HTYPE_ENV);

    if (my_qid >= 0)
        msgctl(my_qid, IPC_RMID, 0);
    userlog("Del %d: Exiting\n", my_id);
    exit(code);
}

/* Tuxedo */
tpsvrinit(argc, argv)
char **argv;
{
        char *p;
        char filename[200];
        int proc_no, count;
        struct utsname name;

        if ((p = getenv("TMPDIR")) == (char *)NULL) {
                userlog("TMPDIR environment variable not set\n");
                exit(1);
        }

        proc_no = atoi(argv[optind]);   /* Needs argument which is the proc_no */

        /* Get hostname of our machine  and create results file */
        uname( &name);
        strcpy(filename, p);
        sprintf(filename+strlen(filename), "/%s.del%d", name.nodename, proc_no);
        delfile = fopen(filename, "w");
        if (delfile == NULL) {
                userlog("Cannot create file %s\n", filename);
        }
        return(init_del_tx());          /* Prepare transaction */
}

void
tpsvrdone()
{
        fclose(delfile);        /* Close results file */
}

DEL(rqst)
TPSVCINFO *rqst;
{
        if (delivery_tx(rqst))
        tpreturn(TPFAIL, 0, rqst->data, sizeof(struct req_struct), 0);
else
        tpreturn(TPSUCCESS, 0, rqst->data, sizeof(struct req_struct), 0);
}
```

tuxserver/tpcc_srv_newo.c

```
/*
 * Copyright (c) 1995 by Sun Microsystems, Inc.
 */

#pragma ident "@(#)tpcso_srv_newo.c1.1497/01/02SMI"

/*+=================================================================+
 |        Copyright (c) 1996  Oracle Corp, Redwood Shores, CA       |
 |                    OPEN SYSTEMS PERFORMANCE GROUP                |
 |                         All Rights Reserved                      |
 +=================================================================+
 | FILENAME
 |    plnew.c
 | DESCRIPTION
 |    OCI version (using PL/SQL stored procedure) of
 |    NEW ORDER transaction in TPC-C benchmark.
 +=================================================================*/
#include "ora_oci.h"

#include <signal.h>
#include <stdio.h>
#include <sys/types.h>
#include <sys/ipc.h>
#include <sys/msg.h>
#include "./ora_err.h"

/* Tuxedo includes */
#include "atmi.h"
#include "userlog.h"

static inttx_count = 0;

#define MOVETO(element, struct_name) element = struct_name->element
#define MOVEBACK(element, struct_name) struct_name->element = element
#define MOVECBACK(element, cnt, struct_name) strncpy(struct_name->element, element,
cnt)


/* Lists of items on an order */
/* These structures should match the struct definitions for no_struct
 * defined in tpcc_client.h exactly.
 * Any change to those, should be reflected here
 */

struct items_inf {
int ol_supply_w_id;
int ol_i_id;
char i_name[25];
int ol_quantity;
int s_quantity;
char brand[2];
double i_price;
double ol_amount;
} ;

/* List of fields in neworder */

struct newo_inf {
int w_id;
int d_id;
int c_id;
int o_id;
int o_ol_cnt;
double c_discount;
double w_tax;
double d_tax;
char o_entry_d[20];
char c_credit[3];
char c_last[17];
struct items_inf n_items[15];
char status_mesg[25];
double total;
} ;

/*struct msgh_req message; */
char blank_mesg[25] = "                         ";

int my_qid, my_id;
char my_name[] = "Newo";


/****************************
 * BEGIN BLOCK OF COMMON CODE
 ****************************/

/* struct newo_inf */

int w_id;
int d_id;
int c_id;
int o_id;
int o_ol_cnt;
int c_discount;
int w_tax;
int d_tax;
char o_entry_d[20];
char c_credit[3];
char c_last[17];
char status_mesg[25];
double total;

int nol_i_id[15];
int nol_supply_w_id[15];
int nol_quantity[15];
int nol_amount[15];

char i_name[15][25];
int s_quantity[15];
char brand_gen[15][2];
char brand_generic[15];
int i_price[15];
int o_all_local;
int retries;

char cr_date[7];

#defineSQLTXT"alter session set isolation_level = serializable"

#define SQLTXT1 "BEGIN neworder.enterorder (:w_id, :d_id, :c_id, :o_ol_cnt, \
   :o_all_local, :c_discount, :c_last, :c_credit, :d_tax, :w_tax, :o_id, \
   :retry, :cr_date); END;"

#define SQLTXT2 "BEGIN initnew.new_init(:idx1arr); END;"

#define NITEMS 15
#define ROWIDLEN 20
#define OCIROWLEN 20


struct newctx {
  sb2 nol_i_id_ind[NITEMS];
  sb2 nol_supply_w_id_ind[NITEMS];
  sb2 nol_quantity_ind[NITEMS];
  sb2 nol_amount_ind[NITEMS];
  sb2 i_name_ind[NITEMS];
```

```
sb2 s_quantity_ind[NITEMS];
sb2 i_price_ind[NITEMS];
sb2 ol_w_id_ind[NITEMS];
sb2 ol_d_id_ind[NITEMS];
sb2 ol_o_id_ind[NITEMS];
sb2 ol_number_ind[NITEMS];
sb2 cons_ind[NITEMS];
sb2 s_rowid_ind[NITEMS];
sb2 s_remote_ind[NITEMS];
sb2 s_quant_ind[NITEMS];
sb2 i_data_ind[NITEMS];
sb2 s_data_ind[NITEMS];
sb2 s_dist_info_ind[NITEMS];
sb2 ol_dist_info_ind[NITEMS];
sb2 null_date_ind[NITEMS];
sb2 s_bg_ind[NITEMS];

ub2 nol_i_id_len[NITEMS];
ub2 nol_supply_w_id_len[NITEMS];
ub2 nol_quantity_len[NITEMS];
ub2 nol_amount_len[NITEMS];
ub2 i_name_len[NITEMS];
ub2 s_quantity_len[NITEMS];
ub2 i_price_len[NITEMS];
ub2 ol_w_id_len[NITEMS];
ub2 ol_d_id_len[NITEMS];
ub2 ol_o_id_len[NITEMS];
ub2 ol_number_len[NITEMS];
ub2 cons_len[NITEMS];
ub2 s_rowid_len[NITEMS];
ub2 s_remote_len[NITEMS];
ub2 s_quant_len[NITEMS];
ub2 i_data_len[NITEMS];
ub2 s_data_len[NITEMS];
ub2 s_dist_info_len[NITEMS];
ub2 ol_dist_info_len[NITEMS];
ub2 null_date_len[NITEMS];
ub2 s_bg_len[NITEMS];

ub2 nol_i_id_rcode[NITEMS];
ub2 nol_supply_w_id_rcode[NITEMS];
ub2 nol_quantity_rcode[NITEMS];
ub2 nol_amount_rcode[NITEMS];
ub2 i_name_rcode[NITEMS];
ub2 s_quantity_rcode[NITEMS];
ub2 i_price_rcode[NITEMS];
ub2 ol_w_id_rcode[NITEMS];
ub2 ol_d_id_rcode[NITEMS];
ub2 ol_o_id_rcode[NITEMS];
ub2 ol_number_rcode[NITEMS];
ub2 cons_rcode[NITEMS];
ub2 s_rowid_rcode[NITEMS];
ub2 s_remote_rcode[NITEMS];
ub2 s_quant_rcode[NITEMS];
ub2 i_data_rcode[NITEMS];
ub2 s_data_rcode[NITEMS];
ub2 s_dist_info_rcode[NITEMS];
ub2 ol_dist_info_rcode[NITEMS];
ub2 null_date_rc[NITEMS];
ub2 s_bg_rcode[NITEMS];

int ol_w_id[NITEMS];
int ol_d_id[NITEMS];
int ol_o_id[NITEMS];
int ol_number[NITEMS];
int cons[NITEMS];

OCIRowid  *s_rowid_ptr[NITEMS];

int s_remote[NITEMS];
char i_data[NITEMS][51];
char s_data[NITEMS][51];
char s_dist_info[NITEMS][25];
unsigned char null_date[NITEMS][7]; /* base date for null date entry */
OCIStmt *curn1;
OCIBind *ol_i_id_bp;
OCIBind *ol_supply_w_id_bp;
OCIBind *i_price_bp;
OCIBind *i_name_bp;
OCIBind *s_bg_bp;
OCIBind *s_data_bp;
OCIBind *i_data_bp;
ub4 nol_i_count;
ub4 nol_s_count;
ub4 nol_q_count;
ub4 nol_item_count;
ub4 nol_name_count;
ub4 nol_qty_count;
ub4 nol_bg_count;
ub4 nol_am_count;
ub4 s_remote_count;
ub4 s_data_count;
ub4 i_data_count;
OCIStmt *curn;
OCIStmt *curn2;
OCIStmt *curn3[10];
OCIBind *ol_i_id_bp4;
OCIBind *ol_supply_w_id_bp4;
OCIBind *ol_quantity_bp;
OCIBind *ol_quantity_bp4;
OCIBind *s_remote_bp;
OCIBind *s_quantity_bp;
OCIStmt *curn4;
OCIBind *w_id_bp;
OCIBind *d_id_bp;
OCIBind *c_id_bp;
OCIBind *o_all_local_bp;
OCIBind *o_all_cnt_bp;
OCIBind *w_tax_bp;
OCIBind *d_tax_bp;
OCIBind *o_id_bp;
OCIBind *c_discount_bp;
OCIBind *c_credit_bp;
OCIBind *c_last_bp;
OCIBind *retries_bp;
OCIBind *cr_date_bp;
OCIBind *s_rowid_bp;
OCIBind *id_bp[10][15];
OCIBind *sd_bp[10][15];
OCIDefine *Dcons[10];
OCIDefine *Ds_rowid[10];
OCIDefine *Di_price[10];
OCIDefine *Di_data[10];
OCIDefine *Ds_dist_info[10];
OCIDefine *Ds_data[10];
OCIDefine *Ds_quantity[10];
OCIDefine *Di_name[10];
OCIBind *ol_o_id_bp;
OCIBind *ol_d_id_bp;
OCIBind *ol_w_id_bp;
OCIBind *ol_number_bp;
OCIBind *ol_amount_bp;
OCIBind *ol_dist_info_bp;
OCIBind *null_date_bp;
sb2 w_id_ind;
ub2 w_id_len;
ub2 w_id_rc;

sb2 d_id_ind;
ub2 d_id_len;
ub2 d_id_rc;

sb2 c_id_ind;
ub2 c_id_len;
ub2 c_id_rc;

sb2 o_all_local_ind;
ub2 o_all_local_len;
ub2 o_all_local_rc;

sb2 o_ol_cnt_ind;
ub2 o_ol_cnt_len;
ub2 o_ol_cnt_rc;

sb2 w_tax_ind;
ub2 w_tax_len;
ub2 w_tax_rc;

sb2 d_tax_ind;
ub2 d_tax_len;
ub2 d_tax_rc;

sb2 o_id_ind;
ub2 o_id_len;
ub2 o_id_rc;

sb2 c_discount_ind;
ub2 c_discount_len;
ub2 c_discount_rc;

sb2 c_credit_ind;
ub2 c_credit_len;
ub2 c_credit_rc;

sb2 c_last_ind;
ub2 c_last_len;
ub2 c_last_rc;

sb2 retries_ind;
ub2 retries_len;
ub2 retries_rc;

sb2 cr_date_ind;
ub2 cr_date_len;
ub2 cr_date_rc;


int cs;
int norow;
};

typedef struct newctx newctx;

newctx *nctx;

OCIEnv *tpcenv;
OCIServer *tpcsrv;
OCIError *errhp;
OCISvcCtx *tpcsvc;
OCISession *tpcusr;
char *uid = "dbbench";
char *pwd = "dbbench";

/*
 * Initialize the neworder transaction
 */

int status, execstatus, errcode;

int
init_newo_tx()
{

   int i, j;
   text stmbuf[2*SQL_BUF_SIZE];
   char id[4];
   char sd[4];

OCIStmt *curi;

   OCIInitialize(OCI_DEFAULT,(dvoid *)0,0,0,0);
   OCIEnvInit(&tpcenv, OCI_DEFAULT, 0, (dvoid **)0);
   OCIHandleAlloc((dvoid *)tpcenv, (dvoid **)&tpcsrv, OCI_HTYPE_SERVER, 0 , (dvoid
**)0);
   OCIHandleAlloc((dvoid *)tpcenv, (dvoid **)&errhp, OCI_HTYPE_ERROR, 0 , (dvoid
**)0);
   OCIHandleAlloc((dvoid *)tpcenv, (dvoid **)&tpcsvc, OCI_HTYPE_SVCCTX, 0 , (dvoid
**)0);
```

```
   OCIServerAttach(tpcsrv, errhp, (text *)0,0,OCI_DEFAULT);
   OCIAttrSet((dvoid *)tpcsvc, OCI_HTYPE_SVCCTX, (dvoid *)tpcsrv,
(ub4)0,OCI_ATTR_SRVRCTXT, errhp);
   OCIHandleAlloc((dvoid *)tpcenv, (dvoid **)&tpcusr, OCI_HTYPE_SESSION, 0 , (dvoid
**)0);
   OCIAttrSet((dvoid *)tpcusr, OCI_HTYPE_SESSION, (dvoid *)uid,
(ub4)strlen(uid),OCI_ATTR_USERNAME, errhp);
   OCIAttrSet((dvoid *)tpcusr, OCI_HTYPE_SESSION, (dvoid *)pwd, (ub4)strlen(pwd),
      OCI_ATTR_PASSWORD, errhp);
   OCIERROR(errhp, OCISessionBegin(tpcsvc, errhp, tpcusr, OCI_CRED_RDBMS,
OCI_DEFAULT));

   OCIAttrSet(tpcsvc, OCI_HTYPE_SVCCTX, tpcusr, 0, OCI_ATTR_USERCTXT, errhp);

   /* run all transaction in serializable mode */

   OCIHandleAlloc(tpcenv, (dvoid **)&curi, OCI_HTYPE_STMT, 0, (dvoid**)0);
   sprintf ((char *) stmbuf, SQLTXT);
   OCIStmtPrepare(curi, errhp, stmbuf, strlen((char *)stmbuf), OCI_NTV_SYNTAX,
OCI_DEFAULT);
   OCIERROR(errhp,OCIStmtExecute(tpcsvc, curi, errhp,1,0,0,0,OCI_DEFAULT));
   OCIHandleFree(curi, OCI_HTYPE_STMT);


#ifdef SQL_TRACE
   /* Turn on the SQL_TRACE */
   OCIHandleAlloc(tpcenv, (dvoid **)&curi, OCI_HTYPE_STMT, 0, &xmem);
   sprintf ((char *) stmbuf, SQLTXT1);
   OCIStmtPrepare(curi, errhp, stmbuf, strlen((char *)stmbuf), OCI_NTV_SYNTAX,
OCI_DEFAULT);
   OCIERROR(errhp, OCIStmtExecute(tpcsvc, curi, errhp,1,0,0,0,OCI_DEFAULT));
   OCIHandleFree((dvoid *)curi, OCI_HTYPE_STMT);
#endif /* End SQL_TRACE */

vgetdate(cr_date);

   nctx = (newctx *) malloc (sizeof(newctx));
memset(nctx, (char)0, sizeof(newctx));
nctx->cs = 1;
nctx->norow = 0;

  for(i=0;i<NITEMS;i++) {
    OCIERROR(errhp, OCIDescriptorAlloc(tpcenv,(dvoid **)&nctx->s_rowid_ptr[i],
       OCI_DTYPE_ROWID,0,(dvoid**)0));
  }
  nctx->w_id_ind = TRUE;
  nctx->w_id_len = sizeof(w_id);
  nctx->d_id_ind = TRUE;
  nctx->d_id_len = sizeof(d_id);
  nctx->c_id_ind = TRUE;
  nctx->c_id_len = sizeof(c_id);
  nctx->o_all_local_ind = TRUE;
  nctx->o_all_local_len = sizeof(o_all_local);
  nctx->o_ol_cnt_ind = TRUE;
  nctx->o_ol_cnt_len = sizeof(o_ol_cnt);
  nctx->w_tax_ind = TRUE;
  nctx->w_tax_len = 0;
  nctx->d_tax_ind = TRUE;
  nctx->d_tax_len = 0;
  nctx->o_id_ind = TRUE;
  nctx->o_id_len = sizeof(o_id);
  nctx->c_discount_ind = TRUE;
  nctx->c_discount_len = 0;
  nctx->c_credit_ind = TRUE;
  nctx->c_credit_len = 0;
/*  nctx->c_credit_len = 0; */
  nctx->c_last_ind = TRUE;
  nctx->c_last_len = 0;
  nctx->retries_ind = TRUE;
  nctx->retries_len = sizeof(retries);
  nctx->cr_date_ind = TRUE;
  nctx->cr_date_len = sizeof(cr_date);

  /* open first cursor */
  OCIERROR(errhp,OCIHandleAlloc(tpcenv,(dvoid **)(&nctx->curn1),
           OCI_HTYPE_STMT, 0, (dvoid**)0));

  sqlfile("pnew.sql",stmbuf);
  OCIERROR(errhp,OCIStmtPrepare(nctx->curn1, errhp, stmbuf, strlen((char *)stmbuf),
OCI_NTV_SYNTAX, OCI_DEFAULT));

  /* bind variables */

  OCIBNDR(nctx->curn1, nctx->w_id_bp, errhp, ":w_id",ADR(w_id),SIZ(w_id),
          SQLT_INT, &nctx->w_id_ind, &nctx->w_id_len, &nctx->w_id_rc);
  OCIBNDR(nctx->curn1, nctx->d_id_bp, errhp, ":d_id",ADR(d_id),SIZ(d_id),
          SQLT_INT, &nctx->d_id_ind, &nctx->d_id_len, &nctx->d_id_rc);
  OCIBNDR(nctx->curn1, nctx->c_id_bp, errhp, ":c_id",ADR(c_id),SIZ(c_id),
          SQLT_INT, &nctx->c_id_ind, &nctx->c_id_len, &nctx->c_id_rc);
  OCIBNDR(nctx->curn1, nctx->o_all_local_bp, errhp, ":o_all_local",
          ADR(o_all_local), SIZ(o_all_local),SQLT_INT, &nctx->o_all_local_ind,
          &nctx->o_all_local_len, &nctx->o_all_local_rc);
  OCIBNDR(nctx->curn1, nctx->o_all_cnt_bp, errhp, ":o_ol_cnt",ADR(o_ol_cnt),
  SIZ(o_ol_cnt),SQLT_INT,
  &nctx->o_ol_cnt_ind, &nctx->o_ol_cnt_len, &nctx->o_ol_cnt_rc);
  OCIBNDR(nctx->curn1, nctx->w_tax_bp, errhp, ":w_tax",ADR(w_tax),SIZ(w_tax),
          SQLT_INT, &nctx->w_tax_ind, &nctx->w_tax_len, &nctx->w_tax_rc);
  OCIBNDR(nctx->curn1, nctx->d_tax_bp, errhp, ":d_tax",ADR(d_tax),SIZ(d_tax),
          SQLT_INT, &nctx->d_tax_ind, &nctx->d_tax_len, &nctx->d_tax_rc);
  OCIBNDR(nctx->curn1, nctx->o_id_bp, errhp, ":o_id",ADR(o_id),SIZ(o_id),
          SQLT_INT, &nctx->o_id_ind, &nctx->o_id_len, &nctx->o_id_rc);
  OCIBNDR(nctx->curn1, nctx->c_discount_bp, errhp, ":c_discount",
          ADR(c_discount), SIZ(c_discount),SQLT_INT,
  &nctx->c_discount_ind, &nctx->c_discount_len, &nctx->c_discount_rc);
  OCIBNDR(nctx->curn1, nctx->c_credit_bp, errhp, ":c_credit",c_credit,
          SIZ(c_credit),SQLT_CHR,
  &nctx->c_credit_ind, &nctx->c_credit_len, &nctx->c_credit_rc);
  OCIBNDR(nctx->curn1, nctx->c_last_bp, errhp, ":c_last",c_last,SIZ(c_last),
          SQLT_STR, &nctx->c_last_ind, &nctx->c_last_len, &nctx->c_last_rc);
  OCIBNDR(nctx->curn1, nctx->retries_bp, errhp, ":retry",ADR(retries),
          SIZ(retries),SQLT_INT,
  &nctx->retries_ind, &nctx->retries_len, &nctx->retries_rc);
 OCIBNDR(nctx->curn1, nctx->cr_date_bp, errhp, ":cr_date",cr_date,SIZ(cr_date),
SQLT_DAT, &nctx->cr_date_ind, &nctx->cr_date_len, &nctx->cr_date_rc);

  OCIBNDRAA(nctx->curn1, nctx->ol_i_id_bp,errhp,":ol_i_id",nol_i_id,
           SIZ(int), SQLT_INT, nctx->nol_i_id_ind,nctx->nol_i_id_len,
           nctx->nol_i_id_rcode,NITEMS,&nctx->nol_i_count);
  OCIBNDRAA(nctx->curn1, nctx->ol_supply_w_id_bp, errhp, ":ol_supply_w_id",
           nol_supply_w_id,SIZ(int),SQLT_INT, nctx->nol_supply_w_id_ind,
           nctx->nol_supply_w_id_len, nctx->nol_supply_w_id_rcode,
           NITEMS, &nctx->nol_s_count);
 OCIBNDRAA(nctx->curn1, nctx->ol_quantity_bp,errhp,":ol_quantity",nol_quantity,
SIZ(int),SQLT_INT,nctx->nol_quantity_ind,nctx->nol_quantity_len,
           nctx->nol_quantity_rcode,NITEMS,&nctx->nol_q_count);
  OCIBNDRAA(nctx->curn1, nctx->i_price_bp,errhp,":i_price",i_price,SIZ(int),
            SQLT_INT, nctx->i_price_ind,nctx->i_price_len,nctx->i_price_rcode,
            NITEMS, &nctx->nol_item_count);
  OCIBNDRAA(nctx->curn1, nctx->i_name_bp,errhp,":i_name",i_name,
             SIZ(i_name[0]),SQLT_STR, nctx->i_name_ind,nctx->i_name_len,
             nctx->i_name_rcode,NITEMS,&nctx->nol_name_count);
  OCIBNDRAA(nctx->curn1, nctx->s_quantity_bp,errhp,":s_quantity",s_quantity,
           SIZ(int), SQLT_INT,nctx->s_quant_ind,nctx->s_quant_len,
           nctx->s_quant_rcode,NITEMS,&nctx->nol_qty_count);
  OCIBNDRAA(nctx->curn1, nctx->s_bg_bp,errhp,":brand_generic",brand_generic,
           SIZ(char), SQLT_CHR,nctx->s_bg_ind,nctx->s_bg_len,
           nctx->s_bg_rcode,NITEMS,&nctx->nol_bg_count);
  OCIBNDRAA(nctx->curn1, nctx->ol_amount_bp,errhp,":ol_amount",nol_amount,
           SIZ(int),SQLT_INT, nctx->nol_amount_ind,nctx->nol_amount_len,
           nctx->nol_amount_rcode,NITEMS,&nctx->nol_am_count);
  OCIBNDRAA(nctx->curn1, nctx->s_remote_bp,errhp,":s_remote",nctx->s_remote,
           SIZ(int),SQLT_INT, nctx->s_remote_ind,nctx->s_remote_len,
           nctx->s_remote_rcode,NITEMS,&nctx->s_remote_count);


  /* open second cursor */
  OCIERROR(errhp,OCIHandleAlloc(tpcenv, (dvoid **)(&nctx->curn2), OCI_HTYPE_STMT,
                                0, (dvoid**)0));
  sprintf ((char *) stmbuf, SQLTXT2);
  OCIERROR(errhp,OCIStmtPrepare(nctx->curn2, errhp, stmbuf,
           strlen((char *)stmbuf), OCI_NTV_SYNTAX, OCI_DEFAULT));


  /* execute second cursor to init newinit package */
  {
    int idx1arr[NITEMS];
    OCIBind *idx1arr_bp;
    ub2 idx1arr_len[NITEMS];
    ub2 idx1arr_rcode[NITEMS];
    sb2 idx1arr_ind[NITEMS];
    ub4 idx1arr_count;
    ub2 idx;

    for (idx = 0; idx < NITEMS; idx++) {
      idx1arr[idx] = idx + 1;
      idx1arr_ind[idx] = TRUE;
      idx1arr_len[idx] = sizeof(int);
    }
    idx1arr_count = NITEMS;
        o_ol_cnt = NITEMS;


    /* Bind array */
    OCIBNDRAA(nctx->curn2, idx1arr_bp,errhp,":idx1arr",idx1arr,
             SIZ(int), SQLT_INT, idx1arr_ind,idx1arr_len,
             idx1arr_rcode,NITEMS,&idx1arr_count);


     execstatus = OCIStmtExecute(tpcsvc,nctx->curn2,errhp,1,0,0,0,OCI_DEFAULT);
     if(execstatus != OCI_SUCCESS) {
       OCITransRollback(tpcsvc,errhp,OCI_DEFAULT);
       errcode = OCIERROR(errhp,execstatus);
       return -1;
     }
   }
return(0);
}

/****************************
 * END BLOCK OF COMMON CODE
 ****************************/



get_newo_tx_cnt()
{
        return tx_count;
}


/*
 * This function executes the neworder transaction
 */


#if ACID
#include <sys/types.h>
#include <time.h>
time_t curtime, *timep = &curtime;
#endif

neworder_tx(rqst)
TPSVCINFO *rqst;
{

/****************************
 * BEGIN BLOCK OF COMMON CODE
 ****************************/


int i, j, k;
int rpc, rpc3, rowoff, iters;
int rcount;
ub4 flags;
ub4 attr_size;
        struct newo_inf *neworder_p;

#if ACID
int reread;
```

```
char sdate[30];
time(timep);
userlog("ACID NEWORDER started at %s\n", ctime(timep));
#endif

        neworder_p = (struct newo_inf *)(rqst->data);

    MOVETO(w_id, neworder_p);
    MOVETO(d_id, neworder_p);
    MOVETO(c_id , neworder_p);
    MOVETO(o_ol_cnt, neworder_p);
tx_count++;

strcpy(neworder_p->status_mesg, blank_mesg);
vgetdate(cr_date);
retry:
status = 0;

o_all_local = 1;
for (i = 0; i < o_ol_cnt; i++) {
nol_supply_w_id[i] = neworder_p->n_items[i].ol_supply_w_id;
if (nol_supply_w_id[i] == w_id) {
nctx->s_remote[i] = 0;
}
else {
nctx->s_remote[i] = 1;
o_all_local = 0;
}
nol_i_id[i] = neworder_p->n_items[i].ol_i_id;
nol_quantity[i] = neworder_p->n_items[i].ol_quantity;
}
for (; i < 15; i++) {
nol_supply_w_id[i] = 0;
nol_i_id[i] = 0;
}

   nctx->w_id_ind = TRUE;
   nctx->w_id_len = sizeof(w_id);
   nctx->d_id_ind = TRUE;
   nctx->d_id_len = sizeof(d_id);
   nctx->c_id_ind = TRUE;
   nctx->c_id_len = sizeof(c_id);
   nctx->o_all_local_ind = TRUE;
   nctx->o_all_local_len = sizeof(o_all_local);
   nctx->o_ol_cnt_ind = TRUE;
   nctx->o_ol_cnt_len = sizeof(o_ol_cnt);
   nctx->w_tax_ind = TRUE;
   nctx->w_tax_len = 0;
   nctx->d_tax_ind = TRUE;
   nctx->d_tax_len = 0;
   nctx->o_id_ind = TRUE;
   nctx->o_id_len = sizeof(o_id);
   nctx->c_discount_ind = TRUE;
   nctx->c_discount_len = 0;
   nctx->c_credit_ind = TRUE;
   nctx->c_credit_len = 0;
   nctx->c_last_ind = TRUE;
   nctx->c_last_len = 0;
   nctx->retries_ind = TRUE;
   nctx->retries_len = sizeof(retries);
   nctx->cr_date_ind = TRUE;
   nctx->cr_date_len = sizeof(cr_date);
   /* this is the row count */
   rcount = o_ol_cnt;
   nctx->nol_i_count = o_ol_cnt;
   nctx->nol_q_count = o_ol_cnt;
   nctx->nol_s_count = o_ol_cnt;
   nctx->s_remote_count = o_ol_cnt;

   nctx->nol_qty_count  = 0;
   nctx->nol_bg_count = 0;
   nctx->nol_item_count = 0;
   nctx->nol_name_count = 0;
   nctx->nol_am_count   = 0;
   /* following not relevant */
   nctx->s_data_count = o_ol_cnt;
   nctx->i_data_count = o_ol_cnt;

   /* initialization for array operations */
   for (i = 0; i < o_ol_cnt; i++) {
      nctx->ol_w_id[i] = w_id;
      nctx->ol_d_id[i] = d_id;
      nctx->ol_number[i] = i + 1;
      nctx->null_date_ind[i]= TRUE;
      nctx->nol_i_id_ind[i] = 0;
      nctx->nol_supply_w_id_ind[i] = TRUE;
      nctx->nol_quantity_ind[i] = TRUE;
      nctx->nol_amount_ind[i] = TRUE;
      nctx->ol_w_id_ind[i] = TRUE;
      nctx->ol_d_id_ind[i] = TRUE;
      nctx->ol_o_id_ind[i] = TRUE;
      nctx->ol_number_ind[i] = TRUE;
      nctx->ol_dist_info_ind[i] = TRUE;
      nctx->s_remote_ind[i] = TRUE;
      nctx->s_data_ind[i] = TRUE;
      nctx->i_data_ind[i] = TRUE;
      nctx->s_quant_ind[i] = TRUE;
      nctx->s_bg_ind[i] = TRUE;
      nctx->cons_ind[i] = TRUE;
      nctx->s_rowid_ind[i] = TRUE;
      nctx->nol_i_id_len[i] = sizeof(int);
      nctx->nol_supply_w_id_len[i] = sizeof(int);
      nctx->nol_quantity_len[i] = sizeof(int);
      nctx->nol_amount_len[i] = sizeof(int);
      nctx->ol_w_id_len[i] = sizeof(int);
      nctx->ol_d_id_len[i] = sizeof(int);
      nctx->ol_o_id_len[i] = sizeof(int);
      nctx->ol_number_len[i] = sizeof(int);
      nctx->ol_dist_info_len[i] = nctx->s_dist_info_len[i];
      nctx->null_date_len[i]=sizeof(OCIDate);
      nctx->s_remote_len[i] = sizeof(int);
      nctx->s_data_len[i] = sizeof(int);
      nctx->i_data_len[i] = sizeof(int);
      nctx->s_quant_len[i] = sizeof(int);
      nctx->s_rowid_len[i] = sizeof(nctx->s_rowid_ptr[0]);
      nctx->cons_len[i] = sizeof(int);
      nctx->i_name_len[i]=0;
      nctx->s_bg_len[i] = 0;
   }
   for (i = o_ol_cnt; i < NITEMS; i++) {
      nctx->nol_i_id_ind[i] = NA;
      nctx->nol_supply_w_id_ind[i] = NA;
      nctx->nol_quantity_ind[i] = NA;
      nctx->nol_amount_ind[i] = NA;
      nctx->ol_w_id_ind[i] = NA;
      nctx->ol_d_id_ind[i] = NA;
      nctx->ol_o_id_ind[i] = NA;
      nctx->ol_number_ind[i] = NA;
      nctx->ol_dist_info_ind[i] = NA;
      nctx->null_date_ind[i]= NA;
      nctx->s_remote_ind[i] = NA;
      nctx->s_data_ind[i] = NA;
      nctx->i_data_ind[i] = NA;
      nctx->s_quant_ind[i] = NA;
      nctx->s_bg_ind[i] = NA;
      nctx->cons_ind[i] = NA;
      nctx->s_rowid_ind[i] = NA;

      nctx->nol_i_id_len[i] = 0;
      nctx->nol_supply_w_id_len[i] = 0;
      nctx->nol_quantity_len[i] = 0;
      nctx->nol_amount_len[i] = 0;
      nctx->ol_w_id_len[i] = 0;
      nctx->ol_d_id_len[i] = 0;
      nctx->ol_o_id_len[i] = 0;
      nctx->ol_number_len[i] = 0;
      nctx->ol_dist_info_len[i] = 0;
      nctx->null_date_len[i]= 0;
      nctx->s_remote_len[i] = 0;
      nctx->i_data_len[i] = 0;
      nctx->s_data_len[i] = 0;
      nctx->s_quant_len[i] = 0;
      nctx->s_rowid_len[i] = 0;
      nctx->cons_len[i] = 0;
      nctx->i_name_len[i]=0;
      nctx->s_bg_len[i] = 0;
   }

   execstatus = OCIStmtExecute(tpcsvc,nctx->curn1,errhp,1,0,0,0,
                               OCI_DEFAULT | OCI_COMMIT_ON_SUCCESS);


   if(execstatus != OCI_SUCCESS) {
     OCITransRollback(tpcsvc,errhp,OCI_DEFAULT);
     errcode = OCIERROR(errhp,execstatus);
     if(errcode == NOT_SERIALIZABLE) {
retries++;
goto retry;
     } else if (errcode == RECOVERR) {
retries++;
goto retry;
     } else {
return -1;
     }
   }

   /* did the txn succeed ? */
   if (rcount != o_ol_cnt)
   {
     status = rcount - o_ol_cnt;
     o_ol_cnt = rcount;
   }
   if (status) {
        strcpy(neworder_p->status_mesg, "Item number is not valid");
   }


   total = 0.0;
   for (i = 0; i < o_ol_cnt; i++) {
neworder_p->n_items[i].s_quantity = s_quantity[i];
neworder_p->n_items[i].i_price = ((double)i_price[i]) / 100;
neworder_p->n_items[i].ol_amount = ((double)nol_amount[i])/ 100;
strcpy(neworder_p->n_items[i].i_name, i_name[i]);
brand_gen[i][0] = brand_generic[i];
        brand_gen[i][1] = '\0';
strcpy(neworder_p->n_items[i].brand, brand_gen[i]);
total = total + nol_amount[i];
        }
        total *= ((double)(10000  - c_discount)/10000) *
     (1.0 + ((double)(d_tax)/10000) + ((double)(w_tax)/10000));
        total = total/100;

/* fill in date for o_entry_d from time in beginning of txn */
cvtdmyhms(cr_date, o_entry_d);
MOVEBACK(o_id , neworder_p);
neworder_p->c_discount = ((double)c_discount) / 100;
neworder_p->w_tax = ((double)w_tax) / 100;
neworder_p->d_tax = ((double)d_tax) / 100;
MOVECBACK(o_entry_d, 20, neworder_p);
MOVECBACK(c_credit, 2, neworder_p);
MOVECBACK(c_last, 16, neworder_p);
MOVEBACK(total, neworder_p);

/***************************
 * END BLOCK OF COMMON CODE
 ***************************/

#if ACID
        time(timep);
        userlog("ACID NEWORDER w_id=%d, d_id=%d, c_id=%d, o_id=%d, total=%f\n",
                w_id, d_id, c_id, o_id, total);
        userlog("ACID NEWORDER completed at %s\n", ctime(timep));
#endif
return(0);
}


/* the arrays are initialized based on a successful select from */
```

```
/* stock/item. We need to shift the values in the orderline array */
/* one position up to compensate when we have an invalid item */

void
cleanup(code)
int code;
{
int i;


   if (nctx)
      free (nctx);

   OCIHandleFree((dvoid *)nctx->curn1,OCI_HTYPE_STMT);
   OCIHandleFree((dvoid *)nctx->curn2,OCI_HTYPE_STMT);
   for (i = 0; i < 10; i++)
     OCIHandleFree((dvoid *)(nctx->curn3)[i],OCI_HTYPE_STMT);
   OCIHandleFree((dvoid *)nctx->curn4,OCI_HTYPE_STMT);

   /* log off */

   OCIHandleFree((dvoid *)tpcusr, OCI_HTYPE_SESSION);
   OCIHandleFree((dvoid *)tpcsvc, OCI_HTYPE_SVCCTX);
   OCIHandleFree((dvoid *)errhp, OCI_HTYPE_ERROR);
   OCIHandleFree((dvoid *)tpcsrv, OCI_HTYPE_SERVER);
   OCIHandleFree((dvoid *)tpcenv, OCI_HTYPE_ENV);

   if (my_qid >= 0)
msgctl(my_qid, IPC_RMID, 0);
#if DEBUG
write_log("Newo %d: Exiting. Completed %d transactions\n", my_id, tx_count);
#endif
exit(code);
}


/* Start of Tuxedo code */
int
tpsvrinit(argc, argv)
char **argv;
{
        return(init_newo_tx());         /* Prepare transaction */
}

void
tpsvrdone()
{
}

NEWO(rqst)
TPSVCINFO *rqst;
{
    if (neworder_tx(rqst)) {
        tpreturn(TPFAIL, 0, rqst->data, sizeof(struct newo_inf), 0);
    }
    else {
        tpreturn(TPSUCCESS, 0, rqst->data, sizeof(struct newo_inf), 0);
    }
}
```

tuxserver/tpcc_srv_ords.c

```
/*
 * Copyright (c) 1995 by Sun Microsystems, Inc.
 */

#pragma ident "@(#)tpcso_srv_ords.c1.1797/01/02SMI"

/*+=================================================================+
 |        Copyright (c) 1995  Oracle Corp, Redwood Shores, CA       |
 |                    OPEN SYSTEMS PERFORMANCE GROUP                |
 |                         All Rights Reserved                      |
 +=================================================================+
 | FILENAME
 |    plord.c
 | DESCRIPTION
 |    OCI version (using PL/SQL stored procedure) of
 |    ORDER STATUS transaction in TPC-C benchmark.
 +=================================================================*/

#include "ora_oci.h"

#include <signal.h>
#include <stdio.h>
#include <sys/types.h>
#include <sys/ipc.h>
#include <sys/msg.h>
#include "./ora_err.h"

/* Tuxedo */
#include "atmi.h"
#include "userlog.h"

struct ord_itm_inf {
int ol_supply_w_id;
int ol_i_id;
intol_quantity;
double ol_amount;
char ol_delivery_d[11];
};

struct ord_inf {
int o_ol_cnt;
int w_id;
int d_id;
int c_id;
int o_id;
int o_carrier_id;
double c_balance;
char c_first[17];
char c_middle[3];
char c_last[17];
char o_entry_d[20];
struct ord_itm_inf o_items[15];
};

#define SQLTXT1 "alter session set isolation_level = serializable"

#define MOVETO(element, struct_name) element = struct_name->element
#define MOVEBACK(element, struct_name) struct_name->element = element
#define MOVECBACK(element, cnt, struct_name) strncpy(struct_name->element, element,
cnt)

/* List of fields in ordstat */
/* This structure should be EXACTLY identical to the one declared in client.h */
/* Lists of items on an order */


static int tx_count = 0;       /* Transaction counter */

#if ACID
#include <sys/types.h>
#include <time.h>
time_t curtime;
time_t *timep = &curtime;
#endif

/*****************************
 * BEGIN BLOCK OF COMMON CODE
 *****************************/

#define NITEMS 15

struct ordctx {
   sb2 c_rowid_ind[100];
   sb2 ol_supply_w_id_ind[NITEMS];
   sb2 ol_i_id_ind[NITEMS];
   sb2 ol_quantity_ind[NITEMS];
   sb2 ol_amount_ind[NITEMS];
   sb2 ol_delivery_d_ind[NITEMS];
   sb2 ol_w_id_ind;
   sb2 ol_d_id_ind;
   sb2 ol_o_id_ind;
   sb2 c_id_ind;
   sb2 c_first_ind;
   sb2 c_middle_ind;
   sb2 c_balance_ind;
   sb2 c_last_ind;
   sb2 o_id_ind;
   sb2 o_entry_d_ind;
   sb2 o_carrier_id_ind;
   sb2 o_ol_cnt_ind;

   ub2 c_rowid_len[100];
   ub2 ol_supply_w_id_len[NITEMS];
   ub2 ol_i_id_len[NITEMS];
   ub2 ol_quantity_len[NITEMS];
   ub2 ol_amount_len[NITEMS];
   ub2 ol_delivery_d_len[NITEMS];
   ub2 ol_w_id_len;
   ub2 ol_d_id_len;
   ub2 ol_o_id_len;

   ub2 c_rowid_rcode[100];
   ub2 ol_supply_w_id_rcode[NITEMS];
   ub2 ol_i_id_rcode[NITEMS];
   ub2 ol_quantity_rcode[NITEMS];
   ub2 ol_amount_rcode[NITEMS];
   ub2 ol_delivery_d_rcode[NITEMS];
   ub2 ol_w_id_rcode;
   ub2 ol_d_id_rcode;
   ub2 ol_o_id_rcode;

   ub4 ol_supply_w_id_csize;
   ub4 ol_i_id_csize;
   ub4 ol_quantity_csize;
   ub4 ol_amount_csize;
   ub4 ol_delivery_d_csize;
   ub4 ol_w_id_csize;
   ub4 ol_d_id_csize;
   ub4 ol_o_id_csize;

   OCIStmt *curo0;
   OCIStmt *curo1;
   OCIStmt *curo2;
   OCIStmt *curo3;
   OCIBind *w_id_bp0;
   OCIBind *w_id_bp2;
   OCIBind *w_id_bp3;
   OCIBind *d_id_bp0;
   OCIBind *d_id_bp2;
   OCIBind *d_id_bp3;
   OCIBind *c_id_bp;
   OCIBind *byln_bp;
   OCIBind *c_last_bp;
   OCIBind *o_id_bp;
   OCIBind *c_rowid_bp;
   OCIDefine *c_rowid_dp;
   OCIDefine *c_last_dp;
   OCIDefine *c_last_dp1;
   OCIDefine *c_id_dp;
   OCIDefine *c_id_dp1;
   OCIDefine *c_first_dp1;
   OCIDefine *c_first_dp2;
   OCIDefine *c_middle_dp1;
   OCIDefine *c_middle_dp2;
   OCIDefine *c_balance_dp1;
   OCIDefine *c_balance_dp2;
   OCIDefine *o_id_dp1;
   OCIDefine *o_id_dp2;
   OCIDefine *o_entry_d_dp1;
   OCIDefine *o_entry_d_dp2;
   OCIDefine *o_cr_id_dp1;
   OCIDefine *o_cr_id_dp2;
```

```
   OCIDefine *o_ol_cnt_dp1;
   OCIDefine *o_ol_cnt_dp2;
   OCIDefine *ol_d_d_dp;
   OCIDefine *ol_i_id_dp;
   OCIDefine *ol_supply_w_id_dp;
   OCIDefine *ol_quantity_dp;
   OCIDefine *ol_amount_dp;
   OCIDefine *ol_d_base_dp;

   OCIRowid *c_rowid_ptr[100];
   OCIRowid *middle_cust;
   int cs;
   int cust_idx;
   int norow;
};

typedef struct ordctx ordctx;
ordctx *octx;

unsigned char o_entry_d_base[7];
unsigned char ol_d_base[15][7];

/* struct ord_inf elements */
int w_id;
int d_id;
int c_id, bylastname;
int o_id;
int o_carrier_id;
int o_ol_cnt;
double c_balance;
char c_first[17];
char c_middle[3];
char c_last[17];
char o_entry_d[20];

intol_supply_w_id[15];
intol_i_id[15];
intol_quantity[15];
intol_amount[15];
charol_delivery_d[15][11];


OCIEnv *tpcenv;
OCIServer *tpcsrv;
OCIError *errhp;
OCISvcCtx *tpcsvc;
OCISession *tpcusr;
char *uid = "dbbench";
char *pwd = "dbbench";

/*****************************
 * END BLOCK OF COMMON CODE
 *****************************/


get_ords_tx_cnt()
{
        return tx_count;
}

/*
 * Function: init ordstat transaction
 * Prepare the ordstat transaction
 */

int
init_ords_tx()
{

/*****************************
 * BEGIN BLOCK OF COMMON CODE
 *****************************/

#ifdef ISO9
#define SQLISO9 "BEGIN aorderstatus.agetstatus (:w_id, :d_id, :c_id, :byln, \
   :c_last, :c_first, :c_middle, :c_balance, :o_id, :o_entry_d, :o_cr_id, \
   :o_ol_cnt, :ol_s_w_id, :ol_i_id, :ol_quantity, :ol_amount, :ol_d_d); END;"
#endif

#defineSQLTXT"alter session set isolation_level = serializable"


#define SQLCUR0 "SELECT rowid FROM customer \
                 WHERE c_d_id = :d_id AND c_w_id = :w_id AND c_last = :c_last \
                 ORDER BY c_w_id, c_d_id, c_last, c_first"

#define SQLCUR1 "SELECT c_id, c_balance, c_first, c_middle, \
                 o_id, o_entry_d, o_carrier_id, o_ol_cnt , c_last\
                 FROM customer, orders \
                 WHERE customer.rowid = :cust_rowid \
                 AND   o_d_id = c_d_id AND o_w_id = c_w_id AND o_c_id = c_id \
                 ORDER BY o_w_id, o_d_id, o_c_id, o_id DESC"


#define SQLCUR2 "SELECT c_balance, c_first, c_middle, c_last, \
                 o_id, o_entry_d, o_carrier_id, o_ol_cnt, c_id \
                 FROM customer, orders \
                 WHERE c_id = :c_id AND c_d_id = :d_id AND c_w_id = :w_id \
                 AND o_d_id = c_d_id AND o_w_id = c_w_id AND o_c_id = c_id \
                 ORDER BY o_w_id, o_d_id, o_c_id, o_id DESC"


#define SQLCUR3 "SELECT ol_i_id,ol_supply_w_id,ol_quantity,ol_amount, \
                ol_delivery_d\
                FROM order_line \
                WHERE ol_d_id = :d_id AND ol_w_id = :w_id AND ol_o_id = :o_id"



   int i;
   text stmbuf[SQL_BUF_SIZE];

OCIStmt *curi;
```

```
   OCIInitialize(OCI_DEFAULT,(dvoid *)0,0,0,0);
   OCIEnvInit(&tpcenv, OCI_DEFAULT, 0, (dvoid **)0);
   OCIHandleAlloc((dvoid *)tpcenv, (dvoid **)&tpcsrv, OCI_HTYPE_SERVER, 0 , (dvoid
**)0);
   OCIHandleAlloc((dvoid *)tpcenv, (dvoid **)&errhp, OCI_HTYPE_ERROR, 0 , (dvoid
**)0);
   OCIHandleAlloc((dvoid *)tpcenv, (dvoid **)&tpcsvc, OCI_HTYPE_SVCCTX, 0 , (dvoid
**)0);
   OCIServerAttach(tpcsrv, errhp, (text *)0,0,OCI_DEFAULT);
   OCIAttrSet((dvoid *)tpcsvc, OCI_HTYPE_SVCCTX, (dvoid *)tpcsrv,
(ub4)0,OCI_ATTR_SRVRCTXT, errhp);
   OCIHandleAlloc((dvoid *)tpcenv, (dvoid **)&tpcusr, OCI_HTYPE_SESSION, 0 , (dvoid
**)0);
   OCIAttrSet((dvoid *)tpcusr, OCI_HTYPE_SESSION, (dvoid *)uid,
(ub4)strlen(uid),OCI_ATTR_USERNAME, errhp);
   OCIAttrSet((dvoid *)tpcusr, OCI_HTYPE_SESSION, (dvoid *)pwd, (ub4)strlen(pwd),
      OCI_ATTR_PASSWORD, errhp);
   OCIERROR(errhp, OCISessionBegin(tpcsvc, errhp, tpcusr, OCI_CRED_RDBMS,
OCI_DEFAULT));

   OCIAttrSet(tpcsvc, OCI_HTYPE_SVCCTX, tpcusr, 0, OCI_ATTR_USERCTXT, errhp);

   /* run all transaction in serializable mode */

   OCIHandleAlloc(tpcenv, (dvoid **)&curi, OCI_HTYPE_STMT, 0, (dvoid**)0);
   sprintf ((char *) stmbuf, SQLTXT);
   OCIStmtPrepare(curi, errhp, stmbuf, strlen((char *)stmbuf), OCI_NTV_SYNTAX,
OCI_DEFAULT);
   OCIERROR(errhp,OCIStmtExecute(tpcsvc, curi, errhp,1,0,0,0,OCI_DEFAULT));
   OCIHandleFree(curi, OCI_HTYPE_STMT);


#ifdef SQL_TRACE
   /* Turn on the SQL_TRACE */
   OCIHandleAlloc(tpcenv, (dvoid **)&curi, OCI_HTYPE_STMT, 0, &xmem);
   sprintf ((char *) stmbuf, SQLTXT1);
   OCIStmtPrepare(curi, errhp, stmbuf, strlen((char *)stmbuf), OCI_NTV_SYNTAX,
OCI_DEFAULT);
   OCIERROR(errhp, OCIStmtExecute(tpcsvc, curi, errhp,1,0,0,0,OCI_DEFAULT));
   OCIHandleFree((dvoid *)curi, OCI_HTYPE_STMT);
#endif /* End SQL_TRACE */

   octx = (ordctx *) malloc (sizeof(ordctx));
   memset(octx,(char)0,sizeof(ordctx));
   octx->cs = 1;
octx->norow = 0;

/* get the rowid handles */
   for(i=0;i<100;i++) {
    OCIERROR(errhp, OCIDescriptorAlloc(tpcenv,(dvoid**)&octx->c_rowid_ptr[i],
       OCI_DTYPE_ROWID,0,(dvoid**)0));
  }


#ifdef ISO9
   OCIERROR(errhp,
      OCIHandleAlloc(tpcenv,&octx->curo0,OCI_HTYPE_STMT,0,(dvoid**)0));
#else
   OCIERROR(errhp,
      OCIHandleAlloc(tpcenv,(dvoid**)&octx->curo0,OCI_HTYPE_STMT,0,(dvoid**)0));
   OCIERROR(errhp,
      OCIHandleAlloc(tpcenv,(dvoid**)&octx->curo1,OCI_HTYPE_STMT,0,(dvoid**)0));
   OCIERROR(errhp,
      OCIHandleAlloc(tpcenv,(dvoid**)&octx->curo2,OCI_HTYPE_STMT,0,(dvoid**)0));
   OCIERROR(errhp,
      OCIHandleAlloc(tpcenv,(dvoid**)&octx->curo3,OCI_HTYPE_STMT,0,(dvoid**)0));
#endif

#ifdef ISO9
   sprintf((char *) stmbuf, SQLISO9);
   OCIERROR(errhp,
      OCIStmtPrepare(octx->curo0,errhp,stmbuf,strlen((char *)stmbuf),
  OCI_NTV_SYNTAX,OCI_DEFAULT));
#else
/*  c_id = 0, use find customer by lastname. Get an array or rowid's back*/
   sprintf((char *) stmbuf, SQLCUR0);
   OCIERROR(errhp,
      OCIStmtPrepare(octx->curo0,errhp,stmbuf,strlen((char *)stmbuf),
  OCI_NTV_SYNTAX,OCI_DEFAULT));
   OCIERROR(errhp,
      OCIAttrSet(octx->curo0,OCI_HTYPE_STM,(dvoid*)&octx->norow,0,
                 OCI_ATTR_PREFETCH_ROWS,errhp));

/* get order/customer info back based on rowid */
   sprintf((char *) stmbuf, SQLCUR1);
   OCIERROR(errhp,
      OCIStmtPrepare(octx->curo1,errhp,stmbuf,strlen((char *)stmbuf),
  OCI_NTV_SYNTAX,OCI_DEFAULT));
   OCIERROR(errhp,
      OCIAttrSet(octx->curo1,OCI_HTYPE_STM,(dvoid*)&octx->norow,0,
                 OCI_ATTR_PREFETCH_ROWS,errhp));

/*  c_id == 0, use lastname to find customer */
   sprintf((char *) stmbuf, SQLCUR2);
   OCIERROR(errhp,
      OCIStmtPrepare(octx->curo2,errhp,stmbuf,strlen((char *)stmbuf),
  OCI_NTV_SYNTAX,OCI_DEFAULT));
   OCIERROR(errhp,
      OCIAttrSet(octx->curo2,OCI_HTYPE_STM,(dvoid*)&octx->norow,0,
                 OCI_ATTR_PREFETCH_ROWS,errhp));

   sprintf((char *) stmbuf, SQLCUR3);
   OCIERROR(errhp,
      OCIStmtPrepare(octx->curo3,errhp,stmbuf,strlen((char *)stmbuf),
  OCI_NTV_SYNTAX,OCI_DEFAULT));
   OCIERROR(errhp,
      OCIAttrSet(octx->curo3,OCI_HTYPE_STM,(dvoid*)&octx->norow,0,
                 OCI_ATTR_PREFETCH_ROWS,errhp));
#endif

   for (i = 0; i < NITEMS; i++) {
      octx->ol_supply_w_id_ind[i] = TRUE;
      octx->ol_i_id_ind[i] = TRUE;
      octx->ol_quantity_ind[i] = TRUE;
      octx->ol_amount_ind[i] = TRUE;
```

```
      octx->ol_delivery_d_ind[i] = TRUE;

      octx->ol_supply_w_id_len[i] = sizeof(int);
      octx->ol_i_id_len[i] = sizeof(int);
      octx->ol_quantity_len[i] = sizeof(int);
      octx->ol_amount_len[i] = sizeof(int);
      octx->ol_delivery_d_len[i] = sizeof(ol_d_base[0]);
   }
   octx->ol_supply_w_id_csize = NITEMS;
   octx->ol_i_id_csize = NITEMS;
   octx->ol_quantity_csize = NITEMS;
   octx->ol_amount_csize = NITEMS;
   octx->ol_delivery_d_csize = NITEMS;
   octx->ol_w_id_csize = NITEMS;
   octx->ol_o_id_csize = NITEMS;
   octx->ol_d_id_csize = NITEMS;
   octx->ol_w_id_ind = TRUE;
   octx->ol_d_id_ind = TRUE;
   octx->ol_o_id_ind = TRUE;
   octx->ol_w_id_len = sizeof(int);
   octx->ol_d_id_len = sizeof(int);
   octx->ol_o_id_len = sizeof(int);

   /* bind variables */
#ifdef ISO9

   OCIBND(octx->curo0,octx->w_id_bp,errhp,":w_id",ADR(w_id),SIZ(w_id),SQLT_INT);
   OCIBND(octx->curo0, octx->d_id_bp, errhp,":d_id",ADR(d_id),SIZ(d_id),SQLT_INT);
   OCIBND(octx->curo0, octx->c_id_bp, errhp,":c_id",ADR(c_id),SIZ(c_id),SQLT_INT);
   OCIBND(octx->curo0, octx->byln_bp, errhp,":byln",ADR(bylastname),
SIZ(bylastname),SQLT_INT);
   OCIBND(octx->curo0, octx->c_last_bp, errhp,":c_last",c_last,SIZ(c_last),SQLT_STR);
   OCIBND(octx->curo0, octx->c_first_bp,
errhp,":c_first",c_first,SIZ(c_first),SQLT_STR);
   OCIBND(octx->curo0, octx->c_middle_bp,
errhp,":c_middle",c_middle,SIZ(c_middle),SQLT_STR);
   OCIBND(octx->curo0, octx->c_balance_bp,
errhp,":c_balance",ADR(c_balance),SIZ(c_balance),SQLT_FLT);
   OCIBND(octx->curo0, octx->o_id_bp, errhp,":o_id",ADR(o_id),SIZ(o_id),SQLT_INT);
   OCIBND(octx->curo0, octx->o_entry_d_bp,
errhp,":o_entry_d_base",o_entry_d_base,SIZ(o_entry_d_base),SQLT_DAT);
   OCIBND(octx->curo0, octx->o_cr_id_bp,
errhp,":o_cr_id",ADR(o_carrier_id),SIZ(o_carrier_id),
          SQLT_INT);
   OCIBND(octx->curo0, octx->o_ol_cnt_bp,
errhp,":o_ol_cnt",ADR(o_ol_cnt),SIZ(o_ol_cnt),SQLT_INT);
   OCIBNDRAA(octx->curo0, octx->ol_s_w_id_bp,
errhp,":ol_s_w_id",ol_supply_w_id,SIZ(int),SQLT_INT,
          octx->ol_supply_w_id_ind,octx->ol_supply_w_id_len,
          octx->ol_supply_w_id_rcode,NITEMS,ADR(octx->ol_supply_w_id_csize));
   OCIBNDRAA(octx->curo0, octx->ol_i_id_bp,
errhp,":ol_i_id",ol_i_id,SIZ(int),SQLT_INT,
          octx->ol_i_id_ind,octx->ol_i_id_len,octx->ol_i_id_rcode,NITEMS,
          ADR(octx->ol_i_id_csize));
   OCIBNDRAA(octx->curo0, octx->ol_quantity_bp,
errhp,":ol_quantity",ol_quantity,SIZ(int),SQLT_INT,
          octx->ol_quantity_ind,octx->ol_quantity_len,octx->ol_quantity_rcode,
          NITEMS,ADR(octx->ol_quantity_csize));
   OCIBNDRAA(octx->curo0, octx->ol_amount_bp,
errhp,":ol_amount",ol_amount,SIZ(int),SQLT_INT,
          octx->ol_amount_ind,octx->ol_amount_len,octx->ol_amount_rcode,
          NITEMS,ADR(octx->ol_amount_csize));
   OCIBNDRAA(octx->curo0, octx->ol_d_d_bp,
errhp,":ol_d_d",ol_delivery_d,SIZ(ol_delivery_d[0]),SQLT_STR
,
          octx->ol_delivery_d_ind,octx->ol_delivery_d_len,
          octx->ol_delivery_d_rcode,NITEMS,ADR(octx->ol_delivery_d_csize));
#else

   /* c_id (customer id) is not known */
   OCIBND(octx->curo0,octx->w_id_bp0,errhp,":w_id",ADR(w_id),SIZ(int),SQLT_INT);
   OCIBND(octx->curo0,octx->d_id_bp0,errhp,":d_id",ADR(d_id),SIZ(int),SQLT_INT);
   OCIBND(octx->curo0,octx->c_last_bp,errhp,":c_last",c_last,SIZ(c_last),
         SQLT_STR);
   OCIDFNRA(octx->curo0,octx->c_rowid_dp,errhp,1,octx->c_rowid_ptr,
          sizeof(octx->c_rowid_ptr[0]),SQLT_RDD,octx->c_rowid_ind,
          octx->c_rowid_len,octx->c_rowid_rcode);

   OCIBND(octx->curo1,octx->c_rowid_bp,errhp,":cust_rowid",
       &octx->middle_cust, sizeof( octx->middle_cust),SQLT_RDD);
   OCIDEF(octx->curo1,octx->c_id_dp,errhp,1,ADR(c_id),SIZ(int),SQLT_INT);
   OCIDEF(octx->curo1,octx->c_balance_dp1,errhp,2,ADR(c_balance),
          SIZ(double),SQLT_FLT);
   OCIDEF(octx->curo1,octx->c_first_dp1,errhp,3,c_first,SIZ(c_first),
          SQLT_STR);
   OCIDEF(octx->curo1,octx->c_middle_dp1,errhp,4,c_middle,
          SIZ(c_middle),SQLT_STR);
   OCIDEF(octx->curo1,octx->o_id_dp1,errhp,5,ADR(o_id),SIZ(int),SQLT_INT);
   OCIDEF(octx->curo1,octx->o_entry_d_dp1,errhp,6,
          o_entry_d_base,SIZ(o_entry_d_base),SQLT_DAT);
   OCIDEF(octx->curo1,octx->o_cr_id_dp1,errhp,7,ADR(o_carrier_id),
          SIZ(int),SQLT_INT);
   OCIDEF(octx->curo1,octx->o_ol_cnt_dp1,errhp,8,ADR(o_ol_cnt),
          SIZ(int),SQLT_INT);
   OCIDEF(octx->curo1,octx->c_last_dp1,errhp,9,c_last,SIZ(c_last), SQLT_STR);

/* Bind for third cursor , no-zero customer id */
   OCIBND(octx->curo2,octx->w_id_bp2,errhp,":w_id",ADR(w_id),SIZ(int),SQLT_INT);
   OCIBND(octx->curo2,octx->d_id_bp2,errhp,":d_id",ADR(d_id),SIZ(int),SQLT_INT);
   OCIBND(octx->curo2,octx->c_id_bp,errhp,":c_id",ADR(c_id),SIZ(int),SQLT_INT);
   OCIDEF(octx->curo2,octx->c_balance_dp2,errhp,1,ADR(c_balance),
          SIZ(double),SQLT_FLT);
   OCIDEF(octx->curo2,octx->c_first_dp2,errhp,2,c_first,SIZ(c_first),
          SQLT_STR);
   OCIDEF(octx->curo2,octx->c_middle_dp2,errhp,3,c_middle,
          SIZ(c_middle),SQLT_STR);
   OCIDEF(octx->curo2,octx->c_last_dp,errhp,4,c_last,SIZ(c_last), SQLT_STR);
   OCIDEF(octx->curo2,octx->o_id_dp2,errhp,5,ADR(o_id),SIZ(int),SQLT_INT);
   OCIDEF(octx->curo2,octx->o_entry_d_dp2,errhp,6,
          o_entry_d_base,SIZ(o_entry_d_base),SQLT_DAT);
   OCIDEF(octx->curo2, octx->o_cr_id_dp2,errhp,7,ADR(o_carrier_id),
          SIZ(int), SQLT_INT);
   OCIDEF(octx->curo2,octx->o_ol_cnt_dp2,errhp,8,ADR(o_ol_cnt),
          SIZ(int),SQLT_INT);
   OCIDEF(octx->curo2,octx->c_id_dp1,errhp,9,ADR(c_id),SIZ(int),SQLT_INT);
/* Bind for last cursor */

   OCIBND(octx->curo3,octx->w_id_bp3,errhp,":w_id",ADR(w_id),SIZ(int),SQLT_INT);
   OCIBND(octx->curo3,octx->d_id_bp3,errhp,":d_id",ADR(d_id),SIZ(int),SQLT_INT);
   OCIBND(octx->curo3,octx->o_id_bp,errhp,":o_id",ADR(o_id),SIZ(int),SQLT_INT);

   OCIDFNRA(octx->curo3, octx->ol_i_id_dp, errhp, 1, ol_i_id,SIZ(int),SQLT_INT,
    octx->ol_i_id_ind,octx->ol_i_id_len, octx->ol_i_id_rcode);
   OCIDFNRA(octx->curo3,octx->ol_supply_w_id_dp,errhp,2, ol_supply_w_id,
            SIZ(int),SQLT_INT, octx->ol_supply_w_id_ind,
            octx->ol_supply_w_id_len, octx->ol_supply_w_id_rcode);
   OCIDFNRA(octx->curo3, octx->ol_quantity_dp,errhp,3, ol_quantity,SIZ(int),
            SQLT_INT, octx->ol_quantity_ind,octx->ol_quantity_len,
    octx->ol_quantity_rcode);
   OCIDFNRA(octx->curo3,octx->ol_amount_dp,errhp,4,ol_amount, SIZ(int),
            SQLT_INT,octx->ol_amount_ind, octx->ol_amount_len,
            octx->ol_amount_rcode);
   OCIDFNRA(octx->curo3,octx->ol_d_base_dp,errhp,5,ol_d_base,7, SQLT_DAT,
            octx->ol_delivery_d_ind,octx->ol_delivery_d_len,
    octx->ol_delivery_d_rcode);
#endif
   return (0);

}

/****************************
 * END BLOCK OF COMMON CODE
 ****************************/

ordstat_tx(rqst)
TPSVCINFO *rqst;
{
int i;
int execstatus, rcount,errcode;
struct ord_inf *ordstat_p;
ordstat_p = (struct ord_inf *)(rqst->data);

MOVETO(w_id, ordstat_p);
MOVETO(d_id, ordstat_p);
MOVETO(c_id, ordstat_p);

tx_count++;
#if ACID
time(timep);
userlog("ACID ORDSTAT Transaction begun at %s\n", ctime(timep));
#endif


/****************************
 * BEGIN BLOCK OF COMMON CODE
 ****************************/

if (c_id == 0) {
bylastname = 1;
strcpy(c_last, ordstat_p->c_last);
}
else {
bylastname = 0;
c_last[1] = '\0';
}
retry:
   for (i = 0; i < NITEMS; i++) {
      octx->ol_supply_w_id_ind[i] = TRUE;
      octx->ol_i_id_ind[i] = TRUE;
      octx->ol_quantity_ind[i] = TRUE;
      octx->ol_amount_ind[i] = TRUE;
      octx->ol_delivery_d_ind[i] = TRUE;
      octx->ol_supply_w_id_len[i] = sizeof(int);
      octx->ol_i_id_len[i] = sizeof(int);
      octx->ol_quantity_len[i] = sizeof(int);
      octx->ol_amount_len[i] = sizeof(int);
      octx->ol_delivery_d_len[i] = sizeof(ol_d_base[0]);
   }
   octx->ol_supply_w_id_csize = NITEMS;
   octx->ol_i_id_csize = NITEMS;
   octx->ol_quantity_csize = NITEMS;
   octx->ol_amount_csize = NITEMS;
   octx->ol_delivery_d_csize = NITEMS;

#ifdef ISO9
   OCIERROR(errhp,
      OCIStmtExecute(tpcsvc,octx->curo0,errhp,1,0,0,0,OCI_DEFAULT));
#else
   if(bylastname) {
   execstatus = OCIStmtExecute(tpcsvc,octx->curo0,errhp,100,0,0,0,OCI_DEFAULT);
     if (execstatus != OCI_NO_DATA)    /* will get OCI_NO_DATA if <100 found */
     {
         OCITransRollback(tpcsvc,errhp,OCI_DEFAULT);
         errcode = OCIERROR(errhp,execstatus);
         if(errcode == NOT_SERIALIZABLE) {
             goto retry;
         } else if (errcode == RECOVERR) {
             goto retry;
         } else {
           return -1;
         }
     }
      /* get rowcount, find middle one */
     OCIAttrGet(octx->curo0,OCI_HTYPE_STM,&rcount,NULL,OCI_ATTR_ROWCNT,errhp);
     octx->cust_idx=(rcount-1)/2 ;
     octx->middle_cust = octx->c_rowid_ptr[octx->cust_idx];
     execstatus = OCIStmtExecute(tpcsvc,octx->curo1,errhp,1,0,0,0,OCI_DEFAULT);
     if (execstatus != OCI_SUCCESS)
     {
         OCITransRollback(tpcsvc,errhp,OCI_DEFAULT);
         errcode = OCIERROR(errhp,execstatus);
         if(errcode == NOT_SERIALIZABLE) {
             goto retry;
         } else if (errcode == RECOVERR) {
             goto retry;
         } else {
           return -1;
         }
     }
```

```
   } else {
     execstatus = OCIStmtExecute(tpcsvc,octx->curo2,errhp,1,0,0,0,OCI_DEFAULT);
     if (execstatus != OCI_SUCCESS)
     {
         OCITransRollback(tpcsvc,errhp,OCI_DEFAULT);
         errcode = OCIERROR(errhp,execstatus);
         if(errcode == NOT_SERIALIZABLE) {
             goto retry;
         } else if (errcode == RECOVERR) {
             goto retry;
         } else {
           return -1;
         }
     }
   }
   octx->ol_w_id_ind = TRUE;
   octx->ol_d_id_ind = TRUE;
   octx->ol_o_id_ind = TRUE;
   octx->ol_w_id_len = sizeof(int);
   octx->ol_d_id_len = sizeof(int);
   octx->ol_o_id_len = sizeof(int);

   execstatus = OCIStmtExecute(tpcsvc,octx->curo3,errhp,o_ol_cnt,0,0,0,
                    OCI_DEFAULT | OCI_COMMIT_ON_SUCCESS);
   if (execstatus != OCI_SUCCESS)
     {
         OCITransRollback(tpcsvc,errhp,OCI_DEFAULT);
         errcode = OCIERROR(errhp,execstatus);
         if(errcode == NOT_SERIALIZABLE) {
             goto retry;
         } else if (errcode == RECOVERR) {
             goto retry;
         } else {
           return -1;
         }
     }
#ifdef NOTMORE
   OCIERROR(errhp,
      OCITransCommit(tpcsvc,errhp,OCI_DEFAULT));
#endif

for (i = 0; i < o_ol_cnt; i++) {
ordstat_p->o_items[i].ol_supply_w_id = ol_supply_w_id[i];
ordstat_p->o_items[i].ol_i_id = ol_i_id[i];
ordstat_p->o_items[i].ol_quantity = ol_quantity[i];
ordstat_p->o_items[i].ol_amount = ((double)ol_amount[i]) / 100;
if ( octx->ol_delivery_d_ind[i] == -1)/* null date in field */
strncpy(ordstat_p->o_items[i].ol_delivery_d,"01-01-1811",10);
else
cvtdmy(ol_d_base[i], ordstat_p->o_items[i].ol_delivery_d);
}
#endif /* ISO9 */
cvtdmyhms(o_entry_d_base, ordstat_p->o_entry_d);

/****************************
 * END BLOCK OF COMMON CODE
 ****************************/

#if ACID
time(timep);
userlog("ACID ORDSTAT for w_id = %d, d_id = %d, c_id = %d, o_id = %d\n",
w_id, d_id, c_id, o_id);
userlog("ACID ORDSTAT Transaction completed at %s\n", ctime(timep));
#endif

MOVEBACK(o_id, ordstat_p);
MOVEBACK(o_carrier_id, ordstat_p);
MOVEBACK(o_ol_cnt, ordstat_p);
MOVEBACK(c_balance, ordstat_p);
MOVECBACK(c_first, 16, ordstat_p);
MOVECBACK(c_middle, 2, ordstat_p);
MOVECBACK(c_last, 16, ordstat_p);
/***** Copied earlier
MOVECBACK(o_entry_d, 19, ordstat_p);
****/
/* for search by clastname
 */
 MOVEBACK(c_id, ordstat_p);
return(0);
}


void
cleanup(code)
{
if (octx)
free(octx);

   /* log off */

   OCIHandleFree((dvoid *)tpcusr, OCI_HTYPE_SESSION);
   OCIHandleFree((dvoid *)tpcsvc, OCI_HTYPE_SVCCTX);
   OCIHandleFree((dvoid *)errhp, OCI_HTYPE_ERROR);
   OCIHandleFree((dvoid *)tpcsrv, OCI_HTYPE_SERVER);
   OCIHandleFree((dvoid *)tpcenv, OCI_HTYPE_ENV);

    exit(code);
}

tpsvrinit(argc, argv)
char **argv;
{
        if (init_ords_tx())             /* Prepare transaction */
                return(1);
        else
                return(0);
}

void
tpsvrdone()
{
   /*oclose (&curo0);
   oclose (&curo1);
   oclose (&curo2); */
   /* log off */
   /*ologof (&tpclda);*/
}

ORDS(rqst)
TPSVCINFO *rqst;
{
        if (ordstat_tx(rqst) )
                tpreturn(TPFAIL, 0, rqst->data, sizeof(struct ord_inf), 0);
        else
                tpreturn(TPSUCCESS, 0, rqst->data, sizeof(struct ord_inf), 0);
}
```

tuxserver/tpcc_srv_paym.c

```
/*
 * Copyright (c) 1995 by Sun Microsystems, Inc.
 */

#pragma ident "@(#)tpcso_srv_paym.c1.1797/01/02SMI"

/*+=============================================================+
 |        Copyright (c) 1995  Oracle Corp, Redwood Shores, CA       |
 |                    OPEN SYSTEMS PERFORMANCE GROUP                |
 |                         All Rights Reserved                      |
 +=============================================================+
 | FILENAME
 |    plpay.c
 | DESCRIPTION
 |    OCI version (using PL/SQL stored procedure) of
 |    PAYMENT transaction in TPC-C benchmark.
 +=============================================================*/

#include "ora_oci.h"

#include <signal.h>
#include <stdio.h>
#include <sys/types.h>
#include <sys/ipc.h>
#include <sys/msg.h>

/* Tuxedo */
#include "atmi.h"
#include "userlog.h"

#include "./ora_err.h"

static int tx_count = 0;

/*#include "proc_stat.h" */

#define SQLTXT1 "alter session set isolation_level = serializable"

#define MOVETO(element, struct_name) \
element = struct_name -> element
#define MOVEBACK(element, struct_name) \
struct_name -> element = element
#define MOVECTO(element, cnt, struct_name) {\
inti;\
strncpy(element, struct_name -> element, cnt); \
element[cnt] = '\0';\
for(i=0; i<=cnt; i++)\
{\
if(isspace(element[i]))\
{\
element[i] = '\0';\
break;\
}\
}\
}
#define MOVECBACK(element, cnt, struct_name) \
strncpy(struct_name -> element, element, cnt)
struct pay_inf {
intw_id;
intd_id;
intc_id;
intc_w_id;
intc_d_id;
double h_amount;
double c_credit_lim;
double c_balance;
double c_discount;
char h_date[20];
char w_street_1[21];
char w_street_2[21];
char w_city[21];
char w_state[3];
char w_zip[11];
char d_street_1[21];
char d_street_2[21];
char d_city[21];
char d_state[3];
char d_zip[11];
char c_first[17];
char c_middle[3];
char c_last[17];
char c_street_1[21];
char c_street_2[21];
char c_city[21];
char c_state[3];
char c_zip[11];
char c_phone[17];
char c_since[11];
char c_credit[3];
char c_data_1[51];
char c_data_2[51];
char c_data_3[51];
char c_data_4[51];
```

```
};


#if ACID
#include <sys/types.h>
#include <time.h>
time_t curtime;
time_t *timep = &curtime;
#endif


/*****************************
 * BEGIN BLOCK OF COMMON CODE
 *****************************/

unsigned char cr_date[7];
unsigned char c_since[7];

/* List of fields in payment */

int retry;
char c_data[201];

intw_id;
intd_id;
intc_id, bylastname;
intc_w_id;
intc_d_id;
int h_amount;
int c_credit_lim;
double c_balance;
int c_discount;
char h_date[20];
char w_street_1[21];
char w_street_2[21];
char w_city[21];
char w_state[3];
char w_zip[10];
char d_street_1[21];
char d_street_2[21];
char d_city[21];
char d_state[3];
char d_zip[10];
char c_first[17];
char c_middle[3];
char c_last[17];
char c_street_1[21];
char c_street_2[21];
char c_city[21];
char c_state[3];
char c_zip[10];
char c_phone[17];
char c_since_d[11];
char c_credit[3];
int retries;

struct payctx {
  OCIStmt *curpi;
  OCIStmt *curp0;
  OCIStmt *curp1;
  OCIBind *w_id_bp;
  OCIBind *w_id_bp1;
  sb2 w_id_ind;
  ub2 w_id_len;
  ub2 w_id_rc;

  OCIBind *d_id_bp;
  OCIBind *d_id_bp1;
  sb2 d_id_ind;
  ub2 d_id_len;
  ub2 d_id_rc;

  OCIBind *c_w_id_bp;
  OCIBind *c_w_id_bp1;
  sb2 c_w_id_ind;
  ub2 c_w_id_len;
  ub2 c_w_id_rc;

  OCIBind *c_d_id_bp;
  OCIBind *c_d_id_bp1;
  sb2 c_d_id_ind;
  ub2 c_d_id_len;
  ub2 c_d_id_rc;

  OCIBind *c_id_bp;
  OCIBind *c_id_bp1;
  sb2 c_id_ind;
  ub2 c_id_len;
  ub2 c_id_rc;

  OCIBind *h_amount_bp;
  OCIBind *h_amount_bp1;
  sb2 h_amount_ind;
  ub2 h_amount_len;
  ub2 h_amount_rc;

  OCIBind *c_last_bp;
  OCIBind *c_last_bp1;
  sb2 c_last_ind;
  ub2 c_last_len;
  ub2 c_last_rc;

  OCIBind *w_street_1_bp;
  OCIBind *w_street_1_bp1;
  sb2 w_street_1_ind;
  ub2 w_street_1_len;
  ub2 w_street_1_rc;

  OCIBind *w_street_2_bp;
  OCIBind *w_street_2_bp1;
  sb2 w_street_2_ind;
  ub2 w_street_2_len;
  ub2 w_street_2_rc;

  OCIBind *w_city_bp;
  OCIBind *w_city_bp1;
  sb2 w_city_ind;
  ub2 w_city_len;
  ub2 w_city_rc;

  OCIBind *w_state_bp;
  OCIBind *w_state_bp1;
  sb2 w_state_ind;
  ub2 w_state_len;
  ub2 w_state_rc;

  OCIBind *w_zip_bp;
  OCIBind *w_zip_bp1;
  sb2 w_zip_ind;
  ub2 w_zip_len;
  ub2 w_zip_rc;

  OCIBind *d_street_1_bp;
  OCIBind *d_street_1_bp1;
  sb2 d_street_1_ind;
  ub2 d_street_1_len;
  ub2 d_street_1_rc;

  OCIBind *d_street_2_bp;
  OCIBind *d_street_2_bp1;
  sb2 d_street_2_ind;
  ub2 d_street_2_len;
  ub2 d_street_2_rc;

  OCIBind *d_city_bp;
  OCIBind *d_city_bp1;
  sb2 d_city_ind;
  ub2 d_city_len;
  ub2 d_city_rc;

  OCIBind *d_state_bp;
  OCIBind *d_state_bp1;
  sb2 d_state_ind;
  ub2 d_state_len;
  ub2 d_state_rc;

  OCIBind *d_zip_bp;
  OCIBind *d_zip_bp1;
  sb2 d_zip_ind;
  ub2 d_zip_len;
  ub2 d_zip_rc;

  OCIBind *c_first_bp;
  OCIBind *c_first_bp1;
  sb2 c_first_ind;
  ub2 c_first_len;
  ub2 c_first_rc;

  OCIBind *c_middle_bp;
  OCIBind *c_middle_bp1;
  sb2 c_middle_ind;
  ub2 c_middle_len;
  ub2 c_middle_rc;

  OCIBind *c_street_1_bp;
  OCIBind *c_street_1_bp1;
  sb2 c_street_1_ind;
  ub2 c_street_1_len;
  ub2 c_street_1_rc;

  OCIBind *c_street_2_bp;
  OCIBind *c_street_2_bp1;
  sb2 c_street_2_ind;
  ub2 c_street_2_len;
  ub2 c_street_2_rc;

  OCIBind *c_city_bp;
  OCIBind *c_city_bp1;
  sb2 c_city_ind;
  ub2 c_city_len;
  ub2 c_city_rc;

  OCIBind *c_state_bp;
  OCIBind *c_state_bp1;
  sb2 c_state_ind;
  ub2 c_state_len;
  ub2 c_state_rc;

  OCIBind *c_zip_bp;
  OCIBind *c_zip_bp1;
  sb2 c_zip_ind;
  ub2 c_zip_len;
  ub2 c_zip_rc;

  OCIBind *c_phone_bp;
  OCIBind *c_phone_bp1;
  sb2 c_phone_ind;
  ub2 c_phone_len;
  ub2 c_phone_rc;

  OCIBind *c_since_bp;
  OCIBind *c_since_bp1;
  sb2 c_since_ind;
  ub2 c_since_len;
  ub2 c_since_rc;

  OCIBind *c_credit_bp;
  OCIBind *c_credit_bp1;
  sb2 c_credit_ind;
  ub2 c_credit_len;
  ub2 c_credit_rc;

  OCIBind *c_credit_lim_bp;
  OCIBind *c_credit_lim_bp1;
  sb2 c_credit_lim_ind;
  ub2 c_credit_lim_len;
  ub2 c_credit_lim_rc;
```

```
  OCIBind *c_discount_bp;
  OCIBind *c_discount_bp1;
  sb2 c_discount_ind;
  ub2 c_discount_len;
  ub2 c_discount_rc;

  OCIBind *c_balance_bp;
  OCIBind *c_balance_bp1;
  sb2 c_balance_ind;
  ub2 c_balance_len;
  ub2 c_balance_rc;

  OCIBind *c_data_bp;
  OCIBind *c_data_bp1;
  sb2 c_data_ind;
  ub2 c_data_len;
  ub2 c_data_rc;

  OCIBind *h_date_bp;
  OCIBind *h_date_bp1;
  sb2 h_date_ind;
  ub2 h_date_len;
  ub2 h_date_rc;

  OCIBind *retries_bp;
  OCIBind *retries_bp1;
  sb2 retries_ind;
  ub2 retries_len;
  ub2 retries_rc;

  OCIBind *cr_date_bp;
  OCIBind *cr_date_bp1;
  sb2 cr_date_ind;
  ub2 cr_date_len;
  ub2 cr_date_rc;

  OCIBind *byln_bp;
  sb2 byln_ind;
  ub2 byln_len;
  ub2 byln_rc;
};
typedef struct payctx payctx;



payctx *pctx;

/****************************
 * END BLOCK OF COMMON CODE
 ****************************/


get_paym_tx_cnt()
{
        return tx_count;
}


/*
 * Function: init payment transaction
 * Prepare the payment transaction
 */

/****************************
 * BEGIN BLOCK OF COMMON CODE
 ****************************/

OCIEnv *tpcenv;
OCIServer *tpcsrv;
OCIError *errhp;
OCISvcCtx *tpcsvc;
OCISession *tpcusr;
char *uid = "dbbench";
char *pwd = "dbbench";

int
init_paym_tx()
{
#defineSQLTXT"alter session set isolation_level = serializable"
#defineSQLTXT_INIT"BEGIN pay.pay_init; END;"

text stmbuf[SQL_BUF_SIZE];

   OCIStmt *curi;

   OCIInitialize(OCI_DEFAULT,(dvoid *)0,0,0,0);
   OCIEnvInit(&tpcenv, OCI_DEFAULT, 0, (dvoid **)0);
   OCIHandleAlloc((dvoid *)tpcenv, (dvoid **)&tpcsrv, OCI_HTYPE_SERVER, 0 , (dvoid
**)0);
   OCIHandleAlloc((dvoid *)tpcenv, (dvoid **)&errhp, OCI_HTYPE_ERROR, 0 , (dvoid
**)0);
   OCIHandleAlloc((dvoid *)tpcenv, (dvoid **)&tpcsvc, OCI_HTYPE_SVCCTX, 0 , (dvoid
**)0);
   OCIServerAttach(tpcsrv, errhp, (text *)0,0,OCI_DEFAULT);
   OCIAttrSet((dvoid *)tpcsvc, OCI_HTYPE_SVCCTX, (dvoid *)tpcsrv,
(ub4)0,OCI_ATTR_SRVRCTXT, errhp);
   OCIHandleAlloc((dvoid *)tpcenv, (dvoid **)&tpcusr, OCI_HTYPE_SESSION, 0 , (dvoid
**)0);
   OCIAttrSet((dvoid *)tpcusr, OCI_HTYPE_SESSION, (dvoid *)uid,
(ub4)strlen(uid),OCI_ATTR_USERNAME, errhp);
   OCIAttrSet((dvoid *)tpcusr, OCI_HTYPE_SESSION, (dvoid *)pwd, (ub4)strlen(pwd),
      OCI_ATTR_PASSWORD, errhp);
   OCIERROR(errhp, OCISessionBegin(tpcsvc, errhp, tpcusr, OCI_CRED_RDBMS,
OCI_DEFAULT));

   OCIAttrSet(tpcsvc, OCI_HTYPE_SVCCTX, tpcusr, 0, OCI_ATTR_USERCTXT, errhp);

   /* run all transaction in serializable mode */

   OCIHandleAlloc(tpcenv, (dvoid **)&curi, OCI_HTYPE_STMT, 0, (dvoid**)0);
   sprintf ((char *) stmbuf, SQLTXT);
   OCIStmtPrepare(curi, errhp, stmbuf, strlen((char *)stmbuf), OCI_NTV_SYNTAX,
OCI_DEFAULT);
   OCIERROR(errhp,OCIStmtExecute(tpcsvc, curi, errhp,1,0,0,0,OCI_DEFAULT));
   OCIHandleFree(curi, OCI_HTYPE_STMT);


#ifdef SQL_TRACE
   /* Turn on the SQL_TRACE */
   OCIHandleAlloc(tpcenv, (dvoid **)&curi, OCI_HTYPE_STMT, 0, &xmem);
   sprintf ((char *) stmbuf, SQLTXT1);
   OCIStmtPrepare(curi, errhp, stmbuf, strlen((char *)stmbuf), OCI_NTV_SYNTAX,
OCI_DEFAULT);
   OCIERROR(errhp, OCIStmtExecute(tpcsvc, curi, errhp,1,0,0,0,OCI_DEFAULT));
   OCIHandleFree((dvoid *)curi, OCI_HTYPE_STMT);
#endif /* End SQL_TRACE */

   pctx = (payctx *)malloc(sizeof(payctx));
   memset(pctx,(char)0,sizeof(payctx));

/* cursor for init */
   OCIERROR(errhp,OCIHandleAlloc(tpcenv, (dvoid **)(&(pctx->curpi)),
            OCI_HTYPE_STMT,0,(dvoid**)0));

   OCIERROR(errhp,OCIHandleAlloc(tpcenv, (dvoid **)(&(pctx->curp0)),
            OCI_HTYPE_STMT,0,(dvoid**)0));
   OCIERROR(errhp,OCIHandleAlloc(tpcenv, (dvoid **)(&(pctx->curp1)),
            OCI_HTYPE_STMT,0,(dvoid**)0));

   /*  build the init statement  and execute it */

   sprintf ((char*)stmbuf, SQLTXT_INIT);
   OCIERROR(errhp,OCIStmtPrepare(pctx->curpi, errhp, stmbuf,
            strlen((char *)stmbuf), OCI_NTV_SYNTAX, OCI_DEFAULT));
   OCIERROR(errhp,
     OCIStmtExecute(tpcsvc,pctx->curpi,errhp,1,0,0,0,OCI_DEFAULT));

   /* customer id !=  0, go by last name */
#ifdef ATOMA
   sqlfile("paynz_abort.sql",stmbuf);
#else
   sqlfile("paynz.sql",stmbuf);
#endif
   OCIERROR(errhp,OCIStmtPrepare(pctx->curp0, errhp, stmbuf,
            strlen((char *)stmbuf), OCI_NTV_SYNTAX, OCI_DEFAULT));

   /* customer id ==  0, go by last name */
#ifdef ATOMA
   sqlfile("payz_abort.sql",stmbuf);
#else
   sqlfile("payz.sql",stmbuf);
#endif
   OCIERROR(errhp,OCIStmtPrepare(pctx->curp1, errhp, stmbuf,
            strlen((char *)stmbuf), OCI_NTV_SYNTAX, OCI_DEFAULT));

  pctx->w_id_ind = TRUE;
  pctx->w_id_len = SIZ(w_id);
  pctx->d_id_ind = TRUE;
  pctx->d_id_len = SIZ(d_id);
  pctx->c_w_id_ind = TRUE;
  pctx->c_w_id_len = SIZ(c_w_id);
  pctx->c_d_id_ind = TRUE;
  pctx->c_d_id_len = SIZ(c_d_id);
  pctx->c_id_ind = TRUE;
  pctx->c_id_len = 0;
  pctx->h_amount_len = SIZ(h_amount);
  pctx->h_amount_ind = TRUE;
  pctx->c_last_ind = TRUE;
  pctx->c_last_len = 0;
  pctx->w_street_1_ind = TRUE;
  pctx->w_street_1_len = 0;
  pctx->w_street_2_ind = TRUE;
  pctx->w_street_2_len = 0;
  pctx->w_city_ind = TRUE;
  pctx->w_city_len = 0;
  pctx->w_state_ind = TRUE;
  pctx->w_state_len = 0;
  pctx->w_zip_ind = TRUE;
  pctx->w_zip_len = 0;
  pctx->d_street_1_ind = TRUE;
  pctx->d_street_1_len = 0;
  pctx->d_street_2_ind = TRUE;
  pctx->d_street_2_len = 0;
  pctx->d_city_ind = TRUE;
  pctx->d_city_len = 0;
  pctx->d_state_ind = TRUE;
  pctx->d_state_len = 0;
  pctx->d_zip_ind = TRUE;
  pctx->d_zip_len = 0;
  pctx->c_first_ind = TRUE;
  pctx->c_first_len = 0;
  pctx->c_middle_ind = TRUE;
  pctx->c_middle_len = 0;
  pctx->c_street_1_ind = TRUE;
  pctx->c_street_1_len = 0;
  pctx->c_street_2_ind = TRUE;
  pctx->c_street_2_len = 0;
  pctx->c_city_ind = TRUE;
  pctx->c_city_len = 0;
  pctx->c_state_ind = TRUE;
  pctx->c_state_len = 0;
  pctx->c_zip_ind = TRUE;
  pctx->c_zip_len = 0;
  pctx->c_phone_ind = TRUE;
  pctx->c_phone_len = 0;
  pctx->c_since_ind = TRUE;
  pctx->c_since_len = 0;
  pctx->c_credit_ind = TRUE;
  pctx->c_credit_len = 0;
  pctx->c_credit_lim_ind = TRUE;
  pctx->c_credit_lim_len = 0;
  pctx->c_discount_ind = TRUE;
  pctx->c_discount_len = 0;
  pctx->c_balance_ind = TRUE;
  pctx->c_balance_len = sizeof(double);
  pctx->c_data_ind = TRUE;
  pctx->c_data_len = 0;
  pctx->h_date_ind = TRUE;
```

```
  pctx->h_date_len = 0;
  pctx->retries_ind = TRUE;
  pctx->retries_len = 0;
  pctx->cr_date_ind = TRUE;
  pctx->cr_date_len = 7;



   /* bind variables */


   OCIBNDR(pctx->curp0, pctx->w_id_bp, errhp,":w_id",ADR(w_id),SIZ(int),
           SQLT_INT, &pctx->w_id_ind, NULL, NULL);
   OCIBNDR(pctx->curp0, pctx->d_id_bp, errhp,":d_id",ADR(d_id),SIZ(int),
           SQLT_INT, &pctx->d_id_ind, NULL, NULL);
   OCIBND(pctx->curp0, pctx->c_w_id_bp, errhp,":c_w_id",ADR(c_w_id),SIZ(int),
           SQLT_INT);
   OCIBND(pctx->curp0, pctx->c_d_id_bp, errhp,":c_d_id",ADR(c_d_id),SIZ(int),
           SQLT_INT);
   OCIBND(pctx->curp0, pctx->c_id_bp, errhp,":c_id",ADR(c_id),SIZ(int),
           SQLT_INT);
   OCIBNDR(pctx->curp0, pctx->h_amount_bp, errhp,":h_amount",ADR(h_amount),
           SIZ(int),SQLT_INT, &pctx->h_amount_ind, &pctx->h_amount_len,
           &pctx->h_amount_rc);
   OCIBNDR(pctx->curp0, pctx->c_last_bp, errhp,":c_last",c_last,SIZ(c_last),
           SQLT_STR, &pctx->c_last_ind, &pctx->c_last_len, &pctx->c_last_rc);
   OCIBNDR(pctx->curp0, pctx->w_street_1_bp, errhp,":w_street_1",w_street_1,
           SIZ(w_street_1),SQLT_STR, &pctx->w_street_1_ind,
           &pctx->w_street_1_len, &pctx->w_street_1_rc);
   OCIBNDR(pctx->curp0, pctx->w_street_2_bp, errhp,":w_street_2",w_street_2,
           SIZ(w_street_2),SQLT_STR, &pctx->w_street_2_ind,
           &pctx->w_street_2_len, &pctx->w_street_2_rc);
   OCIBNDR(pctx->curp0, pctx->w_city_bp, errhp,":w_city",w_city,SIZ(w_city),
           SQLT_STR, &pctx->w_city_ind, &pctx->w_city_len, &pctx->w_city_rc);
   OCIBNDR(pctx->curp0, pctx->w_state_bp, errhp,":w_state",w_state,SIZ(w_state),
           SQLT_STR, &pctx->w_state_ind, &pctx->w_state_len, &pctx->w_state_rc);
   OCIBNDR(pctx->curp0, pctx->w_zip_bp, errhp,":w_zip",w_zip,SIZ(w_zip),
           SQLT_STR, &pctx->w_zip_ind, &pctx->w_zip_len, &pctx->w_zip_rc);
   OCIBNDR(pctx->curp0, pctx->d_street_1_bp, errhp,":d_street_1",d_street_1,
           SIZ(d_street_1),SQLT_STR, &pctx->d_street_1_ind,
           &pctx->d_street_1_len, &pctx->d_street_1_rc);
   OCIBNDR(pctx->curp0, pctx->d_street_2_bp, errhp,":d_street_2",d_street_2,
           SIZ(d_street_2),SQLT_STR, &pctx->d_street_2_ind,
           &pctx->d_street_2_len, &pctx->d_street_2_rc);
   OCIBNDR(pctx->curp0, pctx->d_city_bp, errhp,":d_city",d_city,SIZ(d_city),
           SQLT_STR, &pctx->d_city_ind, &pctx->d_city_len, &pctx->d_city_rc);
   OCIBNDR(pctx->curp0, pctx->d_state_bp, errhp,":d_state",d_state,SIZ(d_state),
           SQLT_STR, &pctx->d_state_ind, &pctx->d_state_len, &pctx->d_state_rc);
   OCIBNDR(pctx->curp0, pctx->d_zip_bp, errhp,":d_zip",d_zip,SIZ(d_zip),
           SQLT_STR, &pctx->d_zip_ind, &pctx->d_zip_len, &pctx->d_zip_rc);
   OCIBNDR(pctx->curp0, pctx->c_first_bp, errhp,":c_first",c_first,SIZ(c_first),
           SQLT_STR, &pctx->c_first_ind, &pctx->c_first_len, &pctx->c_first_rc);
   OCIBNDR(pctx->curp0, pctx->c_middle_bp, errhp,":c_middle",c_middle,2,
           SQLT_AFC, &pctx->c_middle_ind, &pctx->c_middle_len,
           &pctx->c_middle_rc);
   OCIBNDR(pctx->curp0, pctx->c_street_1_bp, errhp,":c_street_1",c_street_1,
           SIZ(c_street_1),SQLT_STR, &pctx->c_street_1_ind,
           &pctx->c_street_1_len, &pctx->c_street_1_rc);
   OCIBNDR(pctx->curp0, pctx->c_street_2_bp, errhp,":c_street_2",c_street_2,
           SIZ(c_street_2),SQLT_STR, &pctx->c_street_2_ind,
           &pctx->c_street_2_len, &pctx->c_street_2_rc);
   OCIBNDR(pctx->curp0, pctx->c_city_bp, errhp,":c_city",c_city,SIZ(c_city),
           SQLT_STR, &pctx->c_city_ind, &pctx->c_city_len, &pctx->c_city_rc);
   OCIBNDR(pctx->curp0, pctx->c_state_bp, errhp,":c_state",c_state,SIZ(c_state),
           SQLT_STR, &pctx->c_state_ind, &pctx->c_state_len, &pctx->c_state_rc);
   OCIBNDR(pctx->curp0, pctx->c_zip_bp, errhp,":c_zip",c_zip,SIZ(c_zip),
           SQLT_STR, &pctx->c_zip_ind, &pctx->c_zip_len, &pctx->c_zip_rc);
  OCIBNDR(pctx->curp0, pctx->c_phone_bp, errhp,":c_phone",c_phone,SIZ(c_phone),
SQLT_STR, &pctx->c_phone_ind, &pctx->c_phone_len, &pctx->c_phone_rc);
   OCIBNDR(pctx->curp0, pctx->c_since_bp, errhp,":c_since",c_since,7,
           SQLT_DAT, &pctx->c_since_ind, &pctx->c_since_len, &pctx->c_since_rc);
   OCIBNDR(pctx->curp0, pctx->c_credit_bp, errhp,":c_credit",c_credit,
           SIZ(c_credit),SQLT_CHR, &pctx->c_credit_ind, &pctx->c_credit_len,
           &pctx->c_credit_rc);
   OCIBNDR(pctx->curp0, pctx->c_credit_lim_bp, errhp,":c_credit_lim",
           ADR(c_credit_lim),SIZ(int), SQLT_INT, &pctx->c_credit_lim_ind,
           &pctx->c_credit_lim_len, &pctx->c_credit_lim_rc);
   OCIBNDR(pctx->curp0, pctx->c_discount_bp, errhp,":c_discount",
           ADR(c_discount),SIZ(int), SQLT_INT, &pctx->c_discount_ind,
           &pctx->c_discount_len, &pctx->c_discount_rc);
   OCIBNDR(pctx->curp0, pctx->c_balance_bp, errhp,":c_balance",ADR(c_balance),
           SIZ(double),SQLT_FLT, &pctx->c_balance_ind, &pctx->c_balance_len,
           &pctx->c_balance_rc);
   OCIBNDR(pctx->curp0, pctx->c_data_bp, errhp,":c_data",c_data,SIZ(c_data),
           SQLT_STR, &pctx->c_data_ind, &pctx->c_data_len, &pctx->c_data_rc);
/*
   OCIBNDR(pctx->curp0, pctx->h_date_bp, errhp,":h_date",h_date,SIZ(h_date),
           SQLT_STR, &pctx->h_date_ind, &pctx->h_date_len, &pctx->h_date_rc);
*/
   OCIBNDR(pctx->curp0, pctx->retries_bp, errhp,":retry",ADR(retries),SIZ(int),
           SQLT_INT, &pctx->retries_ind, &pctx->retries_len, &pctx->retries_rc);
   OCIBNDR(pctx->curp0, pctx->cr_date_bp, errhp,":cr_date",ADR(cr_date),
           SIZ(cr_date),SQLT_DAT, &pctx->cr_date_ind, &pctx->cr_date_len,
           &pctx->cr_date_rc);

/* ---- Binds for  the second cursor   */


   OCIBNDR(pctx->curp1, pctx->w_id_bp1, errhp,":w_id",ADR(w_id),SIZ(int),
           SQLT_INT, &pctx->w_id_ind, &pctx->w_id_len, &pctx->w_id_rc);
   OCIBNDR(pctx->curp1, pctx->d_id_bp1, errhp,":d_id",ADR(d_id),SIZ(int),
           SQLT_INT, &pctx->d_id_ind, &pctx->d_id_len, &pctx->d_id_rc);
   OCIBND(pctx->curp1, pctx->c_w_id_bp1, errhp,":c_w_id",ADR(c_w_id),SIZ(int),
           SQLT_INT);
   OCIBND(pctx->curp1, pctx->c_d_id_bp1, errhp,":c_d_id",ADR(c_d_id),SIZ(int),
           SQLT_INT);
   OCIBNDR(pctx->curp1, pctx->c_id_bp1, errhp,":c_id",ADR(c_id),SIZ(int),
           SQLT_INT, &pctx->c_id_ind, &pctx->c_id_len, &pctx->c_id_rc);
   OCIBNDR(pctx->curp1, pctx->h_amount_bp1, errhp,":h_amount",ADR(h_amount),
           SIZ(int),SQLT_INT, &pctx->h_amount_ind, &pctx->h_amount_len,
           &pctx->h_amount_rc);
   OCIBND(pctx->curp1, pctx->c_last_bp1, errhp,":c_last",c_last,SIZ(c_last),
           SQLT_STR);
   OCIBNDR(pctx->curp1, pctx->w_street_1_bp1, errhp,":w_street_1",w_street_1,
           SIZ(w_street_1),SQLT_STR, &pctx->w_street_1_ind,
           &pctx->w_street_1_len, &pctx->w_street_1_rc);
   OCIBNDR(pctx->curp1, pctx->w_street_2_bp1, errhp,":w_street_2",w_street_2,
           SIZ(w_street_2),SQLT_STR, &pctx->w_street_2_ind,
           &pctx->w_street_2_len, &pctx->w_street_2_rc);
   OCIBNDR(pctx->curp1, pctx->w_city_bp1, errhp,":w_city",w_city,SIZ(w_city),
           SQLT_STR, &pctx->w_city_ind, &pctx->w_city_len, &pctx->w_city_rc);
   OCIBNDR(pctx->curp1, pctx->w_state_bp1, errhp,":w_state",w_state,SIZ(w_state),
           SQLT_STR, &pctx->w_state_ind, &pctx->w_state_len, &pctx->w_state_rc);
   OCIBNDR(pctx->curp1, pctx->w_zip_bp1, errhp,":w_zip",w_zip,SIZ(w_zip),
           SQLT_STR, &pctx->w_zip_ind, &pctx->w_zip_len, &pctx->w_zip_rc);
   OCIBNDR(pctx->curp1, pctx->d_street_1_bp1, errhp,":d_street_1",d_street_1,
           SIZ(d_street_1),SQLT_STR, &pctx->d_street_1_ind,
           &pctx->d_street_1_len, &pctx->d_street_1_rc);
   OCIBNDR(pctx->curp1, pctx->d_street_2_bp1, errhp,":d_street_2",d_street_2,
           SIZ(d_street_2),SQLT_STR, &pctx->d_street_2_ind,
           &pctx->d_street_2_len, &pctx->d_street_2_rc);
   OCIBNDR(pctx->curp1, pctx->d_city_bp1, errhp,":d_city",d_city,SIZ(d_city),
           SQLT_STR, &pctx->d_city_ind, &pctx->d_city_len, &pctx->d_city_rc);
   OCIBNDR(pctx->curp1, pctx->d_state_bp1, errhp,":d_state",d_state,
           SIZ(d_state), SQLT_STR, &pctx->d_state_ind, &pctx->d_state_len,
           &pctx->d_state_rc);
   OCIBNDR(pctx->curp1, pctx->d_zip_bp1, errhp,":d_zip",d_zip,SIZ(d_zip),
           SQLT_STR, &pctx->d_zip_ind, &pctx->d_zip_len, &pctx->d_zip_rc);
   OCIBNDR(pctx->curp1, pctx->c_first_bp1, errhp,":c_first",c_first,
           SIZ(c_first), SQLT_STR, &pctx->c_first_ind, &pctx->c_first_len,
           &pctx->c_first_rc);
   OCIBNDR(pctx->curp1, pctx->c_middle_bp1, errhp,":c_middle",c_middle,2,
           SQLT_AFC, &pctx->c_middle_ind, &pctx->c_middle_len,
           &pctx->c_middle_rc);

   OCIBNDR(pctx->curp1, pctx->c_street_1_bp1, errhp,":c_street_1",c_street_1,
           SIZ(c_street_1),SQLT_STR, &pctx->c_street_1_ind,
           &pctx->c_street_1_len, &pctx->c_street_1_rc);
   OCIBNDR(pctx->curp1, pctx->c_street_2_bp1, errhp,":c_street_2",c_street_2,
           SIZ(c_street_2),SQLT_STR, &pctx->c_street_2_ind,
           &pctx->c_street_2_len, &pctx->c_street_2_rc);
   OCIBNDR(pctx->curp1, pctx->c_city_bp1,
errhp,":c_city",c_city,SIZ(c_city),SQLT_STR,
  &pctx->c_city_ind, &pctx->c_city_len, &pctx->c_city_rc);
  OCIBNDR(pctx->curp1, pctx->c_state_bp1, errhp,":c_state",c_state,SIZ(c_state),
SQLT_STR, &pctx->c_state_ind, &pctx->c_state_len, &pctx->c_state_rc);
   OCIBNDR(pctx->curp1, pctx->c_zip_bp1, errhp,":c_zip",c_zip,SIZ(c_zip),
           SQLT_STR, &pctx->c_zip_ind, &pctx->c_zip_len, &pctx->c_zip_rc);
   OCIBNDR(pctx->curp1, pctx->c_phone_bp1, errhp,":c_phone",c_phone,SIZ(c_phone),
           SQLT_STR, &pctx->c_phone_ind, &pctx->c_phone_len, &pctx->c_phone_rc);
   OCIBNDR(pctx->curp1, pctx->c_since_bp1, errhp,":c_since",c_since,7,
           SQLT_DAT, &pctx->c_since_ind, &pctx->c_since_len, &pctx->c_since_rc);
   OCIBNDR(pctx->curp1, pctx->c_credit_bp1, errhp,":c_credit",c_credit,
           SIZ(c_credit),SQLT_CHR, &pctx->c_credit_ind, &pctx->c_credit_len,
           &pctx->c_credit_rc);
   OCIBNDR(pctx->curp1, pctx->c_credit_lim_bp1, errhp,":c_credit_lim",
           ADR(c_credit_lim),SIZ(int), SQLT_INT, &pctx->c_credit_lim_ind,
           &pctx->c_credit_lim_len, &pctx->c_credit_lim_rc);
   OCIBNDR(pctx->curp1, pctx->c_discount_bp1, errhp,":c_discount",
           ADR(c_discount),SIZ(int), SQLT_INT, &pctx->c_discount_ind,
           &pctx->c_discount_len, &pctx->c_discount_rc);
   OCIBNDR(pctx->curp1, pctx->c_balance_bp1, errhp,":c_balance",ADR(c_balance),
           SIZ(double),SQLT_FLT, &pctx->c_balance_ind, &pctx->c_balance_len,
           &pctx->c_balance_rc);
   OCIBNDR(pctx->curp1, pctx->c_data_bp1, errhp,":c_data",c_data,SIZ(c_data),
           SQLT_STR, &pctx->c_data_ind, &pctx->c_data_len, &pctx->c_data_rc);
/*
   OCIBNDR(pctx->curp1, pctx->h_date_bp1, errhp,":h_date",h_date,SIZ(h_date),
           SQLT_STR, &pctx->h_date_ind, &pctx->h_date_len, &pctx->h_date_rc);
*/
   OCIBNDR(pctx->curp1, pctx->retries_bp1, errhp,":retry",ADR(retries),SIZ(int),
           SQLT_INT, &pctx->retries_ind, &pctx->retries_len, &pctx->retries_rc);
   OCIBNDR(pctx->curp1, pctx->cr_date_bp1, errhp,":cr_date",ADR(cr_date),
           SIZ(cr_date),SQLT_DAT, &pctx->cr_date_ind, &pctx->cr_date_len,
           &pctx->cr_date_rc);

return(0);
}

int execstatus,errcode;

/*****************************
 * END BLOCK OF COMMON CODE
 *****************************/


payment_tx(rqst)
TPSVCINFO *rqst;
{

struct pay_inf *payment_p;
       payment_p = (struct pay_inf *)(rqst->data);

MOVETO(w_id, payment_p);
MOVETO(d_id, payment_p);
MOVETO(c_id, payment_p);
MOVETO(c_w_id, payment_p);
MOVETO(c_d_id, payment_p);

h_amount = (int)(payment_p->h_amount * 100);
strcpy(c_last, payment_p->c_last);
tx_count++;


#if ACID
time(timep);
userlog("ACID PAYMENT Transaction Begun at %s\n", ctime(timep));
#endif
/*****************************
 * BEGIN BLOCK OF COMMON CODE
 *****************************/
retryp:
vgetdate(cr_date);
  pctx->w_id_ind = TRUE;
  pctx->w_id_len = SIZ(w_id);
  pctx->d_id_ind = TRUE;
  pctx->d_id_len = SIZ(d_id);
  pctx->c_w_id_ind = TRUE;
```

```
  pctx->c_w_id_len = SIZ(c_w_id);
  pctx->c_d_id_ind = TRUE;
  pctx->c_d_id_len = SIZ(c_d_id);
  pctx->c_id_ind = TRUE;
  pctx->c_id_len = SIZ(c_id);
  pctx->h_amount_ind = TRUE;
  pctx->h_amount_len = SIZ(h_amount);
  pctx->c_last_ind = TRUE;
  pctx->c_last_len = SIZ(c_last);
  pctx->w_street_1_ind = TRUE;
  pctx->w_street_1_len = 0;
  pctx->w_street_2_ind = TRUE;
  pctx->w_street_2_len = 0;
  pctx->w_city_ind = TRUE;
  pctx->w_city_len = 0;
  pctx->w_state_ind = TRUE;
  pctx->w_state_len = 0;
  pctx->w_zip_ind = TRUE;
  pctx->w_zip_len = 0;
  pctx->d_street_1_ind = TRUE;
  pctx->d_street_1_len = 0;
  pctx->d_street_2_ind = TRUE;
  pctx->d_street_2_len = 0;
  pctx->d_city_ind = TRUE;
  pctx->d_city_len = 0;
  pctx->d_state_ind = TRUE;
  pctx->d_state_len = 0;
  pctx->d_zip_ind = TRUE;
  pctx->d_zip_len = 0;
  pctx->c_first_ind = TRUE;
  pctx->c_first_len = 0;
  pctx->c_middle_ind = TRUE;
  pctx->c_middle_len = 0;
  pctx->c_street_1_ind = TRUE;
  pctx->c_street_1_len = 0;
  pctx->c_street_2_ind = TRUE;
  pctx->c_street_2_len = 0;
  pctx->c_city_ind = TRUE;
  pctx->c_city_len = 0;
  pctx->c_state_ind = TRUE;
  pctx->c_state_len = 0;
  pctx->c_zip_ind = TRUE;
  pctx->c_zip_len = 0;
  pctx->c_phone_ind = TRUE;
  pctx->c_phone_len = 0;
  pctx->c_since_ind = TRUE;
  pctx->c_since_len = 0;
  pctx->c_credit_ind = TRUE;
  pctx->c_credit_len = 0;
  pctx->c_credit_lim_ind = TRUE;
  pctx->c_credit_lim_len = 0;
  pctx->c_discount_ind = TRUE;
  pctx->c_discount_len = 0;
  pctx->c_balance_ind = TRUE;
  pctx->c_balance_len = sizeof(double);
  pctx->c_data_ind = TRUE;
  pctx->c_data_len = 0;
  pctx->h_date_ind = TRUE;
  pctx->h_date_len = 0;
  pctx->retries_ind = TRUE;
  pctx->retries_len = 0;
  pctx->cr_date_ind = TRUE;
  pctx->cr_date_len = 7;

if (c_id == 0) {
bylastname = 1;
    execstatus=OCIStmtExecute(tpcsvc,pctx->curp1,errhp,1,0,0,0,OCI_DEFAULT);
  } else {
bylastname = 0;
    execstatus=OCIStmtExecute(tpcsvc,pctx->curp0,errhp,1,0,0,0,OCI_DEFAULT);
  }
  if (execstatus != OCI_SUCCESS)
     {
         OCITransRollback(tpcsvc,errhp,OCI_DEFAULT);
         errcode = OCIERROR(errhp,execstatus);
         if(errcode == NOT_SERIALIZABLE) {
             retries++;
             goto retryp;
         } else if (errcode == RECOVERR) {
             retries++;
             goto retryp;
         } else {
           return -1;
         }
     }
cvtdmyhms(cr_date, h_date);
cvtdmy(c_since, c_since_d);

/****************************
 * END BLOCK OF COMMON CODE
 ****************************/

MOVEBACK(c_id, payment_p);
payment_p->c_credit_lim = ((double)c_credit_lim) / 100;
payment_p->c_discount = ((double)c_discount) / 100;
#if ACID
time(timep);
userlog("w_id %d, d_id %d, c_id %d, h_amount = %d, c_balance = %f\n",
w_id, d_id, c_id, h_amount, c_balance);
userlog("ACID PAYMENT Transaction completed at %s\n", ctime(timep));
#endif
strcpy(payment_p->c_since, c_since_d);
MOVEBACK(c_balance, payment_p);
MOVECBACK(h_date, 20, payment_p);
MOVECBACK(w_street_1, 21, payment_p);
MOVECBACK(w_street_2, 21, payment_p);
MOVECBACK(w_city, 21, payment_p);
MOVECBACK(w_state, 3, payment_p);
MOVECBACK(w_zip, 11, payment_p);
MOVECBACK(d_street_1, 21, payment_p);
MOVECBACK(d_street_2, 21, payment_p);
MOVECBACK(d_city, 21, payment_p);
MOVECBACK(d_state, 3, payment_p);
MOVECBACK(d_zip, 11, payment_p);
MOVECBACK(c_first, 17, payment_p);
MOVECBACK(c_middle, 3, payment_p);
MOVECBACK(c_last, 17, payment_p);
MOVECBACK(c_street_1, 21, payment_p);
MOVECBACK(c_street_2, 21, payment_p);
MOVECBACK(c_city, 21, payment_p);
MOVECBACK(c_state, 3, payment_p);
MOVECBACK(c_zip, 11, payment_p);
MOVECBACK(c_phone, 17, payment_p);
MOVECBACK(c_credit, 3, payment_p);
strncpy(payment_p->c_data_1, c_data, 50);
strncpy(payment_p->c_data_2, c_data+50, 50);
strncpy(payment_p->c_data_3, c_data+100, 50);
strncpy(payment_p->c_data_4, c_data+150, 50);

return(0);
}

/* Tuxedo code */
tpsvrinit(argc, argv)
char **argv;
{
        return(init_paym_tx());         /* Prepare transaction */
}

void
tpsvrdone()
{
}


PAYM(rqst)
TPSVCINFO *rqst;
{
        if (payment_tx(rqst) )
                tpreturn(TPFAIL, 0, rqst->data, sizeof(struct pay_inf), 0);
        else
                tpreturn(TPSUCCESS, 0, rqst->data, sizeof(struct pay_inf), 0);
}
```

tuxserver/tpcc_srv_stock.c

```
/*
 * Copyright (c) 1994 by Sun Microsystems, Inc.
 */

#pragma ident "@(#)tpcso_srv_stock.c1.695/04/12SMI"

/*+=============================================================+
 |        Copyright (c) 1994  Oracle Corp, Redwood Shores, CA       |
 |                    OPEN SYSTEMS PERFORMANCE GROUP                |
 |                         All Rights Reserved                      |
 +=============================================================+
 | FILENAME
 |    plsto.c
 | DESCRIPTION
 |    OCI version of STOCK LEVEL transaction in TPC-C benchmark.
 +=============================================================*/

#include "ora_oci.h"

#include <signal.h>
#include <stdio.h>
#include <sys/types.h>
#include <sys/ipc.h>
#include <sys/msg.h>
#include "./ora_err.h"
/* Tuxedo */
#include "atmi.h"
#include "userlog.h"

static int tx_count = 0;

#define MOVETO(element, struct_name) element = struct_name -> element
#define MOVEBACK(element, struct_name) struct_name -> element = element

/* List of fields in stock */
/* This structure should be EXACTLY identical to the one declared in client.h */
/* List of fields in stock-level */

struct stock_inf {
intw_id;
int d_id;
int threshold;
int low_stock;
};


/*struct msgh_req message;*/
int my_qid, my_id;
char my_name[] = "Stock";

#define SQLTXT "SELECT  /*+ nocache(stock) */ \
count (DISTINCT s_i_id) \
            FROM order_line, stock, district \
            WHERE d_id = :d_id AND d_w_id = :w_id AND \
                  d_id = ol_d_id AND d_w_id = ol_w_id AND \
                  ol_i_id = s_i_id AND ol_w_id = s_w_id AND \
                  s_quantity < :threshold AND \
                  ol_o_id BETWEEN (d_next_o_id - 20) AND (d_next_o_id - 1)"


#define SQLTXTTEST "BEGIN stocklevel.getstocklevel (:w_id, :d_id, \
:threshold); END;"


struct stoctx {
  OCIStmt *curs;
  OCIBind *w_id_bp;
  OCIBind *d_id_bp;
```

```
  OCIBind *threshold_bp;
  OCIDefine *low_stock_bp;

  int norow;
};

typedef struct stoctx stoctx;
stoctx *sctx;

int w_id;
int d_id;
int threshold;
int low_stock;

/*
 * Initialize transaction
 */
get_stock_tx_cnt()
{
        return tx_count;
}

OCIEnv *tpcenv;
OCIServer *tpcsrv;
OCIError *errhp;
OCISvcCtx *tpcsvc;
OCISession *tpcusr;
char *uid = "dbbench";
char *pwd = "dbbench";

int
init_stock_tx()
{

/*****************************
 * BEGIN BLOCK OF COMMON CODE
 *****************************/

   text stmbuf[SQL_BUF_SIZE];
OCIStmt *curi;

   OCIInitialize(OCI_DEFAULT,(dvoid *)0,0,0,0);
   OCIEnvInit(&tpcenv, OCI_DEFAULT, 0, (dvoid **)0);
   OCIHandleAlloc((dvoid *)tpcenv, (dvoid **)&tpcsrv, OCI_HTYPE_SERVER, 0 , (dvoid
**)0);
   OCIHandleAlloc((dvoid *)tpcenv, (dvoid **)&errhp, OCI_HTYPE_ERROR, 0 , (dvoid
**)0);
   OCIHandleAlloc((dvoid *)tpcenv, (dvoid **)&tpcsvc, OCI_HTYPE_SVCCTX, 0 , (dvoid
**)0);
   OCIServerAttach(tpcsrv, errhp, (text *)0,0,OCI_DEFAULT);
   OCIAttrSet((dvoid *)tpcsvc, OCI_HTYPE_SVCCTX, (dvoid *)tpcsrv,
(ub4)0,OCI_ATTR_SRVRCTXT, errhp);
   OCIHandleAlloc((dvoid *)tpcenv, (dvoid **)&tpcusr, OCI_HTYPE_SESSION, 0 , (dvoid
**)0);
   OCIAttrSet((dvoid *)tpcusr, OCI_HTYPE_SESSION, (dvoid *)uid,
(ub4)strlen(uid),OCI_ATTR_USERNAME, errhp);
   OCIAttrSet((dvoid *)tpcusr, OCI_HTYPE_SESSION, (dvoid *)pwd, (ub4)strlen(pwd),
      OCI_ATTR_PASSWORD, errhp);
   OCIERROR(errhp, OCISessionBegin(tpcsvc, errhp, tpcusr, OCI_CRED_RDBMS,
OCI_DEFAULT));

   OCIAttrSet(tpcsvc, OCI_HTYPE_SVCCTX, tpcusr, 0, OCI_ATTR_USERCTXT, errhp);

#ifdef SQL_TRACE
   /* Turn on the SQL_TRACE */
   OCIHandleAlloc(tpcenv, (dvoid **)&curi, OCI_HTYPE_STMT, 0, &xmem);
   sprintf ((char *) stmbuf, SQLTXT1);
   OCIStmtPrepare(curi, errhp, stmbuf, strlen((char *)stmbuf), OCI_NTV_SYNTAX,
OCI_DEFAULT);
   OCIERROR(errhp, OCIStmtExecute(tpcsvc, curi, errhp,1,0,0,0,OCI_DEFAULT));
   OCIHandleFree((dvoid *)curi, OCI_HTYPE_STMT);
#endif /* End SQL_TRACE */

   sctx = (stoctx *)malloc(sizeof(stoctx));
   memset(sctx,(char)0,sizeof(stoctx));
   sctx->norow = 0;

   OCIERROR(errhp,
      OCIHandleAlloc(tpcenv,(dvoid**)&sctx->curs,OCI_HTYPE_STMT,0,(dvoid**)0));
   sprintf ((char *) stmbuf, SQLTXT);
   OCIERROR(errhp,OCIStmtPrepare(sctx->curs,errhp,stmbuf,strlen((char *)stmbuf),
  OCI_NTV_SYNTAX,OCI_DEFAULT));
   OCIERROR(errhp,
      OCIAttrSet(sctx->curs,OCI_HTYPE_STM,(dvoid*)&sctx->norow,0,
                 OCI_ATTR_PREFETCH_ROWS,errhp));

   /* bind variables */

   OCIBND(sctx->curs,sctx->w_id_bp,errhp, ":w_id", ADR(w_id),sizeof(int),
          SQLT_INT);
   OCIBND(sctx->curs,sctx->d_id_bp,errhp, ":d_id", ADR(d_id),sizeof(int),
      SQLT_INT);
   OCIBND(sctx->curs,sctx->threshold_bp,errhp, ":threshold", ADR(threshold),
      sizeof(int),SQLT_INT);
   OCIDEFINE(sctx->curs,sctx->low_stock_bp,errhp, 1, ADR(low_stock),
      sizeof(int), SQLT_INT);

#ifdef TKPROF
EXEC SQL ALTER SESSION SET SQL_TRACE = TRUE;
#endif

/*proc_stat_msg("init_stock_tx()\n");
proc_stat(); */

return(0);

/*****************************
 * END BLOCK OF COMMON CODE
 *****************************/
}


/*
 * Function: do stocklevel transaction
 * Input is the stocklevel structure. Output is low_stock field
 */
stocklevel_tx(rqst)
TPSVCINFO *rqst;
{

int err, execstatus,errcode;
        struct stock_inf *stocklevel_p;
        stocklevel_p = (struct stock_inf *)(rqst->data);

MOVETO(w_id, stocklevel_p);
MOVETO(d_id, stocklevel_p);
MOVETO(threshold, stocklevel_p);

/*****************************
 * BEGIN BLOCK OF COMMON CODE
 *****************************/

tx_count++;
retry:
  execstatus=OCIStmtExecute(tpcsvc,sctx->curs,errhp,1,0,0,0,OCI_COMMIT_ON_SUCCESS);
  if (execstatus != OCI_SUCCESS)
     {
         OCITransRollback(tpcsvc,errhp,OCI_DEFAULT);
         errcode = OCIERROR(errhp,execstatus);
         if(errcode == NOT_SERIALIZABLE) {
             goto retry;
         } else if (errcode == RECOVERR) {
             goto retry;
         } else {
           return -1;
         }
     }

/*****************************
 * END BLOCK OF COMMON CODE
 *****************************/

MOVEBACK(low_stock, stocklevel_p);
        tpreturn(TPSUCCESS, 0, rqst->data, sizeof(struct stock_inf), 0);
return(0);
}


void
cleanup(code)
{
   /* log off */

   OCIHandleFree((dvoid *)tpcusr, OCI_HTYPE_SESSION);
   OCIHandleFree((dvoid *)tpcsvc, OCI_HTYPE_SVCCTX);
   OCIHandleFree((dvoid *)errhp, OCI_HTYPE_ERROR);
   OCIHandleFree((dvoid *)tpcsrv, OCI_HTYPE_SERVER);
   OCIHandleFree((dvoid *)tpcenv, OCI_HTYPE_ENV);

if (sctx) free (sctx);
    if (my_qid >= 0)
        msgctl(my_qid, IPC_RMID, 0);
    userlog("Stock %d: Exiting\n", my_id);
    exit(code);
}

/* Tuxedo */
tpsvrinit(argc, argv)
char **argv;
{
        return(init_stock_tx());                /* Prepare transaction */
}

void
tpsvrdone()
{
}


STOCK(rqst)
TPSVCINFO *rqst;
{
        stocklevel_tx(rqst);
}
```

tuxserver/tpcc_srv_util.c

```
/*
 * Copyright (c) 1995 by Sun Microsystems, Inc.
 */

#pragma ident "@(#)tpcso_srv_util.c1.1797/01/02SMI"

/*+=================================================================+
 |        Copyright (c) 1995  Oracle Corp, Redwood Shores, CA       |
 |                    OPEN SYSTEMS PERFORMANCE GROUP                |
 |                         All Rights Reserved                      |
 +=================================================================*/
/* Common utility functions used by all tpcso_srv* programs */

#include <stdio.h>
#include <sys/types.h>
#include <sys/file.h>

#include "ora_oci.h"
#include "ora_err.h"

FILE  *vopen(fnam,mode)
char  *fnam;
char  *mode;
{
FILE *fd;

#ifdef  DEBUG
```

```
  fprintf(stderr, "tkvuopen() fnam: %s,   mode: %s\n", fnam, mode);
#endif

    fd = fopen((char *)fnam,(char *)mode);
    if (!fd){
        fprintf(stderr," fopen on %s failed %d\n",fnam,fd);
        exit(-1);
    }
    return(fd);
}


int sqlfile(fnam,linebuf)
char   *fnam;
text   *linebuf;
{
FILE *fd;
int nulpt = 0;

#ifdef  DEBUG
  fprintf(stderr, "sqlfile() fnam: %s,  linebuf: %#x\n", fnam, linebuf);
#endif

    fd = vopen(fnam,"r");
    while (fgets((char *)linebuf+nulpt, SQL_BUF_SIZE,fd))
    {
        nulpt = strlen((char *)linebuf);
    }
    return(nulpt);
}


void vgetdate (unsigned char *oradt)
{
 struct tm *loctime;
 time_t  int_time;

 struct ORADATE {
 unsigned charcentury;
 unsigned charyear;
 unsigned charmonth;
 unsigned charday;
 unsigned charhour;
 unsigned charminute;
 unsigned charsecond;
 } Date;
int century;
int cnvrtOK;

/* assume convert is successful */
cnvrtOK = 1;

/* get the current date and time as an integer */
time( &int_time);

/* Convert the current date and time into local time */
loctime = localtime( &int_time);

century = (1900+loctime->tm_year) / 100;

Date.century = (unsigned char)(century + 100);
if (Date.century < 119 || Date.century > 120) cnvrtOK = 0;
Date.year  = (unsigned char)(loctime->tm_year+100);
if (Date.year < 100 || Date.year > 199) cnvrtOK = 0;
Date.month = (unsigned char)(loctime->tm_mon + 1);
if (Date.month < 1 || Date.month > 12) cnvrtOK = 0;
Date.day   = (unsigned char)loctime->tm_mday;
if (Date.day < 1 || Date.day > 31) cnvrtOK = 0;
Date.hour  = (unsigned char)(loctime->tm_hour + 1);
if (Date.hour < 1 || Date.hour > 24) cnvrtOK = 0;
Date.minute= (unsigned char)(loctime->tm_min + 1);
if (Date.minute < 1 || Date.minute > 60) cnvrtOK = 0;
Date.second= (unsigned char)(loctime->tm_sec + 1);
if (Date.second < 1 || Date.second > 60) cnvrtOK = 0;


if (cnvrtOK)
  memcpy(oradt,&Date,7);
  else
    *oradt = '\0';

 return;

}


void cvtdmy (unsigned char *oradt, char *outdate)
{

        struct ORADATE {
                unsigned char   century;
                unsigned char   year;
                unsigned char   month;
                unsigned char   day;
                unsigned char   hour;
                unsigned char   minute;
                unsigned char   second;
        } Date;


        int day,month,year;

        memcpy(&Date,oradt,7);

        year = (Date.century-100)*100 + Date.year-100;
        month = Date.month;
        day = Date.day;
        sprintf(outdate,"%02d-%02d-%4d",day,month,year);

        return;
}

void cvtdmyhms (unsigned char *oradt, char *outdate)
{

        struct ORADATE {
                unsigned char   century;
                unsigned char   year;
                unsigned char   month;
                unsigned char   day;
                unsigned char   hour;
                unsigned char   minute;
                unsigned char   second;
        } Date;


        int day,month,year;
        int hour,min,sec;

        memcpy(&Date,oradt,7);

        year = (Date.century-100)*100 + Date.year-100;
        month = Date.month;
        day = Date.day;
        hour = Date.hour - 1;
        min = Date.minute - 1;
        sec = Date.second - 1;

        sprintf(outdate,"%02d-%02d-%4d %02d:%02d:%02d",
                        day,month,year,hour,min,sec);

        return;
}
```

tuxserver/blocks/initpay.sql

```
CREATE OR REPLACE PACKAGE initpay
AS
 TYPE rowidarray IS TABLE OF ROWID INDEX BY BINARY_INTEGER;
 row_id                  rowidarray;
 cust_rowid              ROWID;
 dist_name               VARCHAR2(11);
 ware_name               VARCHAR2(11);
 c_num                   BINARY_INTEGER;
 PROCEDURE pay_init;
END initpay;
/
CREATE OR REPLACE PACKAGE BODY initpay AS
  PROCEDURE pay_init IS
  BEGIN
    NULL;
  END pay_init;
END initpay;
/
exit
```

tuxserver/blocks/paynz.sql

```
DECLARE /* paynz */
--      cust_rowid              ROWID;
--      dist_name               VARCHAR2(11);
--      ware_name               VARCHAR2(11);
      not_serializable        EXCEPTION;
      PRAGMA EXCEPTION_INIT(not_serializable,-8177);
      deadlock                EXCEPTION;
      PRAGMA EXCEPTION_INIT(deadlock,-60);
      snapshot_too_old        EXCEPTION;
      PRAGMA EXCEPTION_INIT(snapshot_too_old,-1555);
   BEGIN
      LOOP BEGIN
            UPDATE warehouse
               SET w_ytd = w_ytd + :h_amount
             WHERE w_id = :w_id
         RETURNING w_name, w_street_1, w_street_2, w_city, w_state, w_zip
              INTO initpay.ware_name, :w_street_1, :w_street_2, :w_city,
                   :w_state, :w_zip;

           UPDATE  customer
              SET  c_balance = c_balance - :h_amount,
                   c_ytd_payment = c_ytd_payment + :h_amount,
                   c_payment_cnt = c_payment_cnt+1
            WHERE   c_id = :c_id AND c_d_id = :c_d_id AND
                   c_w_id = :c_w_id
         RETURNING rowid, c_first, c_middle, c_last, c_street_1,
                   c_street_2, c_city, c_state, c_zip, c_phone,
                   c_since, c_credit, c_credit_lim,
                   c_discount, c_balance
              INTO initpay.cust_rowid,:c_first, :c_middle, :c_last, :c_street_1,
                   :c_street_2, :c_city, :c_state, :c_zip, :c_phone,
                   :c_since, :c_credit, :c_credit_lim,
                   :c_discount, :c_balance;
           IF SQL%NOTFOUND THEN
             raise NO_DATA_FOUND;
           END IF;


--         :c_data := ' ';

         IF :c_credit = 'BC' THEN
           UPDATE customer
      SET c_data= substr ((to_char (:c_id) || ' ' ||
                                   to_char (:c_d_id) || ' ' ||
                                   to_char (:c_w_id) || ' ' ||
                                   to_char (:d_id) || ' ' ||
                                   to_char (:w_id) || ' ' ||
                                   to_char (:h_amount, '9999.99') || ' | ')
                                   || c_data, 1, 500)
            WHERE rowid = initpay.cust_rowid
```

```
        RETURNING substr(c_data,1, 200)
             INTO :c_data;

        END IF;

           UPDATE district
              SET d_ytd = d_ytd + :h_amount
            WHERE d_id = :d_id
              AND d_w_id = :w_id
        RETURNING d_name, d_street_1, d_street_2, d_city,d_state, d_zip
             INTO initpay.dist_name,:d_street_1,:d_street_2,:d_city,:d_state,
                  :d_zip;
         IF SQL%NOTFOUND THEN
           raise NO_DATA_FOUND;
         END IF;


        INSERT INTO history  (h_c_id, h_c_d_id, h_c_w_id, h_d_id, h_w_id,
                              h_amount, h_date, h_data)
        VALUES
           (:c_id, :c_d_id, :c_w_id, :d_id, :w_id, :h_amount,
            :cr_date, initpay.ware_name || '    ' || initpay.dist_name);
--         COMMIT;
--         :h_date := to_char (:cr_date, 'DD-MM-YYYY.HH24:MI:SS');
        EXIT;

        EXCEPTION
           WHEN not_serializable OR deadlock OR snapshot_too_old THEN
              ROLLBACK;
              :retry := :retry + 1;
        END;

     END LOOP;
  END;
```

tuxserver/blocks/paynz_abort.sql

```
DECLARE /* paynz */
--      cust_rowid              ROWID;
--      dist_name               VARCHAR2(11);
--      ware_name               VARCHAR2(11);
      not_serializable         EXCEPTION;
      PRAGMA EXCEPTION_INIT(not_serializable,-8177);
      deadlock                 EXCEPTION;
      PRAGMA EXCEPTION_INIT(deadlock,-60);
      snapshot_too_old         EXCEPTION;
      PRAGMA EXCEPTION_INIT(snapshot_too_old,-1555);
   BEGIN
      LOOP BEGIN
           UPDATE warehouse
              SET w_ytd = w_ytd + :h_amount
            WHERE w_id = :w_id
        RETURNING w_name, w_street_1, w_street_2, w_city, w_state, w_zip
             INTO pay.ware_name, :w_street_1, :w_street_2, :w_city, :w_state,
                  :w_zip;

          UPDATE  customer
             SET  c_balance = c_balance - :h_amount,
                  c_ytd_payment = c_ytd_payment + :h_amount,
                  c_payment_cnt = c_payment_cnt+1
           WHERE    c_id = :c_id AND c_d_id = :c_d_id AND
                    c_w_id = :c_w_id
        RETURNING rowid, c_first, c_middle, c_last, c_street_1,
                  c_street_2, c_city, c_state, c_zip, c_phone,
                  c_since, c_credit, c_credit_lim,
                  c_discount, c_balance
             INTO pay.cust_rowid,:c_first, :c_middle, :c_last, :c_street_1,
                  :c_street_2, :c_city, :c_state, :c_zip, :c_phone,
                  :c_since, :c_credit, :c_credit_lim,
                  :c_discount, :c_balance;

--         :c_data := ' ';

        IF :c_credit = 'BC' THEN
           UPDATE customer
      SET c_data= substr ((to_char (:c_id) || ' ' ||
                                   to_char (:c_d_id) || ' ' ||
                                   to_char (:c_w_id) || ' ' ||
                                   to_char (:d_id) || ' ' ||
                                   to_char (:w_id) || ' ' ||
                                   to_char (:h_amount, '9999.99') || ' | ')
                                   || c_data, 1, 500)
            WHERE rowid = pay.cust_rowid
        RETURNING substr(c_data,1, 200)
             INTO :c_data;

        END IF;

           UPDATE district
              SET d_ytd = d_ytd + :h_amount
            WHERE d_id = :d_id
              AND d_w_id = :w_id
        RETURNING d_name, d_street_1, d_street_2, d_city,d_state, d_zip
             INTO pay.dist_name,:d_street_1,:d_street_2,:d_city,:d_state,
                  :d_zip;

        INSERT INTO history  (h_c_id, h_c_d_id, h_c_w_id, h_d_id, h_w_id,
                              h_amount, h_date, h_data)
        VALUES
           (:c_id, :c_d_id, :c_w_id, :d_id, :w_id, :h_amount,
            :cr_date, pay.ware_name || '    ' || pay.dist_name);
        ROLLBACK;
--         :h_date := to_char (:cr_date, 'DD-MM-YYYY.HH24:MI:SS');
        EXIT;

        EXCEPTION
           WHEN not_serializable OR deadlock OR snapshot_too_old THEN
              ROLLBACK;
              :retry := :retry + 1;
        END;
     END LOOP;
  END;
```

tuxserver/blocks/payz.sql

```
DECLARE /* payz */
      not_serializable         EXCEPTION;
      PRAGMA EXCEPTION_INIT(not_serializable,-8177);
      deadlock                 EXCEPTION;
      PRAGMA EXCEPTION_INIT(deadlock,-60);
      snapshot_too_old         EXCEPTION;
      PRAGMA EXCEPTION_INIT(snapshot_too_old,-1555);
   BEGIN
      LOOP BEGIN
         UPDATE warehouse
            SET w_ytd = w_ytd+:h_amount
            WHERE w_id = :w_id
            RETURNING w_name,
                      w_street_1, w_street_2, w_city, w_state, w_zip
              INTO initpay.ware_name,
                   :w_street_1, :w_street_2, :w_city, :w_state, :w_zip;


--Bulk fetch
         SELECT rowid
         BULK COLLECT INTO initpay.row_id
         FROM customer
         WHERE c_d_id = :c_d_id AND c_w_id = :c_w_id AND c_last = :c_last
         ORDER BY c_last, c_d_id, c_w_id, c_first;

--Store number of rows processed
       initpay.c_num := sql%rowcount;
       initpay.cust_rowid := initpay.row_id((initpay.c_num) / 2);

         UPDATE customer
           SET c_balance = c_balance - :h_amount,
               c_ytd_payment = c_ytd_payment+ :h_amount,
               c_payment_cnt = c_payment_cnt+1
         WHERE rowid = initpay.cust_rowid
         RETURNING
                c_id, c_first, c_middle, c_last, c_street_1, c_street_2,
                c_city, c_state, c_zip, c_phone,
                c_since, c_credit, c_credit_lim,
                c_discount, c_balance
             INTO :c_id, :c_first, :c_middle, :c_last,
                  :c_street_1, :c_street_2, :c_city, :c_state,
                  :c_zip, :c_phone, :c_since, :c_credit,
                  :c_credit_lim, :c_discount, :c_balance;

         :c_data := ' ';
         IF :c_credit = 'BC' THEN
            UPDATE customer
              SET c_data = substr ((to_char (:c_id) || ' ' ||
                                    to_char (:c_d_id) || ' ' ||
                                    to_char (:c_w_id) || ' ' ||
                                    to_char (:d_id) || ' ' ||
                                    to_char (:w_id) || ' ' ||
                                    to_char (:h_amount/100, '9999.99') || ' | ')
                                    || c_data, 1, 500)
              WHERE rowid = initpay.cust_rowid
              RETURNING substr(c_data,1, 200)
              INTO :c_data;

         END IF;

         UPDATE district
            SET d_ytd = d_ytd+:h_amount
            WHERE d_id = :d_id
              AND d_w_id = :w_id
            RETURNING  d_name, d_street_1, d_street_2, d_city,
         d_state, d_zip
            INTO initpay.dist_name, :d_street_1, :d_street_2, :d_city,
                 :d_state, :d_zip;

         INSERT INTO history (h_c_id, h_c_d_id, h_c_w_id, h_d_id, h_w_id,
                              h_amount, h_date, h_data)
             VALUES (:c_id, :c_d_id, :c_w_id, :d_id, :w_id, :h_amount,
             :cr_date, initpay.ware_name || '    ' || initpay.dist_name);

--Sanjay-No commit needed iff Commit on Success done
--         COMMIT;
         EXIT;

         EXCEPTION
            WHEN not_serializable OR deadlock OR snapshot_too_old THEN
               ROLLBACK;
               :retry := :retry + 1;
            END;

      END LOOP;
   END;
```

tuxserver/blocks/payz_abort.sql

```
DECLARE /* payz */
--      TYPE rowidarray IS TABLE OF ROWID INDEX BY BINARY_INTEGER;
--      cust_rowid              ROWID;
--      dist_name               VARCHAR2(11);
--      ware_name               VARCHAR2(11);
--      c_num                   BINARY_INTEGER;
--      row_id                  rowidarray;
      not_serializable         EXCEPTION;
      PRAGMA EXCEPTION_INIT(not_serializable,-8177);
      deadlock                 EXCEPTION;
      PRAGMA EXCEPTION_INIT(deadlock,-60);
      snapshot_too_old         EXCEPTION;
```

```
     PRAGMA EXCEPTION_INIT(snapshot_too_old,-1555);
     CURSOR c_cur IS
        SELECT rowid
        FROM customer
        WHERE c_d_id = :c_d_id AND c_w_id = :c_w_id AND c_last = :c_last
        ORDER BY c_w_id, c_d_id, c_last, c_first;
  BEGIN
     LOOP BEGIN
        UPDATE warehouse
           SET w_ytd = w_ytd+:h_amount
           WHERE w_id = :w_id
           RETURNING w_name,
                     w_street_1, w_street_2, w_city, w_state, w_zip
             INTO pay.ware_name,
                  :w_street_1, :w_street_2, :w_city, :w_state, :w_zip;


        pay.c_num := 0;
        FOR c_id_rec IN c_cur LOOP
           pay.c_num := pay.c_num + 1;
           pay.row_id(pay.c_num) := c_id_rec.rowid;
        END LOOP;
        pay.cust_rowid := pay.row_id ((pay.c_num + 1) / 2);

       UPDATE customer
         SET c_balance = c_balance - :h_amount,
             c_ytd_payment = c_ytd_payment+ :h_amount,
             c_payment_cnt = c_payment_cnt+1
        WHERE rowid = pay.cust_rowid
        RETURNING
                c_id, c_first, c_middle, c_last, c_street_1, c_street_2,
                c_city, c_state, c_zip, c_phone,
                c_since, c_credit, c_credit_lim,
                c_discount, c_balance
           INTO :c_id, :c_first, :c_middle, :c_last,
                :c_street_1, :c_street_2, :c_city, :c_state,
                :c_zip, :c_phone, :c_since, :c_credit,
                :c_credit_lim, :c_discount, :c_balance;

        :c_data := ' ';
        IF :c_credit = 'BC' THEN
           UPDATE customer
             SET c_data = substr ((to_char (:c_id) || ' ' ||
                                   to_char (:c_d_id) || ' ' ||
                                   to_char (:c_w_id) || ' ' ||
                                   to_char (:d_id) || ' ' ||
                                   to_char (:w_id) || ' ' ||
                                   to_char (:h_amount/100, '9999.99') || ' | ')
                                   || c_data, 1, 500)
              WHERE rowid = pay.cust_rowid
              RETURNING substr(c_data,1, 200)
              INTO :c_data;

        END IF;

        UPDATE district
           SET d_ytd = d_ytd+:h_amount
           WHERE d_id = :d_id
             AND d_w_id = :w_id
           RETURNING  d_name, d_street_1, d_street_2, d_city,
        d_state, d_zip
           INTO pay.dist_name, :d_street_1, :d_street_2, :d_city,
                :d_state, :d_zip;

        INSERT INTO history (h_c_id, h_c_d_id, h_c_w_id, h_d_id, h_w_id,
                             h_amount, h_date, h_data)
            VALUES (:c_id, :c_d_id, :c_w_id, :d_id, :w_id, :h_amount,
            :cr_date, pay.ware_name || '    ' || pay.dist_name);
        ROLLBACK;
--        :h_date := to_char (:cr_date, 'DD-MM-YYYY.HH24:MI:SS');
        EXIT;

        EXCEPTION
           WHEN not_serializable OR deadlock OR snapshot_too_old THEN
              ROLLBACK;
              :retry := :retry + 1;
        END;

     END LOOP;
  END;
```

tuxserver/blocks/tkvcbnew.sql

```
 DECLARE   /* new order */
     not_serializable         EXCEPTION;
     PRAGMA EXCEPTION_INIT(not_serializable,-8177);
     deadlock                 EXCEPTION;
     PRAGMA EXCEPTION_INIT(deadlock,-60);
     snapshot_too_old         EXCEPTION;
     PRAGMA EXCEPTION_INIT(snapshot_too_old,-1555);
  BEGIN
     LOOP BEGIN
        SELECT c_discount, c_last, c_credit
          INTO :c_discount, :c_last, :c_credit
          FROM customer
         WHERE c_id = :c_id
           AND c_d_id = :d_id
           AND c_w_id = :w_id;

        UPDATE wh_dist SET d_next_o_id = d_next_o_id + 1, d_tax=d_tax+0
         WHERE  d_id = :d_id
           AND  w_id = :w_id
         RETURNING d_tax, d_next_o_id-1, w_tax
          INTO :d_tax, :o_id, :w_tax;

        INSERT INTO new_order  (no_o_id, no_d_id, no_w_id)
            VALUES (:o_id , :d_id, :w_id);
        INSERT INTO orders (o_id, o_w_id, o_d_id, o_c_id, o_carrier_id,
                            o_ol_cnt, o_all_local,o_entry_d)
            VALUES (:o_id, :w_id, :d_id, :c_id, 11,
                        :o_ol_cnt, :o_all_local, :cr_date);
        EXIT;

        EXCEPTION
           WHEN not_serializable OR deadlock OR snapshot_too_old THEN
              ROLLBACK;
              :retry := :retry + 1;
        END;
     END LOOP;
  END;
```

tuxserver/blocks/tkvcinin.sql

```
-- The initnew package for storing variables used in the
-- New Order anonymous block

CREATE OR REPLACE PACKAGE initnew
AS
 TYPE intarray IS TABLE OF INTEGER index by binary_integer;
 TYPE distarray IS TABLE OF VARCHAR(24) index by binary_integer;
 nulldate       DATE;
 s_distdistarray;
 idx1arrintarray;
 s_remoteintarray;
 PROCEDURE new_init(idxarr intarray);
END initnew;
/
show errors;

CREATE OR REPLACE PACKAGE BODY initnew AS
  PROCEDURE new_init (idxarr  intarray)
  IS
  BEGIN
        -- initialize null date
   nulldate := TO_DATE('09-15-1811', 'MM-DD-YYYY');
    idx1arr := idxarr;
  END new_init;
END initnew;
/
show errors
exit
```

tuxserver/blocks/tkvcpnew.sql

```
-- New Order Anonymous block

  DECLARE
      idx                     BINARY_INTEGER;
      dummy_local             BINARY_INTEGER;
      not_serializable        EXCEPTION;
      PRAGMA EXCEPTION_INIT(not_serializable,-8177);
      deadlock                EXCEPTION;
      PRAGMA EXCEPTION_INIT(deadlock,-60);
      snapshot_too_old        EXCEPTION;
      PRAGMA EXCEPTION_INIT(snapshot_too_old,-1555);
   PROCEDURE u1 IS
   BEGIN
         FORALL idx IN 1 .. :o_ol_cnt
          UPDATE stock_item
          SET s_order_cnt = s_order_cnt + 1,
          s_ytd = s_ytd + :ol_quantity(idx),
          s_remote_cnt = s_remote_cnt + :s_remote(idx),
          s_quantity = s_quantity - :ol_quantity(idx) +
                       DECODE(sign(s_quantity - :ol_quantity(idx) -
10),-1,91,0)
          WHERE i_id = :ol_i_id(idx)
          AND s_w_id = :ol_supply_w_id(idx)
          RETURNING i_price, i_name, s_quantity, s_dist_01,
  DECODE (instr(i_data,'original'), 0, 'G',
                       DECODE(instr(s_data,'original'), 0, 'G', 'B'))
 BULK COLLECT INTO :i_price, :i_name, :s_quantity, initnew.s_dist,
:brand_generic;

   END u1;

   PROCEDURE u2 IS
   BEGIN
         FORALL idx IN 1 .. :o_ol_cnt
          UPDATE stock_item
          SET s_order_cnt = s_order_cnt + 1,
          s_ytd = s_ytd + :ol_quantity(idx),
          s_remote_cnt = s_remote_cnt + :s_remote(idx),
          s_quantity = s_quantity - :ol_quantity(idx) +
                       DECODE(sign(s_quantity - :ol_quantity(idx) -
10),-1,91,0)
          WHERE i_id = :ol_i_id(idx)
          AND s_w_id = :ol_supply_w_id(idx)
          RETURNING i_price, i_name, s_quantity, s_dist_02,
  DECODE (instr(i_data,'original'), 0, 'G',
                       DECODE(instr(s_data,'original'), 0, 'G', 'B'))
 BULK COLLECT INTO :i_price, :i_name, :s_quantity, initnew.s_dist,
                           :brand_generic;
   END u2;

   PROCEDURE u3 IS
   BEGIN
         FORALL idx IN 1 .. :o_ol_cnt
          UPDATE stock_item
          SET s_order_cnt = s_order_cnt + 1,
          s_ytd = s_ytd + :ol_quantity(idx),
          s_remote_cnt = s_remote_cnt + :s_remote(idx),
          s_quantity = s_quantity - :ol_quantity(idx) +
                       DECODE(sign(s_quantity - :ol_quantity(idx) -
10),-1,91,0)
          WHERE i_id = :ol_i_id(idx)
```

```
         AND s_w_id = :ol_supply_w_id(idx)
         RETURNING i_price, i_name, s_quantity, s_dist_03,
  DECODE (instr(i_data,'original'), 0, 'G',
                     DECODE(instr(s_data,'original'), 0, 'G', 'B'))
 BULK COLLECT INTO :i_price, :i_name, :s_quantity, initnew.s_dist,
                          :brand_generic;
   END u3;

   PROCEDURE u4 IS
   BEGIN
         FORALL idx IN 1 .. :o_ol_cnt
          UPDATE stock_item
          SET s_order_cnt = s_order_cnt + 1,
          s_ytd = s_ytd + :ol_quantity(idx),
          s_remote_cnt = s_remote_cnt + :s_remote(idx),
          s_quantity = s_quantity - :ol_quantity(idx) +
                       DECODE(sign(s_quantity - :ol_quantity(idx) -
10),-1,91,0)
          WHERE i_id = :ol_i_id(idx)
          AND s_w_id = :ol_supply_w_id(idx)
          RETURNING i_price, i_name, s_quantity, s_dist_04,
  DECODE (instr(i_data,'original'), 0, 'G',
                     DECODE(instr(s_data,'original'), 0, 'G', 'B'))
 BULK COLLECT INTO :i_price, :i_name, :s_quantity, initnew.s_dist,
                          :brand_generic;
   END u4;

   PROCEDURE u5 IS
   BEGIN
         FORALL idx IN 1 .. :o_ol_cnt
          UPDATE stock_item
          SET s_order_cnt = s_order_cnt + 1,
          s_ytd = s_ytd + :ol_quantity(idx),
          s_remote_cnt = s_remote_cnt + :s_remote(idx),
          s_quantity = s_quantity - :ol_quantity(idx) +
                       DECODE(sign(s_quantity - :ol_quantity(idx) -
10),-1,91,0)
          WHERE i_id = :ol_i_id(idx)
          AND s_w_id = :ol_supply_w_id(idx)
          RETURNING i_price, i_name, s_quantity, s_dist_05,
  DECODE (instr(i_data,'original'), 0, 'G',
                     DECODE(instr(s_data,'original'), 0, 'G', 'B'))
 BULK COLLECT INTO :i_price, :i_name, :s_quantity, initnew.s_dist,
                          :brand_generic;
   END u5;

   PROCEDURE u6 IS
   BEGIN
         FORALL idx IN 1 .. :o_ol_cnt
          UPDATE stock_item
          SET s_order_cnt = s_order_cnt + 1,
          s_ytd = s_ytd + :ol_quantity(idx),
          s_remote_cnt = s_remote_cnt + :s_remote(idx),
          s_quantity = s_quantity - :ol_quantity(idx) +
                       DECODE(sign(s_quantity - :ol_quantity(idx) -
10),-1,91,0)
          WHERE i_id = :ol_i_id(idx)
          AND s_w_id = :ol_supply_w_id(idx)
          RETURNING i_price, i_name, s_quantity, s_dist_06,
  DECODE (instr(i_data,'original'), 0, 'G',
                     DECODE(instr(s_data,'original'), 0, 'G', 'B'))
 BULK COLLECT INTO :i_price, :i_name, :s_quantity, initnew.s_dist,
                          :brand_generic;
   END u6;

   PROCEDURE u7 IS
   BEGIN
         FORALL idx IN 1 .. :o_ol_cnt
          UPDATE stock_item
          SET s_order_cnt = s_order_cnt + 1,
          s_ytd = s_ytd + :ol_quantity(idx),
          s_remote_cnt = s_remote_cnt + :s_remote(idx),
          s_quantity = s_quantity - :ol_quantity(idx) +
                       DECODE(sign(s_quantity - :ol_quantity(idx) -
10),-1,91,0)
          WHERE i_id = :ol_i_id(idx)
          AND s_w_id = :ol_supply_w_id(idx)
          RETURNING i_price, i_name, s_quantity, s_dist_07,
  DECODE (instr(i_data,'original'), 0, 'G',
                     DECODE(instr(s_data,'original'), 0, 'G', 'B'))
 BULK COLLECT INTO :i_price, :i_name, :s_quantity, initnew.s_dist,
                          :brand_generic;
   END u7;

   PROCEDURE u8 IS
   BEGIN
         FORALL idx IN 1 .. :o_ol_cnt
          UPDATE stock_item
          SET s_order_cnt = s_order_cnt + 1,
          s_ytd = s_ytd + :ol_quantity(idx),
          s_remote_cnt = s_remote_cnt + :s_remote(idx),
          s_quantity = s_quantity - :ol_quantity(idx) +
                       DECODE(sign(s_quantity - :ol_quantity(idx) -
10),-1,91,0)
          WHERE i_id = :ol_i_id(idx)
          AND s_w_id = :ol_supply_w_id(idx)
          RETURNING i_price, i_name, s_quantity, s_dist_08,
  DECODE (instr(i_data,'original'), 0, 'G',
                     DECODE(instr(s_data,'original'), 0, 'G', 'B'))
 BULK COLLECT INTO :i_price, :i_name, :s_quantity, initnew.s_dist,
                          :brand_generic;
   END u8;

   PROCEDURE u9 IS
   BEGIN
         FORALL idx IN 1 .. :o_ol_cnt
          UPDATE stock_item
          SET s_order_cnt = s_order_cnt + 1,
          s_ytd = s_ytd + :ol_quantity(idx),
          s_remote_cnt = s_remote_cnt + :s_remote(idx),
          s_quantity = s_quantity - :ol_quantity(idx) +
                       DECODE(sign(s_quantity - :ol_quantity(idx) -
10),-1,91,0)
          WHERE i_id = :ol_i_id(idx)
          AND s_w_id = :ol_supply_w_id(idx)
          RETURNING i_price, i_name, s_quantity, s_dist_09,
  DECODE (instr(i_data,'original'), 0, 'G',
                     DECODE(instr(s_data,'original'), 0, 'G', 'B'))
 BULK COLLECT INTO :i_price, :i_name, :s_quantity, initnew.s_dist,
                          :brand_generic;
   END u9;

   PROCEDURE u10 IS
   BEGIN
         FORALL idx IN 1 .. :o_ol_cnt
          UPDATE stock_item
          SET s_order_cnt = s_order_cnt + 1,
          s_ytd = s_ytd + :ol_quantity(idx),
          s_remote_cnt = s_remote_cnt + :s_remote(idx),
          s_quantity = s_quantity - :ol_quantity(idx) +
                       DECODE(sign(s_quantity - :ol_quantity(idx) -
10),-1,91,0)
          WHERE i_id = :ol_i_id(idx)
          AND s_w_id = :ol_supply_w_id(idx)
          RETURNING i_price, i_name, s_quantity, s_dist_10,
  DECODE (instr(i_data,'original'), 0, 'G',
                     DECODE(instr(s_data,'original'), 0, 'G', 'B'))
 BULK COLLECT INTO :i_price, :i_name, :s_quantity, initnew.s_dist,
                          :brand_generic;
   END u10;

   PROCEDURE fix_items IS
     rows_lost                    BINARY_INTEGER;
     max_index                    BINARY_INTEGER;
     temp_index                   BINARY_INTEGER;
   BEGIN
-- gotta shift price, name, s_quantity, brand_generic, s_dist, ol_amount
         idx := 1;
-- found 0 bad rows
         rows_lost := 0;
-- so many rows in out array to begin with
max_index := sql%rowcount;

         WHILE (max_index != :o_ol_cnt) LOOP

-- find item where item ids dont match
  WHILE (idx <= sql%rowcount AND
                sql%bulk_rowcount(idx + rows_lost) = 1)
           LOOP
    idx := idx + 1;
           END LOOP;

-- shift the items please
           temp_index := max_index;
           WHILE (temp_index >= idx + rows_lost) LOOP
     :i_price(temp_index + 1)       :=  :i_price(temp_index);
           :i_name(temp_index + 1)        :=  :i_name(temp_index);
     :s_quantity(temp_index + 1)    :=  :s_quantity(temp_index);
            initnew.s_dist(temp_index + 1) :=  initnew.s_dist(temp_index);
     :brand_generic(temp_index + 1) :=  :brand_generic(temp_index);
     temp_index := temp_index - 1;
           END LOOP;

--  values for the non-existent items if not at end
          IF (idx + rows_lost <= :o_ol_cnt) THEN
    :i_price(idx + rows_lost)     :=   0;
    :i_name(idx + rows_lost)      :=   NULL;
           :s_quantity(idx + rows_lost)  :=   0;
           initnew.s_dist(idx + rows_lost) := NULL;
           :brand_generic(idx + rows_lost) := NULL;

--  one more bad row
           rows_lost := rows_lost + 1;
           max_index := max_index + 1;
   END IF;

        END LOOP;
   END fix_items;

   BEGIN
      LOOP BEGIN
         UPDATE district SET d_next_o_id = d_next_o_id + 1
          WHERE d_id = :d_id AND  d_w_id = :w_id
          RETURNING d_tax, d_next_o_id-1
          INTO :d_tax, :o_id;

         SELECT c_discount, c_last, c_credit, w_tax
          INTO :c_discount, :c_last, :c_credit , :w_tax
          FROM customer , warehouse
          WHERE c_id = :c_id AND c_d_id = :d_id AND c_w_id = :w_id
          AND  w_id = :w_id;


         INSERT INTO new_order (no_o_id, no_d_id, no_w_id)
          VALUES (:o_id, :d_id, :w_id);
          INSERT INTO orders  (o_id,o_d_id, o_w_id, o_c_id, o_entry_d,
                               o_carrier_id, o_ol_cnt, o_all_local)
          VALUES (:o_id, :d_id, :w_id, :c_id,
                  :cr_date, 11, :o_ol_cnt, :o_all_local);

         dummy_local :=  :d_id;

         IF (dummy_local = 1) THEN u1; END IF;

         IF (dummy_local = 2) THEN u2; END IF;

         IF (dummy_local = 3) THEN u3; END IF;

         IF (dummy_local = 4) THEN u4; END IF;

         IF (dummy_local = 5) THEN u5; END IF;

         IF (dummy_local = 6) THEN u6; END IF;

         IF (dummy_local = 7) THEN u7; END IF;

         IF (dummy_local = 8) THEN u8; END IF;
```

```
         IF (dummy_local = 9) THEN u9; END IF;

         IF (dummy_local = 10) THEN u10; END IF;

         dummy_local := sql%rowcount;


-- fix the rows if necessary
         IF (dummy_local != :o_ol_cnt )  THEN fix_items; END IF;

-- calculate ol_amount

        FOR idx IN 1 ..:o_ol_cnt LOOP
         :ol_amount(idx):=:ol_quantity(idx)*:i_price(idx);
        END LOOP;

        FORALL idx IN 1..:o_ol_cnt
         INSERT INTO order_line
            (ol_o_id, ol_d_id, ol_w_id, ol_number, ol_delivery_d, ol_i_id,
                  ol_supply_w_id, ol_quantity,ol_amount,ol_dist_info)
         VALUES (:o_id, :d_id, :w_id, initnew.idx1arr(idx), initnew.nulldate,
                 :ol_i_id(idx), :ol_supply_w_id(idx),
         :ol_quantity(idx), :ol_amount(idx), initnew.s_dist(idx));

IF (dummy_local != :o_ol_cnt) THEN
           :o_ol_cnt := dummy_local;
           ROLLBACK;
        END IF;

        EXIT;

        EXCEPTION
           WHEN not_serializable OR deadlock OR snapshot_too_old THEN
               ROLLBACK;
               :retry := :retry + 1;
         END;
      END LOOP;
   END;
```

tuxserver/blocks/views.sql

```
create or replace view wh_cust
(w_id, w_tax, c_id, c_d_id, c_w_id, c_discount, c_last, c_credit)
as select w.w_id, w.w_tax,
          c.c_id, c.c_d_id, c.c_w_id, c.c_discount, c.c_last, c.c_credit
   from customer c, warehouse w
   where w.w_id = c.c_w_id
/

create or replace view wh_dist
(w_id, d_id, d_tax, d_next_o_id, w_tax )
as select w.w_id, d.d_id, d.d_tax, d.d_next_o_id, w.w_tax
   from district d, warehouse w
   where w.w_id = d.d_w_id
/

create  or replace view stock_item
(i_id, s_w_id, i_price, i_name, i_data, s_data, s_quantity,
 s_order_cnt, s_ytd, s_remote_cnt,
 s_dist_01, s_dist_02, s_dist_03, s_dist_04, s_dist_05,
 s_dist_06, s_dist_07, s_dist_08, s_dist_09, s_dist_10)
as
 select i.i_id, s_w_id, i.i_price, i.i_name, i.i_data, s_data, s_quantity,
 s_order_cnt, s_ytd, s_remote_cnt,
 s_dist_01, s_dist_02, s_dist_03, s_dist_04, s_dist_05,
 s_dist_06, s_dist_07, s_dist_08, s_dist_09, s_dist_10
  from stock s, item i
 where i.i_id = s.s_i_id
/
exit
```

Appendix B. Database Design

blocks/initpay.sql

```
CREATE OR REPLACE PACKAGE initpay
AS
 TYPE rowidarray IS TABLE OF ROWID INDEX BY BINARY_INTEGER;
 row_id                  rowidarray;
 cust_rowid              ROWID;
 dist_name               VARCHAR2(11);
 ware_name               VARCHAR2(11);
 c_num                   BINARY_INTEGER;
 PROCEDURE pay_init;
END initpay;
/
CREATE OR REPLACE PACKAGE BODY initpay AS
  PROCEDURE pay_init IS
  BEGIN
    NULL;
  END pay_init;
END initpay;
/
exit
```

blocks/tkvcinin.sql

```
-- The initnew package for storing variables used in the
-- New Order anonymous block

CREATE OR REPLACE PACKAGE initnew
AS
 TYPE intarray IS TABLE OF INTEGER index by binary_integer;
 TYPE distarray IS TABLE OF VARCHAR(24) index by binary_integer;
 nulldate       DATE;
 s_distdistarray;
 idx1arrintarray;
 s_remoteintarray;
 PROCEDURE new_init(idxarr intarray);
END initnew;
/
show errors;

CREATE OR REPLACE PACKAGE BODY initnew AS
  PROCEDURE new_init (idxarr  intarray)
  IS
  BEGIN
        -- initialize null date
   nulldate := TO_DATE('09-15-1811', 'MM-DD-YYYY');
    idx1arr := idxarr;
  END new_init;
END initnew;
/
show errors
exit
```

blocks/views.sql

```
create or replace view wh_cust
(w_id, w_tax, c_id, c_d_id, c_w_id, c_discount, c_last, c_credit)
as select w.w_id, w.w_tax,
          c.c_id, c.c_d_id, c.c_w_id, c.c_discount, c.c_last, c.c_credit
   from customer c, warehouse w
   where w.w_id = c.c_w_id
/

create or replace view wh_dist
(w_id, d_id, d_tax, d_next_o_id, w_tax )
as select w.w_id, d.d_id, d.d_tax, d.d_next_o_id, w.w_tax
   from district d, warehouse w
   where w.w_id = d.d_w_id
/

create  or replace view stock_item
(i_id, s_w_id, i_price, i_name, i_data, s_data, s_quantity,
 s_order_cnt, s_ytd, s_remote_cnt,
 s_dist_01, s_dist_02, s_dist_03, s_dist_04, s_dist_05,
 s_dist_06, s_dist_07, s_dist_08, s_dist_09, s_dist_10)
as
 select i.i_id, s_w_id, i.i_price, i.i_name, i.i_data, s_data, s_quantity,
 s_order_cnt, s_ytd, s_remote_cnt,
 s_dist_01, s_dist_02, s_dist_03, s_dist_04, s_dist_05,
 s_dist_06, s_dist_07, s_dist_08, s_dist_09, s_dist_10
  from stock s, item i
 where i.i_id = s.s_i_id
/
exit
```

build_dir/addallfiles.sh

```
#!/bin/ksh
#


BENCH_HOME=$ORACLE_HOME/bench/tpc
TPCC_ADMIN=$ORACLE_HOME/bench/tpc/tpcc/scripts/9600w/admin
#
#Add datafiles to tablespaces in parallel
#

crts_hist.sh > crts_hist.out 2>&1 &
wait
crts_cust.sh > crts_cust.out 2>&1 &
wait
crts_stk.sh > crts_stk.out 2>&1 &
wait

crts_ord.sh > crts_ord.out 2>&1 &
crts_ord1.sh > crts_ord1.out 2>&1 &
wait

crts_nord.sh > crts_nord.out 2>&1 &
crts_icust1.sh > crts_icust1.out 2>&1 &
crts_icust2.sh > crts_icust2.out 2>&1 &
wait

crts_istk.sh > crts_istk.out 2>&1 &
crts_iord1.sh > crts_iord1.out 2>&1 &
crts_iord2.sh > crts_iord2.out 2>&1 &
wait

crts_temp.sh > crts_temp.out 2>&1 &
wait
```

build_dir/addfile.sh

```
#
# $Header: addfile.sh 7030100.1 96/05/02 10:30:04 plai Generic<base> $ Copyr (c) 1995
Oracle
#

#============================================================+
#        Copyright (c) 1996  Oracle Corp, Redwood Shores, CA       |
#                   OPEN SYSTEMS PERFORMANCE GROUP                 |
#                        All Rights Reserved                       |
#============================================================+
# FILENAME
#     addfile.sh
# DESCRIPTION
#     Add datafile to a tablespace.
# USAGE
#     addfile.sh <tablespace> <data file> <size>
#============================================================*/

FILE=`basename $2`

if [ -d ./outdir ]
then
   echo `date` > ./outdir/${FILE}.addf
fi

svrmgrl <<!
   connect internal
   alter tablespace $1 add datafile '$2' size $3 reuse;
   exit;
!

if [ -d ./outdir ]
then
   echo `date` >> ./outdir/${FILE}.addf
fi
```

build_dir/alter_temp.sh

```
#!/bin/ksh


BUILD_HOME=$ORACLE_HOME/bench/tpc/tpcc/scripts/9600w/
BENCH_HOME=$ORACLE_HOME/bench/tpc
BENCH_GEN=$ORACLE_HOME/bench/gen
GEN_SQL=$BUILD_HOME/sql
TPCC_SOURCE=$BENCH_HOME/tpcc/source
TPCC_SQL=$BUILD_HOME/sql
TPCC_STORE=$BENCH_HOME/tpcc/stored_proc
TPCC_BLOCKS=$BENCH_HOME/tpcc/blocks
TPCC_SCRIPTS=$BENCH_HOME/tpcc/scripts
TPCC_UTILS=$BUILD_HOME/utils
AUDIT_SQL=$BENCH_HOME/tpcc/audit/sql
BUILD_SQL=sql
LOAD_SCRIPTS=${BUILD_HOME}
OUTDIR=${BUILD_HOME}/outdir
STEP=0
START=0
END=0
CONTINUE=1
PROGNAME=$0
MULT=9600

PATH=${PATH}:${TPCC_SOURCE}:${TPCC_UTILS}
export PATH


sqlplus system/manager <<!
   alter user tpcc temporary tablespace temp;
   quit;
!

svrmgrl <<!
   connect internal
   alter tablespace temp
      default storage (initial 100M next 100M pctincrease 0);
   exit;
```

```
!
```

build_dir/benchdb.sh

```
#!/bin/ksh

#
#============================================================+
#        Copyright (c) 1997  Oracle Corp, Redwood Shores, CA       |
#                    OPEN SYSTEMS PERFORMANCE GROUP                |
#                         All Rights Reserved                      |
#============================================================+
# FILENAME
#      benchdb.sh
# DESCRIPTION
#      Usage: benchdb.sh [options]
#             -n           do not create new tpcc database
#             -c           do not run catalog scripts
#============================================================
#


BENCH_HOME=$ORACLE_HOME/bench/tpc
TPCC_ADMIN=$ORACLE_HOME/bench/tpc/tpcc/scripts/9600w/admin

while [ "$#" != "0" ]
do
   case $1 in
       -n) shift
           NO_CREATE="y"
           ;;
       -c) shift
           NO_CAT="y"
           ;;
        *) echo "Bad arg: $1"
           exit 1;
           ;;
   esac
done


#
# Create database if NO_CREATE unset
#

if [ "$NO_CREATE" = "" ]
then
svrmgrl <<!
        set echo on
        connect internal
        startup  pfile=$TPCC_ADMIN/p_create.ora  nomount
        create database tpcc controlfile reuse maxdatafiles 1023
            datafile '?/dbs/tpcc_disks/sys1' size 2047M reuse
            logfile  '?/dbs/tpcc_disks/logt1' size 1023M reuse,
                     '?/dbs/tpcc_disks/logt2' size 1023M reuse;
        exit
!


#
# Create more rollback segments
#

svrmgrl <<!
   connect system/manager
   create rollback segment s1  storage (initial 200k minextents 2 next 200k);
   create rollback segment s2  storage (initial 200k minextents 2 next 200k);
   create rollback segment s3  storage (initial 200k minextents 2 next 200k);
   create rollback segment s4  storage (initial 200k minextents 2 next 200k);
   create rollback segment s5  storage (initial 200k minextents 2 next 200k);
   create rollback segment s6  storage (initial 200k minextents 2 next 200k);
   create rollback segment s7  storage (initial 200k minextents 2 next 200k);
   create rollback segment s8  storage (initial 200k minextents 2 next 200k);
   create rollback segment s9  storage (initial 200k minextents 2 next 200k);
   create rollback segment s10 storage (initial 200k minextents 2 next 200k);
   create rollback segment s11 storage (initial 200k minextents 2 next 200k);
   create rollback segment s12 storage (initial 200k minextents 2 next 200k);
   create rollback segment s13 storage (initial 200k minextents 2 next 200k);
   create rollback segment s14 storage (initial 200k minextents 2 next 200k);
   create rollback segment s15 storage (initial 200k minextents 2 next 200k);
   create rollback segment s16 storage (initial 200k minextents 2 next 200k);
   create rollback segment s17 storage (initial 200k minextents 2 next 200k);
   create rollback segment s18 storage (initial 200k minextents 2 next 200k);
   create rollback segment s19 storage (initial 200k minextents 2 next 200k);
   create rollback segment s20 storage (initial 200k minextents 2 next 200k);
   create rollback segment s21 storage (initial 200k minextents 2 next 200k);
   create rollback segment s22 storage (initial 200k minextents 2 next 200k);
   create rollback segment s23 storage (initial 200k minextents 2 next 200k);
   create rollback segment s24 storage (initial 200k minextents 2 next 200k);
   create rollback segment s25 storage (initial 200k minextents 2 next 200k);
   create rollback segment s26 storage (initial 200k minextents 2 next 200k);
   create rollback segment s27 storage (initial 200k minextents 2 next 200k);
   create rollback segment s28 storage (initial 200k minextents 2 next 200k);
   create rollback segment s29 storage (initial 200k minextents 2 next 200k);
   create rollback segment s30 storage (initial 200k minextents 2 next 200k);
   disconnect;
   connect internal;
   shutdown;
   exit;
!
fi


#
#  Startup database with params file that includes new rollback segments
#
svrmgrl <<!
        connect internal
        startup pfile=$TPCC_ADMIN/p_build.ora;
        exit;
!

svrmgrl <<!
        connect system/manager
        create tablespace roll datafile
           '?/dbs/tpcc_disks/roll1' size 2047M reuse;
        create tablespace ware datafile
           '?/dbs/tpcc_disks/ware1' size 1023M reuse;
        create tablespace items datafile
           '?/dbs/tpcc_disks/item1' size 19M reuse;
        exit;
!


#
#Add datafiles to tablespaces in parallel
#

crts_hist.sh > crts_hist.out 2>&1 &
crts_cust.sh > crts_cust.out 2>&1 &
wait

crts_stk.sh > crts_stk.out 2>&1 &
wait

crts_ord.sh > crts_ord.out 2>&1 &
crts_ordl.sh > crts_ordl.out 2>&1 &
crts_nord.sh > crts_nord.out 2>&1 &
wait

crts_icust1.sh > crts_icust1.out 2>&1 &
crts_icust2.sh > crts_icust2.out 2>&1 &
crts_istk.sh > crts_istk.out 2>&1 &
crts_iord1.sh > crts_iord1.out 2>&1 &
crts_iord2.sh > crts_iord2.out 2>&1 &
wait

crts_temp.sh > crts_temp.out 2>&1 &
wait




#
# run catalog if NO_CAT unset
#

if [ "$NO_CAT" = "" ]
then
svrmgrl <<!
        set echo off;
        connect sys/change_on_install;
        @?/rdbms/admin/catalog;
        @?/rdbms/admin/catproc;
        @?/rdbms/admin/catparr;
        exit;
!
fi
```

build_dir/benchsetup.sh

```
#!/bin/ksh

#
#
#============================================================+
#        Copyright (c) 1998  Oracle Corp, Redwood Shores, CA       |
#                    OPEN SYSTEMS PERFORMANCE GROUP                |
#                         All Rights Reserved                      |
#============================================================+
# NAME
#      benchsetup
# DESCRIPTION
#      Usage: benchsetup.sh [options]
#============================================================
#

BUILD_HOME=$ORACLE_HOME/bench/tpc/tpcc/scripts/9600w/
BENCH_HOME=$ORACLE_HOME/bench/tpc
BENCH_GEN=$ORACLE_HOME/bench/gen
GEN_SQL=$BUILD_HOME/sql
TPCC_SOURCE=$BENCH_HOME/tpcc/source
TPCC_SQL=$BUILD_HOME/sql
TPCC_STORE=$BENCH_HOME/tpcc/stored_proc
TPCC_BLOCKS=$BENCH_HOME/tpcc/blocks
TPCC_SCRIPTS=$BENCH_HOME/tpcc/scripts
TPCC_UTILS=$BUILD_HOME/utils
AUDIT_SQL=$BENCH_HOME/tpcc/audit/sql
BUILD_SQL=sql
LOAD_SCRIPTS=${BUILD_HOME}
OUTDIR=${BUILD_HOME}/outdir
STEP=0
START=0
END=0
CONTINUE=1
PROGNAME=$0
MULT=9600

PATH=${PATH}:${TPCC_SOURCE}:${TPCC_UTILS}
export PATH


function usage {
   echo ""
  echo "Usage:        $PROGNAME [<start> <stop>] [<start>] [-step <stepno>]"
   echo "       [<start> <stop>]         - allows user to run a specified"
   echo "                                  range of steps."
```

```
   echo "      [<start>]               - runs from step number <start> till"
   echo "                                the end of the script."
   echo "      [-step <stepno>]        - runs only step number <stepno> and"
   echo "                                then stops."
   echo ""
   echo "               STEP    FUNCTION"
   echo "-------------------------------------------------------------"
   echo "               0       Create DB."
   echo "               1       Create user tpcc."
   echo "               2       Create warehouse table."
   echo "               3       Create district table."
   echo "               4       Create history table."
   echo "               5       Create Orders table."
   echo "               6       Create New-order table."
   echo "               7       Create Orderline table."
   echo "               8       Create Item table."
   echo "               9       Create Customer table."
   echo "               10      Create Stock table."
   echo "               11      Load New-order."
   echo "               12      Load History."
   echo "               13      Load Order/Orderline."
   echo "               14      Load Warehouse."
   echo "               15      Load District."
   echo "               16      Load Item."
   echo "               17      Load Customer."
   echo "               18      Load Stock"
   echo "               19      Alter temp space."
   echo "               20      Create Warehouse index."
   echo "               21      Create District index."
   echo "               22      Create Item index."
   echo "               23      Create Customer index."
   echo "               24      Create Customer2 index."
   echo "               25      Create Stock index."
   echo "               26      Create Orders index."
   echo "               27      Create Orders2 index."
   echo "               28      Create New-order index."
   echo "               29      Create Orderline index."
   echo "               30      Re-alter temp space."
   echo "               31      Analyze."
   echo "               32      Create TPC-C reports tables."
   echo "               33      Create stored procs."
   echo "               34      Space rpts / etc."
   echo "               35      Alter extents and Lock tables."
   echo "               36      Run catalog scripts."
   echo "               37      Shutdown database."
   echo "-------------------------------------------------------------"

   exit 1;
}

function runnable {
  if [ -a "./stop" ]
  then
    exit 1;
  fi
  if [ $STEP -ge $START ]
  then
    if [ $STEP -le $END ]
    then
        STEP=`expr $STEP + 1`;
        return 0;
    else
        if [ $CONTINUE = 0 ]
        then
           STEP=`expr $STEP + 1`;
           return 0;
        fi
    fi
  fi
  STEP=`expr $STEP + 1`;
  return 1;
}

case $# in
        0)      usage
                CONTINUE=0
                ;;
        1)      case $1 in
                        -h)     usage
                                ;;
                        *)      START=$1
                                CONTINUE=0
                                ;;
                esac
                ;;
        2)      case $1 in
                        -step)  shift
                                START=$1
                                END=$1
                                CONTINUE=1
                                ;;
                        *)      START=$1
                                shift
                                END=$1
                                CONTINUE=1
                                ;;
                esac
                ;;
        *)      usage
                ;;
esac

if [ ! -d $BUILD_HOME ]
then
   mkdir $BUILD_HOME
fi

if [ ! -d $LOAD_SCRIPTS ]
then
   mkdir $LOAD_SCRIPTS
fi

if [ ! -d $OUTDIR ]
then
   mkdir $OUTDIR
fi

if runnable
then
${LOAD_SCRIPTS}/benchdb.sh > ${OUTDIR}/benchdb.out 2>&1
  echo "Switching Logs ..."
  ${TPCC_UTILS}/switchlog.sh >> ${OUTDIR}/switchlog.out 2>&1
fi


if runnable
then
${LOAD_SCRIPTS}/create_user.sh > ${OUTDIR}/create_user.out 2>&1
fi

if runnable
then
${LOAD_SCRIPTS}/create_ware.sh > ${OUTDIR}/create_ware.out 2>&1
fi

if runnable
then
${LOAD_SCRIPTS}/create_dist.sh > ${OUTDIR}/create_dist.out 2>&1
fi

if runnable
then
${LOAD_SCRIPTS}/create_hist.sh > ${OUTDIR}/create_hist.out 2>&1
fi

if runnable
then
${LOAD_SCRIPTS}/create_ordr.sh > ${OUTDIR}/create_ordr.out 2>&1
fi

if runnable
then
${LOAD_SCRIPTS}/create_nord.sh > ${OUTDIR}/create_nord.out 2>&1
fi

if runnable
then
${LOAD_SCRIPTS}/create_ordl.sh > ${OUTDIR}/create_ordl.out 2>&1
fi

if runnable
then
${LOAD_SCRIPTS}/create_item.sh > ${OUTDIR}/create_item.out 2>&1
fi

if runnable
then
${LOAD_SCRIPTS}/create_cust.sh > ${OUTDIR}/create_cust.out 2>&1 &
fi

if runnable
then
${LOAD_SCRIPTS}/create_stok.sh > ${OUTDIR}/create_stok.out 2>&1 &
fi

wait

echo "Switching Logs ..."
${TPCC_UTILS}/switchlog.sh >> ${OUTDIR}/switchlog.out 2>&1

if runnable
then
${LOAD_SCRIPTS}/load_nord.sh > ${OUTDIR}/load_nord.out 2>&1
fi

if runnable
then
${LOAD_SCRIPTS}/load_hist.sh > ${OUTDIR}/load_hist.out 2>&1
fi

if runnable
then
${LOAD_SCRIPTS}/load_ordr.sh > ${OUTDIR}/load_ordr.out 2>&1
fi

echo "Switching Logs ..."
${TPCC_UTILS}/switchlog.sh >> ${OUTDIR}/switchlog.out 2>&1

if runnable
then
${LOAD_SCRIPTS}/load_ware.sh > ${OUTDIR}/load_ware.out 2>&1
fi

if runnable
then
${LOAD_SCRIPTS}/load_dist.sh > ${OUTDIR}/load_dist.out 2>&1
fi

if runnable
then
${LOAD_SCRIPTS}/load_item.sh > ${OUTDIR}/load_item.out 2>&1
fi

if runnable
then
${LOAD_SCRIPTS}/load_cust.sh > ${OUTDIR}/load_cust.out 2>&1 &
fi

if runnable
then
${LOAD_SCRIPTS}/load_stok.sh > ${OUTDIR}/load_stok.out 2>&1 &
fi

wait

echo "Switching Logs ..."
```

```
${TPCC_UTILS}/switchlog.sh >> ${OUTDIR}/switchlog.out 2>&1


if runnable
then
${LOAD_SCRIPTS}/alter_temp.sh > ${OUTDIR}/alter_temp.out 2>&1
fi

if runnable
then
${LOAD_SCRIPTS}/create_iware.sh > ${OUTDIR}/create_iware.out 2>&1
fi

if runnable
then
${LOAD_SCRIPTS}/create_idist.sh > ${OUTDIR}/create_idist.out 2>&1
fi

if runnable
then
${LOAD_SCRIPTS}/create_iitem.sh > ${OUTDIR}/create_iitem.out 2>&1
fi

if runnable
then
${LOAD_SCRIPTS}/create_icust.sh > ${OUTDIR}/create_icust.out 2>&1
fi

if runnable
then
${LOAD_SCRIPTS}/create_icust2.sh > ${OUTDIR}/create_icust2.out 2>&1
fi

if runnable
then
${LOAD_SCRIPTS}/create_istok.sh > ${OUTDIR}/create_istok.out 2>&1
fi

if runnable
then
${LOAD_SCRIPTS}/create_iordr.sh > ${OUTDIR}/create_iordr.out 2>&1
fi

if runnable
then
${LOAD_SCRIPTS}/create_iordr2.sh > ${OUTDIR}/create_iordr2.out 2>&1
fi

if runnable
then
${LOAD_SCRIPTS}/create_inord.sh > ${OUTDIR}/create_inord.out 2>&1
fi

if runnable
then
${LOAD_SCRIPTS}/create_iordl.sh > ${OUTDIR}/create_iordl.out 2>&1
fi

if runnable
then
${LOAD_SCRIPTS}/realter_temp.sh > ${OUTDIR}/realter_temp.out 2>&1
fi


if runnable
then
sqlplus tpcc/tpcc @$TPCC_SQL/tpcc_ana > ${OUTDIR}/tpcc_ana.out 2>&1
fi

if runnable
then
${LOAD_SCRIPTS}/tpcc_reports.sh > ${OUTDIR}/tpcc_reports.out 2>&1
fi

if runnable
then
${LOAD_SCRIPTS}/tpcc_stored_proc.sh > ${OUTDIR}/tpcc_stored_prod.out 2>&1
$TPCC_UTILS/create_cache_views.sh > ${OUTDIR}/create_cache_views.out 2>&1
fi

if runnable
then
${LOAD_SCRIPTS}/tpcc_misc.sh > ${OUTDIR}/tpcc_misc.out 2>&1
fi

if runnable
then
${LOAD_SCRIPTS}/alter.sh > ${OUTDIR}/alter.out 2>&1
${TPCC_UTILS}/dml.sh > ${OUTDIR}/dml.out 2>&1
fi

if runnable
then
${LOAD_SCRIPTS}/cat.sh > ${OUTDIR}/cat.out 2>&1
fi

if runnable
then
svrmgrl <<!
   connect internal;
   alter system switch logfile;
   alter system switch logfile;
   shutdown;
   exit;
!
fi
```

build_dir/cclust.sql

```
rem
rem ================================================================+
rem  CUSTOMER Table on CUST tablespace
rem   140 -  2G datafiles
rem    2010M extent each
rem ================================================================
rem


rem
rem DROP all first
rem
        drop cluster ccluster including tables;

set timing on

connect internal

alter rollback segment rollcclust offline;
drop rollback segment rollcclust;
create rollback segment rollcclust
tablespace roll
storage (initial 1M next 5M maxextents unlimited);
alter rollback segment rollcclust online;

connect tpcc/tpcc;
set transaction use rollback segment rollcclust;


rem
rem CUSTOMER cluster
rem

        create cluster ccluster (
            c_id         number,
            c_d_id       number,
            c_w_id       number
        )
singletable
        hashkeys        288000000
        hash is         ((c_id*96000) + (c_w_id*10) + c_d_id)
        size            850
        initrans        3
        pctfree         0
        tablespace      cust
        storage (buffer_pool recycle);

        exit;
```

build_dir/ccstok.sql

```
rem
rem ================================================================+
rem STOCK table and cluster created on STOCKS tablespace
rem  185 - 2G datafiles
rem   2029M extent per datafile
rem ================================================================
rem


rem
rem DROP all first
rem
        drop cluster scluster including tables;

set timing on
connect internal

alter rollback segment rollccstok offline;
drop rollback segment rollccstok;
create rollback segment rollccstok
tablespace roll
storage (initial 1M next 5M maxextents unlimited);
alter rollback segment rollccstok online;

connect tpcc/tpcc;
set transaction use rollback segment rollccstok;



rem
rem STOCK table
rem

        create cluster scluster (
           s_i_id       number,
           s_w_id       number
        )
singletable
        hashkeys        960000000
        hash is         (s_i_id * 9600 + s_w_id)
        size            350
        initrans        3
        pctfree         0
        tablespace      stocks
        storage (freelist groups 4 freelists 11
                 buffer_pool keep);

rem
rem done
rem

        exit;
```

build_dir/chks.sh

```
#!/bin/ksh

TLOAD=`which tpccload | grep "no tpccload in"`
ERRR=0
```

```
if [ "${TLOAD}" != "" ]
then
  echo "ERROR:tpccload not found."
  echo "SOLUTION:Go to source directory and compile tpccload.ott if"
  echo "necessary. Also make sure a link called 'tpccload'"
  echo "exists in the tpc/bin directory. Finally, check your"
  echo "path settings."
  ERRR=1
fi

if [ ! -e "${ORACLE_HOME}/rdbms/admin/standard.sql" ]
then
  echo "WARNING: Package STANDARD not found in rdbms/admin"
  echo "Copying plsql/admin to rdbms/admin ..."
  cp ${ORACLE_HOME}/plsql/admin/* ${ORACLE_HOME}/rdbms/admin
fi

TLOAD=`which oracle | grep "no oracle in"`
if [ "${TLOAD}" != "" ]
then
  echo "ERROR:Oracle executable not found."
  ERRR=1
fi

TLOAD=`which sqlplus | grep "no sqlplus in"`
if [ "${TLOAD}" != "" ]
then
  echo "ERROR:Sqlplus executable not found."
  ERRR=1
fi

TLOAD=`which sqlldr | grep "no sqlldr in"`
if [ "${TLOAD}" != "" ]
then
  echo "ERROR:Sqlldr executable not found."
  ERRR=1
fi

TLOAD=`which svrmgrl | grep "no svrmgrl in"`
if [ "${TLOAD}" != "" ]
then
  echo "ERROR:Svrmgrl executable not found."
  ERRR=1
fi

if [ ! -e "${ORACLE_HOME}/bench/tpc/tpcc/blocks/views.sql" ]
then
  echo "ERROR:tpcc/blocks/views.sql not found."
  ERRR=1
fi

if [ ! -e "${ORACLE_HOME}/bench/tpc/tpcc/blocks/initpay.sql" ]
then
  echo "ERROR:tpcc/blocks/initpay.sql not found."
  ERRR=1
fi

if [ $ERRR -eq 0 ]
then
  echo "You're clean."
fi
```

build_dir/crdf_overflow.sh

```
#=================================================================+
# FILENAME
#      crdf_overflow.sh
# DESCRIPTION
#      Add extra datafiles as needed for space requirements.
#=================================================================+


addfile.sh cust ?/dbs/tpcc_disks/cust141 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust142 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust143 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust144 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust145 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk186 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk187 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk188 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk189 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk190 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk191 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk192 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk193 2047M &
addfile.sh icust1 ?/dbs/tpcc_disks/icust1-5 2047M &
addfile.sh icust2 ?/dbs/tpcc_disks/icust2-9 2047M &
addfile.sh hist ?/dbs/tpcc_disks/hist11 2047M &

wait
```

build_dir/create_cclust.sh

```
#!/bin/ksh


BUILD_HOME=$ORACLE_HOME/bench/tpc/tpcc/scripts/build10/
BENCH_HOME=$ORACLE_HOME/bench/tpc
BENCH_GEN=$ORACLE_HOME/bench/gen
GEN_SQL=$BUILD_HOME/sql
TPCC_SOURCE=$BENCH_HOME/tpcc/source
TPCC_SQL=$BUILD_HOME/sql
TPCC_STORE=$BENCH_HOME/tpcc/stored_proc
TPCC_BLOCKS=$BENCH_HOME/tpcc/blocks
TPCC_SCRIPTS=$BENCH_HOME/tpcc/scripts
TPCC_UTILS=$BUILD_HOME/utils
AUDIT_SQL=$BENCH_HOME/tpcc/audit/sql
BUILD_SQL=sql
TPCC_LOADER=$BUILD_HOME/loader
LOAD_SCRIPTS=${BUILD_HOME}/scripts
OUTDIR=${BUILD_HOME}/outdir
LDIR=${BUILD_HOME}/data
STEP=0
START=0
END=0
CONTINUE=1
PROGNAME=$0
MULT=10

PATH=${PATH}:${TPCC_SOURCE}:${TPCC_UTILS}
export PATH

sqlplus tpcc/tpcc @cclust
```

build_dir/create_ccstok.sh

```
#!/bin/ksh


BUILD_HOME=$ORACLE_HOME/bench/tpc/tpcc/scripts/9600w/
BENCH_HOME=$ORACLE_HOME/bench/tpc
BENCH_GEN=$ORACLE_HOME/bench/gen
GEN_SQL=$BUILD_HOME/sql
TPCC_SOURCE=$BENCH_HOME/tpcc/source
TPCC_SQL=$BUILD_HOME/sql
TPCC_STORE=$BENCH_HOME/tpcc/stored_proc
TPCC_BLOCKS=$BENCH_HOME/tpcc/blocks
TPCC_SCRIPTS=$BENCH_HOME/tpcc/scripts
TPCC_UTILS=$BUILD_HOME/utils
AUDIT_SQL=$BENCH_HOME/tpcc/audit/sql
BUILD_SQL=sql
TPCC_LOADER=$BUILD_HOME/loader
LOAD_SCRIPTS=${BUILD_HOME}/scripts
OUTDIR=${BUILD_HOME}/outdir
LDIR=${BUILD_HOME}/data
STEP=0
START=0
END=0
CONTINUE=1
PROGNAME=$0
MULT=9600

PATH=${PATH}:${TPCC_SOURCE}:${TPCC_UTILS}
export PATH

sqlplus tpcc/tpcc @ccstok
```

build_dir/create_ctcust.sh

```
#!/bin/ksh


BUILD_HOME=$ORACLE_HOME/bench/tpc/tpcc/scripts/build10/
BENCH_HOME=$ORACLE_HOME/bench/tpc
BENCH_GEN=$ORACLE_HOME/bench/gen
GEN_SQL=$BUILD_HOME/sql
TPCC_SOURCE=$BENCH_HOME/tpcc/source
TPCC_SQL=$BUILD_HOME/sql
TPCC_STORE=$BENCH_HOME/tpcc/stored_proc
TPCC_BLOCKS=$BENCH_HOME/tpcc/blocks
TPCC_SCRIPTS=$BENCH_HOME/tpcc/scripts
TPCC_UTILS=$BUILD_HOME/utils
AUDIT_SQL=$BENCH_HOME/tpcc/audit/sql
BUILD_SQL=sql
TPCC_LOADER=$BUILD_HOME/loader
LOAD_SCRIPTS=${BUILD_HOME}/scripts
OUTDIR=${BUILD_HOME}/outdir
LDIR=${BUILD_HOME}/data
STEP=0
START=0
END=0
CONTINUE=1
PROGNAME=$0
MULT=10

PATH=${PATH}:${TPCC_SOURCE}:${TPCC_UTILS}
export PATH

sqlplus tpcc/tpcc @ctcust
```

build_dir/create_ctstok.sh

```
#!/bin/ksh


BUILD_HOME=$ORACLE_HOME/bench/tpc/tpcc/scripts/9600w/
BENCH_HOME=$ORACLE_HOME/bench/tpc
BENCH_GEN=$ORACLE_HOME/bench/gen
GEN_SQL=$BUILD_HOME/sql
TPCC_SOURCE=$BENCH_HOME/tpcc/source
TPCC_SQL=$BUILD_HOME/sql
TPCC_STORE=$BENCH_HOME/tpcc/stored_proc
TPCC_BLOCKS=$BENCH_HOME/tpcc/blocks
TPCC_SCRIPTS=$BENCH_HOME/tpcc/scripts
TPCC_UTILS=$BUILD_HOME/utils
AUDIT_SQL=$BENCH_HOME/tpcc/audit/sql
BUILD_SQL=sql
TPCC_LOADER=$BUILD_HOME/loader
```

```
LOAD_SCRIPTS=${BUILD_HOME}/scripts
OUTDIR=${BUILD_HOME}/outdir
LDIR=${BUILD_HOME}/data
STEP=0
START=0
END=0
CONTINUE=1
PROGNAME=$0
MULT=9600

PATH=${PATH}:${TPCC_SOURCE}:${TPCC_UTILS}
export PATH

sqlplus tpcc/tpcc @ctstok
```

build_dir/create_cust.sh

```
#!/bin/ksh


BUILD_HOME=$ORACLE_HOME/bench/tpc/tpcc/scripts/build10/
BENCH_HOME=$ORACLE_HOME/bench/tpc
BENCH_GEN=$ORACLE_HOME/bench/gen
GEN_SQL=$BUILD_HOME/sql
TPCC_SOURCE=$BENCH_HOME/tpcc/source
TPCC_SQL=$BUILD_HOME/sql
TPCC_STORE=$BENCH_HOME/tpcc/stored_proc
TPCC_BLOCKS=$BENCH_HOME/tpcc/blocks
TPCC_SCRIPTS=$BENCH_HOME/tpcc/scripts
TPCC_UTILS=$BUILD_HOME/utils
AUDIT_SQL=$BENCH_HOME/tpcc/audit/sql
BUILD_SQL=sql
TPCC_LOADER=$BUILD_HOME/loader
LOAD_SCRIPTS=${BUILD_HOME}/scripts
OUTDIR=${BUILD_HOME}/outdir
LDIR=${BUILD_HOME}/data
STEP=0
START=0
END=0
CONTINUE=1
PROGNAME=$0
MULT=10

PATH=${PATH}:${TPCC_SOURCE}:${TPCC_UTILS}
export PATH

sqlplus tpcc/tpcc @cust
```

build_dir/create_dist.sh

```
#!/bin/ksh


BUILD_HOME=$ORACLE_HOME/bench/tpc/tpcc/scripts/9600w/
BENCH_HOME=$ORACLE_HOME/bench/tpc
BENCH_GEN=$ORACLE_HOME/bench/gen
GEN_SQL=$BUILD_HOME/sql
TPCC_SOURCE=$BENCH_HOME/tpcc/source
TPCC_SQL=$BUILD_HOME/sql
TPCC_STORE=$BENCH_HOME/tpcc/stored_proc
TPCC_BLOCKS=$BENCH_HOME/tpcc/blocks
TPCC_SCRIPTS=$BENCH_HOME/tpcc/scripts
TPCC_UTILS=$BUILD_HOME/utils
AUDIT_SQL=$BENCH_HOME/tpcc/audit/sql
BUILD_SQL=sql
TPCC_LOADER=$BUILD_HOME/loader
LOAD_SCRIPTS=${BUILD_HOME}/scripts
OUTDIR=${BUILD_HOME}/outdir
LDIR=${BUILD_HOME}/data
STEP=0
START=0
END=0
CONTINUE=1
PROGNAME=$0
MULT=9600

PATH=${PATH}:${TPCC_SOURCE}:${TPCC_UTILS}
export PATH

sqlplus tpcc/tpcc @dist
```

build_dir/create_hist.sh

```
#!/bin/ksh


BUILD_HOME=$ORACLE_HOME/bench/tpc/tpcc/scripts/9600w/
BENCH_HOME=$ORACLE_HOME/bench/tpc
BENCH_GEN=$ORACLE_HOME/bench/gen
GEN_SQL=$BUILD_HOME/sql
TPCC_SOURCE=$BENCH_HOME/tpcc/source
TPCC_SQL=$BUILD_HOME/sql
TPCC_STORE=$BENCH_HOME/tpcc/stored_proc
TPCC_BLOCKS=$BENCH_HOME/tpcc/blocks
TPCC_SCRIPTS=$BENCH_HOME/tpcc/scripts
TPCC_UTILS=$BUILD_HOME/utils
AUDIT_SQL=$BENCH_HOME/tpcc/audit/sql
BUILD_SQL=sql
TPCC_LOADER=$BUILD_HOME/loader
LOAD_SCRIPTS=${BUILD_HOME}/scripts
OUTDIR=${BUILD_HOME}/outdir
LDIR=${BUILD_HOME}/data
STEP=0
START=0
END=0
CONTINUE=1
PROGNAME=$0
MULT=9600

PATH=${PATH}:${TPCC_SOURCE}:${TPCC_UTILS}
export PATH

sqlplus tpcc/tpcc @hist
```

build_dir/create_icust.sh

```
#!/bin/ksh


BUILD_HOME=$ORACLE_HOME/bench/tpc/tpcc/scripts/9600w/
BENCH_HOME=$ORACLE_HOME/bench/tpc
BENCH_GEN=$ORACLE_HOME/bench/gen
GEN_SQL=$BUILD_HOME/sql
TPCC_SOURCE=$BENCH_HOME/tpcc/source
TPCC_SQL=$BUILD_HOME/sql
TPCC_STORE=$BENCH_HOME/tpcc/stored_proc
TPCC_BLOCKS=$BENCH_HOME/tpcc/blocks
TPCC_SCRIPTS=$BENCH_HOME/tpcc/scripts
TPCC_UTILS=$BUILD_HOME/utils
AUDIT_SQL=$BENCH_HOME/tpcc/audit/sql
BUILD_SQL=sql
TPCC_LOADER=$BUILD_HOME/loader
LOAD_SCRIPTS=${BUILD_HOME}/scripts
OUTDIR=${BUILD_HOME}/outdir
LDIR=${BUILD_HOME}/data
STEP=0
START=0
END=0
CONTINUE=1
PROGNAME=$0
MULT=9600

PATH=${PATH}:${TPCC_SOURCE}:${TPCC_UTILS}
export PATH

sqlplus tpcc/tpcc @icust
```

build_dir/create_icust2.sh

```
#!/bin/ksh


BUILD_HOME=$ORACLE_HOME/bench/tpc/tpcc/scripts/9600w/
BENCH_HOME=$ORACLE_HOME/bench/tpc
BENCH_GEN=$ORACLE_HOME/bench/gen
GEN_SQL=$BUILD_HOME/sql
TPCC_SOURCE=$BENCH_HOME/tpcc/source
TPCC_SQL=$BUILD_HOME/sql
TPCC_STORE=$BENCH_HOME/tpcc/stored_proc
TPCC_BLOCKS=$BENCH_HOME/tpcc/blocks
TPCC_SCRIPTS=$BENCH_HOME/tpcc/scripts
TPCC_UTILS=$BUILD_HOME/utils
AUDIT_SQL=$BENCH_HOME/tpcc/audit/sql
BUILD_SQL=sql
TPCC_LOADER=$BUILD_HOME/loader
LOAD_SCRIPTS=${BUILD_HOME}/scripts
OUTDIR=${BUILD_HOME}/outdir
LDIR=${BUILD_HOME}/data
STEP=0
START=0
END=0
CONTINUE=1
PROGNAME=$0
MULT=9600

PATH=${PATH}:${TPCC_SOURCE}:${TPCC_UTILS}
export PATH

sqlplus tpcc/tpcc @icust2
```

build_dir/create_idist.sh

```
#!/bin/ksh


BUILD_HOME=$ORACLE_HOME/bench/tpc/tpcc/scripts/9600w/
BENCH_HOME=$ORACLE_HOME/bench/tpc
BENCH_GEN=$ORACLE_HOME/bench/gen
GEN_SQL=$BUILD_HOME/sql
TPCC_SOURCE=$BENCH_HOME/tpcc/source
TPCC_SQL=$BUILD_HOME/sql
TPCC_STORE=$BENCH_HOME/tpcc/stored_proc
TPCC_BLOCKS=$BENCH_HOME/tpcc/blocks
TPCC_SCRIPTS=$BENCH_HOME/tpcc/scripts
TPCC_UTILS=$BUILD_HOME/utils
AUDIT_SQL=$BENCH_HOME/tpcc/audit/sql
BUILD_SQL=sql
TPCC_LOADER=$BUILD_HOME/loader
LOAD_SCRIPTS=${BUILD_HOME}/scripts
OUTDIR=${BUILD_HOME}/outdir
LDIR=${BUILD_HOME}/data
STEP=0
START=0
END=0
CONTINUE=1
PROGNAME=$0
```

```
MULT=9600

PATH=${PATH}:${TPCC_SOURCE}:${TPCC_UTILS}
export PATH

sqlplus tpcc/tpcc @idist
```

build_dir/create_iitem.sh

```
#!/bin/ksh


BUILD_HOME=$ORACLE_HOME/bench/tpc/tpcc/scripts/9600w/
BENCH_HOME=$ORACLE_HOME/bench/tpc
BENCH_GEN=$ORACLE_HOME/bench/gen
GEN_SQL=$BUILD_HOME/sql
TPCC_SOURCE=$BENCH_HOME/tpcc/source
TPCC_SQL=$BUILD_HOME/sql
TPCC_STORE=$BENCH_HOME/tpcc/stored_proc
TPCC_BLOCKS=$BENCH_HOME/tpcc/blocks
TPCC_SCRIPTS=$BENCH_HOME/tpcc/scripts
TPCC_UTILS=$BUILD_HOME/utils
AUDIT_SQL=$BENCH_HOME/tpcc/audit/sql
BUILD_SQL=sql
TPCC_LOADER=$BUILD_HOME/loader
LOAD_SCRIPTS=${BUILD_HOME}/scripts
OUTDIR=${BUILD_HOME}/outdir
LDIR=${BUILD_HOME}/data
STEP=0
START=0
END=0
CONTINUE=1
PROGNAME=$0
MULT=9600

PATH=${PATH}:${TPCC_SOURCE}:${TPCC_UTILS}
export PATH

sqlplus tpcc/tpcc @iitem
```

build_dir/create_iordr.sh

```
#!/bin/ksh


BUILD_HOME=$ORACLE_HOME/bench/tpc/tpcc/scripts/9600w/
BENCH_HOME=$ORACLE_HOME/bench/tpc
BENCH_GEN=$ORACLE_HOME/bench/gen
GEN_SQL=$BUILD_HOME/sql
TPCC_SOURCE=$BENCH_HOME/tpcc/source
TPCC_SQL=$BUILD_HOME/sql
TPCC_STORE=$BENCH_HOME/tpcc/stored_proc
TPCC_BLOCKS=$BENCH_HOME/tpcc/blocks
TPCC_SCRIPTS=$BENCH_HOME/tpcc/scripts
TPCC_UTILS=$BUILD_HOME/utils
AUDIT_SQL=$BENCH_HOME/tpcc/audit/sql
BUILD_SQL=sql
TPCC_LOADER=$BUILD_HOME/loader
LOAD_SCRIPTS=${BUILD_HOME}/scripts
OUTDIR=${BUILD_HOME}/outdir
LDIR=${BUILD_HOME}/data
STEP=0
START=0
END=0
CONTINUE=1
PROGNAME=$0
MULT=9600

PATH=${PATH}:${TPCC_SOURCE}:${TPCC_UTILS}
export PATH

sqlplus tpcc/tpcc @iordr
```

build_dir/create_iordr2.sh

```
#!/bin/ksh


BUILD_HOME=$ORACLE_HOME/bench/tpc/tpcc/scripts/9600w/
BENCH_HOME=$ORACLE_HOME/bench/tpc
BENCH_GEN=$ORACLE_HOME/bench/gen
GEN_SQL=$BUILD_HOME/sql
TPCC_SOURCE=$BENCH_HOME/tpcc/source
TPCC_SQL=$BUILD_HOME/sql
TPCC_STORE=$BENCH_HOME/tpcc/stored_proc
TPCC_BLOCKS=$BENCH_HOME/tpcc/blocks
TPCC_SCRIPTS=$BENCH_HOME/tpcc/scripts
TPCC_UTILS=$BUILD_HOME/utils
AUDIT_SQL=$BENCH_HOME/tpcc/audit/sql
BUILD_SQL=sql
TPCC_LOADER=$BUILD_HOME/loader
LOAD_SCRIPTS=${BUILD_HOME}/scripts
OUTDIR=${BUILD_HOME}/outdir
LDIR=${BUILD_HOME}/data
STEP=0
START=0
END=0
CONTINUE=1
PROGNAME=$0
MULT=9600

PATH=${PATH}:${TPCC_SOURCE}:${TPCC_UTILS}
export PATH

sqlplus tpcc/tpcc @iordr2
```

build_dir/create_istok.sh

```
#!/bin/ksh


BUILD_HOME=$ORACLE_HOME/bench/tpc/tpcc/scripts/9600w/
BENCH_HOME=$ORACLE_HOME/bench/tpc
BENCH_GEN=$ORACLE_HOME/bench/gen
GEN_SQL=$BUILD_HOME/sql
TPCC_SOURCE=$BENCH_HOME/tpcc/source
TPCC_SQL=$BUILD_HOME/sql
TPCC_STORE=$BENCH_HOME/tpcc/stored_proc
TPCC_BLOCKS=$BENCH_HOME/tpcc/blocks
TPCC_SCRIPTS=$BENCH_HOME/tpcc/scripts
TPCC_UTILS=$BUILD_HOME/utils
AUDIT_SQL=$BENCH_HOME/tpcc/audit/sql
BUILD_SQL=sql
TPCC_LOADER=$BUILD_HOME/loader
LOAD_SCRIPTS=${BUILD_HOME}/scripts
OUTDIR=${BUILD_HOME}/outdir
LDIR=${BUILD_HOME}/data
STEP=0
START=0
END=0
CONTINUE=1
PROGNAME=$0
MULT=9600

PATH=${PATH}:${TPCC_SOURCE}:${TPCC_UTILS}
export PATH

sqlplus tpcc/tpcc @istok
```

build_dir/create_item.sh

```
#!/bin/ksh


BUILD_HOME=$ORACLE_HOME/bench/tpc/tpcc/scripts/9600w/
BENCH_HOME=$ORACLE_HOME/bench/tpc
BENCH_GEN=$ORACLE_HOME/bench/gen
GEN_SQL=$BUILD_HOME/sql
TPCC_SOURCE=$BENCH_HOME/tpcc/source
TPCC_SQL=$BUILD_HOME/sql
TPCC_STORE=$BENCH_HOME/tpcc/stored_proc
TPCC_BLOCKS=$BENCH_HOME/tpcc/blocks
TPCC_SCRIPTS=$BENCH_HOME/tpcc/scripts
TPCC_UTILS=$BUILD_HOME/utils
AUDIT_SQL=$BENCH_HOME/tpcc/audit/sql
BUILD_SQL=sql
TPCC_LOADER=$BUILD_HOME/loader
LOAD_SCRIPTS=${BUILD_HOME}/scripts
OUTDIR=${BUILD_HOME}/outdir
LDIR=${BUILD_HOME}/data
STEP=0
START=0
END=0
CONTINUE=1
PROGNAME=$0
MULT=9600

PATH=${PATH}:${TPCC_SOURCE}:${TPCC_UTILS}
export PATH

sqlplus tpcc/tpcc @item
```

build_dir/create_iware.sh

```
#!/bin/ksh


BUILD_HOME=$ORACLE_HOME/bench/tpc/tpcc/scripts/9600w/
BENCH_HOME=$ORACLE_HOME/bench/tpc
BENCH_GEN=$ORACLE_HOME/bench/gen
GEN_SQL=$BUILD_HOME/sql
TPCC_SOURCE=$BENCH_HOME/tpcc/source
TPCC_SQL=$BUILD_HOME/sql
TPCC_STORE=$BENCH_HOME/tpcc/stored_proc
TPCC_BLOCKS=$BENCH_HOME/tpcc/blocks
TPCC_SCRIPTS=$BENCH_HOME/tpcc/scripts
TPCC_UTILS=$BUILD_HOME/utils
AUDIT_SQL=$BENCH_HOME/tpcc/audit/sql
BUILD_SQL=sql
TPCC_LOADER=$BUILD_HOME/loader
LOAD_SCRIPTS=${BUILD_HOME}/scripts
OUTDIR=${BUILD_HOME}/outdir
LDIR=${BUILD_HOME}/data
STEP=0
START=0
END=0
CONTINUE=1
PROGNAME=$0
MULT=9600

PATH=${PATH}:${TPCC_SOURCE}:${TPCC_UTILS}
export PATH

sqlplus tpcc/tpcc @iware
```

build_dir/create_nord.sh

```
#!/bin/ksh


BUILD_HOME=$ORACLE_HOME/bench/tpc/tpcc/scripts/9600w/
BENCH_HOME=$ORACLE_HOME/bench/tpc
BENCH_GEN=$ORACLE_HOME/bench/gen
GEN_SQL=$BUILD_HOME/sql
TPCC_SOURCE=$BENCH_HOME/tpcc/source
TPCC_SQL=$BUILD_HOME/sql
TPCC_STORE=$BENCH_HOME/tpcc/stored_proc
TPCC_BLOCKS=$BENCH_HOME/tpcc/blocks
TPCC_SCRIPTS=$BENCH_HOME/tpcc/scripts
TPCC_UTILS=$BUILD_HOME/utils
AUDIT_SQL=$BENCH_HOME/tpcc/audit/sql
BUILD_SQL=sql
TPCC_LOADER=$BUILD_HOME/loader
LOAD_SCRIPTS=${BUILD_HOME}/scripts
OUTDIR=${BUILD_HOME}/outdir
LDIR=${BUILD_HOME}/data
STEP=0
START=0
END=0
CONTINUE=1
PROGNAME=$0
MULT=9600

PATH=${PATH}:${TPCC_SOURCE}:${TPCC_UTILS}
export PATH

sqlplus tpcc/tpcc @nord
```

build_dir/create_ordl.sh

```
#!/bin/ksh


BUILD_HOME=$ORACLE_HOME/bench/tpc/tpcc/scripts/5800w/
BENCH_HOME=$ORACLE_HOME/bench/tpc
BENCH_GEN=$ORACLE_HOME/bench/gen
GEN_SQL=$BUILD_HOME/sql
TPCC_SOURCE=$BENCH_HOME/tpcc/source
TPCC_SQL=$BUILD_HOME/sql
TPCC_STORE=$BENCH_HOME/tpcc/stored_proc
TPCC_BLOCKS=$BENCH_HOME/tpcc/blocks
TPCC_SCRIPTS=$BENCH_HOME/tpcc/scripts
TPCC_UTILS=$BUILD_HOME/utils
AUDIT_SQL=$BENCH_HOME/tpcc/audit/sql
BUILD_SQL=sql
TPCC_LOADER=$BUILD_HOME/loader
LOAD_SCRIPTS=${BUILD_HOME}/scripts
OUTDIR=${BUILD_HOME}/outdir
LDIR=${BUILD_HOME}/data
STEP=0
START=0
END=0
CONTINUE=1
PROGNAME=$0
MULT=5800

PATH=${PATH}:${TPCC_SOURCE}:${TPCC_UTILS}
export PATH

sqlplus tpcc/tpcc @ordl
```

build_dir/create_ordr.sh

```
#!/bin/ksh


BUILD_HOME=$ORACLE_HOME/bench/tpc/tpcc/scripts/5800w/
BENCH_HOME=$ORACLE_HOME/bench/tpc
BENCH_GEN=$ORACLE_HOME/bench/gen
GEN_SQL=$BUILD_HOME/sql
TPCC_SOURCE=$BENCH_HOME/tpcc/source
TPCC_SQL=$BUILD_HOME/sql
TPCC_STORE=$BENCH_HOME/tpcc/stored_proc
TPCC_BLOCKS=$BENCH_HOME/tpcc/blocks
TPCC_SCRIPTS=$BENCH_HOME/tpcc/scripts
TPCC_UTILS=$BUILD_HOME/utils
AUDIT_SQL=$BENCH_HOME/tpcc/audit/sql
BUILD_SQL=sql
TPCC_LOADER=$BUILD_HOME/loader
LOAD_SCRIPTS=${BUILD_HOME}/scripts
OUTDIR=${BUILD_HOME}/outdir
LDIR=${BUILD_HOME}/data
STEP=0
START=0
END=0
CONTINUE=1
PROGNAME=$0
MULT=5800

PATH=${PATH}:${TPCC_SOURCE}:${TPCC_UTILS}
export PATH

sqlplus tpcc/tpcc @ordr
```

build_dir/create_stok.sh

```
#!/bin/ksh


BUILD_HOME=$ORACLE_HOME/bench/tpc/tpcc/scripts/9600w/
BENCH_HOME=$ORACLE_HOME/bench/tpc
BENCH_GEN=$ORACLE_HOME/bench/gen
GEN_SQL=$BUILD_HOME/sql
TPCC_SOURCE=$BENCH_HOME/tpcc/source
TPCC_SQL=$BUILD_HOME/sql
TPCC_STORE=$BENCH_HOME/tpcc/stored_proc
TPCC_BLOCKS=$BENCH_HOME/tpcc/blocks
TPCC_SCRIPTS=$BENCH_HOME/tpcc/scripts
TPCC_UTILS=$BUILD_HOME/utils
AUDIT_SQL=$BENCH_HOME/tpcc/audit/sql
BUILD_SQL=sql
TPCC_LOADER=$BUILD_HOME/loader
LOAD_SCRIPTS=${BUILD_HOME}/scripts
OUTDIR=${BUILD_HOME}/outdir
LDIR=${BUILD_HOME}/data
STEP=0
START=0
END=0
CONTINUE=1
PROGNAME=$0
MULT=9600

PATH=${PATH}:${TPCC_SOURCE}:${TPCC_UTILS}
export PATH

sqlplus tpcc/tpcc @stok
```

build_dir/create_user.sh

```
#!/bin/ksh


BUILD_HOME=$ORACLE_HOME/bench/tpc/tpcc/scripts/9600w/
BENCH_HOME=$ORACLE_HOME/bench/tpc
BENCH_GEN=$ORACLE_HOME/bench/gen
GEN_SQL=$BUILD_HOME/sql
TPCC_SOURCE=$BENCH_HOME/tpcc/source
TPCC_SQL=$BUILD_HOME/sql
TPCC_STORE=$BENCH_HOME/tpcc/stored_proc
TPCC_BLOCKS=$BENCH_HOME/tpcc/blocks
TPCC_SCRIPTS=$BENCH_HOME/tpcc/scripts
TPCC_UTILS=$BUILD_HOME/utils
AUDIT_SQL=$BENCH_HOME/tpcc/audit/sql
BUILD_SQL=sql
TPCC_LOADER=$BUILD_HOME/loader
LOAD_SCRIPTS=${BUILD_HOME}/scripts
OUTDIR=${BUILD_HOME}/outdir
LDIR=${BUILD_HOME}/data
STEP=0
START=0
END=0
CONTINUE=1
PROGNAME=$0
MULT=9600

PATH=${PATH}:${TPCC_SOURCE}:${TPCC_UTILS}
export PATH


svrmgrl <<!
rem
rem ================================================================+
rem         Copyright (c) 1997  Oracle Corp, Redwood Shores, CA      |
rem                       OPEN SYSTEMS PERFORMANCE GROUP             |
rem                            All Rights Reserved                   |
rem ================================================================+
rem  FILENAME
rem       tpcc_user.sql
rem  DESCRIPTION
rem       Create user for TPC-C database.
rem ================================================================
rem

rem
rem Create TPCC userid and connect to it.
rem
        connect internal;
        grant connect,resource,unlimited tablespace to tpcc identified by tpcc;
        alter user tpcc temporary tablespace temp;
        connect tpcc/tpcc;
        exit;
!
```

build_dir/create_ware.sh

```
#!/bin/ksh


BUILD_HOME=$ORACLE_HOME/bench/tpc/tpcc/scripts/9600w/
BENCH_HOME=$ORACLE_HOME/bench/tpc
BENCH_GEN=$ORACLE_HOME/bench/gen
GEN_SQL=$BUILD_HOME/sql
TPCC_SOURCE=$BENCH_HOME/tpcc/source
TPCC_SQL=$BUILD_HOME/sql
TPCC_STORE=$BENCH_HOME/tpcc/stored_proc
TPCC_BLOCKS=$BENCH_HOME/tpcc/blocks
TPCC_SCRIPTS=$BENCH_HOME/tpcc/scripts
TPCC_UTILS=$BUILD_HOME/utils
AUDIT_SQL=$BENCH_HOME/tpcc/audit/sql
BUILD_SQL=sql
TPCC_LOADER=$BUILD_HOME/loader
LOAD_SCRIPTS=${BUILD_HOME}/scripts
OUTDIR=${BUILD_HOME}/outdir
LDIR=${BUILD_HOME}/data
```

```
STEP=0
START=0
END=0
CONTINUE=1
PROGNAME=$0
MULT=9600

PATH=${PATH}:${TPCC_SOURCE}:${TPCC_UTILS}
export PATH

sqlplus tpcc/tpcc @ware
```

build_dir/crts_cust.sh

```
#9600ware
# 140 datafiles, 2047MB each
# 2010MB extent/datafile
# glennf

#================================================================+
# FILENAME
#      crts_cust.sh
# DESCRIPTION
#      creates tablespace CUST
#================================================================+


svrmgrl <<!
        connect system/manager
        create tablespace cust datafile
           '?/dbs/tpcc_disks/cust1' size 2047M reuse
          extent management local uniform size 2010M nologging ;
exit;
!
addfile.sh cust ?/dbs/tpcc_disks/cust2  2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust3  2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust4  2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust5  2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust6  2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust7  2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust8  2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust9  2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust10 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust11 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust12 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust13 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust14 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust15 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust16 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust17 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust18 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust19 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust20 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust21 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust22 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust23 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust24 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust25 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust26 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust27 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust28 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust29 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust30 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust31 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust32 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust33 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust34 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust35 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust36 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust37 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust38 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust39 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust40 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust41 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust42 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust43 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust44 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust45 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust46 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust47 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust48 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust49 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust50 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust51 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust52 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust53 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust54 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust55 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust56 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust57 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust58 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust59 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust60 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust61 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust62 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust63 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust64 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust65 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust66 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust67 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust68 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust69 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust70 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust71 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust72 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust73 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust74 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust75 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust76 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust77 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust78 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust79 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust80 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust81 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust82 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust83 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust84 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust85 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust86 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust87 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust88 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust89 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust90 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust91 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust92 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust93 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust94 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust95 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust96 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust97 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust98 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust99 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust100 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust101 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust102 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust103 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust104 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust105 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust106 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust107 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust108 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust109 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust110 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust111 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust112 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust113 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust114 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust115 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust116 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust117 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust118 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust119 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust120 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust121 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust122 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust123 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust124 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust125 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust126 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust127 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust128 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust129 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust130 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust131 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust132 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust133 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust134 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust135 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust136 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust137 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust138 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust139 2047M &
addfile.sh cust ?/dbs/tpcc_disks/cust140 2047M &

wait
```

build_dir/crts_hist.sh

```
#9600ware
# 10 datafiles, 2047M each
# glennf

#================================================================+
# FILENAME
#      crts_hist.sh
# DESCRIPTION
#      creates tablespace HIST
#================================================================+


svrmgrl <<!
        connect system/manager
        create tablespace hist datafile
           '?/dbs/tpcc_disks/hist1' size 2047M reuse
           extent management local uniform size 100M nologging;
exit;
!
addfile.sh hist ?/dbs/tpcc_disks/hist2 2047M &
addfile.sh hist ?/dbs/tpcc_disks/hist3 2047M &
addfile.sh hist ?/dbs/tpcc_disks/hist4 2047M &
addfile.sh hist ?/dbs/tpcc_disks/hist5 2047M &
addfile.sh hist ?/dbs/tpcc_disks/hist6 2047M &
addfile.sh hist ?/dbs/tpcc_disks/hist7 2047M &
addfile.sh hist ?/dbs/tpcc_disks/hist8 2047M &
addfile.sh hist ?/dbs/tpcc_disks/hist9 2047M &
addfile.sh hist ?/dbs/tpcc_disks/hist10 2047M &

wait
```

build_dir/crts_icust1.sh

```
#9600ware
# 4 datafiles, 2047M each
```

```
# glennf

#================================================================+
# FILENAME
#      crts_icust1.sh
# DESCRIPTION
#      creates tablespace ICUST1
#================================================================+


svrmgrl <<!
        connect system/manager
        create tablespace icust1 datafile
           '?/dbs/tpcc_disks/icust1-1' size 2047M reuse
           extent management local uniform size 50M nologging ;
exit;
!
addfile.sh icust1 ?/dbs/tpcc_disks/icust1-2 2047M &
addfile.sh icust1 ?/dbs/tpcc_disks/icust1-3 2047M &
addfile.sh icust1 ?/dbs/tpcc_disks/icust1-4 2047M &

wait
```

build_dir/crts_icust2.sh

```
#9600ware
# 8 datafiles, 2047M each
# glennf


#================================================================+
# FILENAME
#      crts_icust2.sh
# DESCRIPTION
#      creates tablespace ICUST2
#================================================================+


svrmgrl <<!
        connect system/manager
        create tablespace icust2 datafile
           '?/dbs/tpcc_disks/icust2-1' size 2047M reuse
           extent management local uniform size 50M nologging ;
exit;
!
addfile.sh icust2 ?/dbs/tpcc_disks/icust2-1 2047M &
addfile.sh icust2 ?/dbs/tpcc_disks/icust2-2 2047M &
addfile.sh icust2 ?/dbs/tpcc_disks/icust2-3 2047M &
addfile.sh icust2 ?/dbs/tpcc_disks/icust2-4 2047M &
addfile.sh icust2 ?/dbs/tpcc_disks/icust2-5 2047M &
addfile.sh icust2 ?/dbs/tpcc_disks/icust2-6 2047M &
addfile.sh icust2 ?/dbs/tpcc_disks/icust2-7 2047M &
addfile.sh icust2 ?/dbs/tpcc_disks/icust2-8 2047M &

wait
```

build_dir/crts_iord1.sh

```
#9600ware
# 7 datafiles, 2047M
# glennf

#================================================================+
# FILENAME
#      crts_iord1.sh
# DESCRIPTION
#      creates tablespace IORD1
#================================================================+


svrmgrl <<!
        connect system/manager
        create tablespace iord1 datafile
           '?/dbs/tpcc_disks/iord1-1' size 2047M reuse
           extent management local uniform size 30M nologging ;
exit;
!
addfile.sh iord1 ?/dbs/tpcc_disks/iord1-2 2047M &
addfile.sh iord1 ?/dbs/tpcc_disks/iord1-3 2047M &
addfile.sh iord1 ?/dbs/tpcc_disks/iord1-4 2047M &
addfile.sh iord1 ?/dbs/tpcc_disks/iord1-5 2047M &
addfile.sh iord1 ?/dbs/tpcc_disks/iord1-6 2047M &
addfile.sh iord1 ?/dbs/tpcc_disks/iord1-7 2047M &

wait
```

build_dir/crts_iord2.sh

```
#9600ware
# 9 datafiles 2047M
# glennf

#================================================================+
# FILENAME
#      crts_iord2.sh
# DESCRIPTION
#      creates tablespace IORD2
#================================================================+


svrmgrl <<!
        connect system/manager
        create tablespace iord2 datafile
           '?/dbs/tpcc_disks/iord2-1' size 2047M reuse
           extent management local uniform size 30M nologging ;
exit;
!
addfile.sh iord2 ?/dbs/tpcc_disks/iord2-2 2047M &
addfile.sh iord2 ?/dbs/tpcc_disks/iord2-3 2047M &
addfile.sh iord2 ?/dbs/tpcc_disks/iord2-4 2047M &
addfile.sh iord2 ?/dbs/tpcc_disks/iord2-5 2047M &
addfile.sh iord2 ?/dbs/tpcc_disks/iord2-6 2047M &
addfile.sh iord2 ?/dbs/tpcc_disks/iord2-7 2047M &
addfile.sh iord2 ?/dbs/tpcc_disks/iord2-8 2047M &
addfile.sh iord2 ?/dbs/tpcc_disks/iord2-9 2047M &

wait
```

build_dir/crts_istk.sh

```
#9600ware
# 10 datafiles, 2047M
# glennf

#================================================================+
# FILENAME
#      crts_istk.sh
# DESCRIPTION
#      creates tablespace ISTK
#================================================================+


svrmgrl <<!
        connect system/manager
        create tablespace istk datafile
           '?/dbs/tpcc_disks/istk1' size 2047M reuse
           extent management local uniform size 50M nologging ;
exit;
!
addfile.sh istk ?/dbs/tpcc_disks/istk2 2047M &
addfile.sh istk ?/dbs/tpcc_disks/istk3 2047M &
addfile.sh istk ?/dbs/tpcc_disks/istk4 2047M &
addfile.sh istk ?/dbs/tpcc_disks/istk5 2047M &
addfile.sh istk ?/dbs/tpcc_disks/istk6 2047M &
addfile.sh istk ?/dbs/tpcc_disks/istk7 2047M &
addfile.sh istk ?/dbs/tpcc_disks/istk8 2047M &
addfile.sh istk ?/dbs/tpcc_disks/istk9 2047M &
addfile.sh istk ?/dbs/tpcc_disks/istk10 2047M &
addfile.sh istk ?/dbs/tpcc_disks/istk11 2047M &
addfile.sh istk ?/dbs/tpcc_disks/istk12 2047M &
addfile.sh istk ?/dbs/tpcc_disks/istk13 2047M &
addfile.sh istk ?/dbs/tpcc_disks/istk14 2047M &

wait
```

build_dir/crts_nord.sh

```
#9600ware
# 4 datafiles 2047M
# glennf

#================================================================+
# FILENAME
#      crts_nord.sh
# DESCRIPTION
#      creates tablespace NORD
#================================================================+


svrmgrl <<!
        connect system/manager
        create tablespace nord datafile
           '?/dbs/tpcc_disks/nord1' size 2047M reuse
           extent management local uniform size 5M logging;
exit;
!
addfile.sh nord ?/dbs/tpcc_disks/nord2 2047M &
addfile.sh nord ?/dbs/tpcc_disks/nord3 2047M &
addfile.sh nord ?/dbs/tpcc_disks/nord4 2047M &

wait
```

build_dir/crts_ord.sh

```
#9600wares
# 8 datafiles, 2047M each, 1200 wares each
# glennf

#================================================================+
# FILENAME
#      crts_ord.sh
# DESCRIPTION
#      creates tablespace ORD
#================================================================+
```

```
svrmgrl <<!
        connect system/manager
        create tablespace ord datafile
           '?/dbs/tpcc_disks/ord1' size 2047M reuse
           extent management local uniform size 100M nologging;
exit;
!
addfile.sh ord ?/dbs/tpcc_disks/ord2 2047M &
addfile.sh ord ?/dbs/tpcc_disks/ord3 2047M &
addfile.sh ord ?/dbs/tpcc_disks/ord4 2047M &
addfile.sh ord ?/dbs/tpcc_disks/ord5 2047M &
addfile.sh ord ?/dbs/tpcc_disks/ord6 2047M &
addfile.sh ord ?/dbs/tpcc_disks/ord7 2047M &
addfile.sh ord ?/dbs/tpcc_disks/ord8 2047M &

wait
```

build_dir/crts_ordl.sh

```
#9600ware
# 162 datafiles, 2047M each
# glennf

#================================================================+
# FILENAME
#      crts_ordl.sh
# DESCRIPTION
#      creates tablespace ORDL
#================================================================+


svrmgrl <<!
        connect system/manager
        create tablespace ordl datafile
           '?/dbs/tpcc_disks/ordl1' size 2047M reuse
           extent management local uniform size 100M logging;
exit;
!
addfile.sh ordl ?/dbs/tpcc_disks/ordl2  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl3  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl4  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl5  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl6  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl7  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl8  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl9  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl10  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl11  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl12  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl13  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl14  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl15  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl16  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl17  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl18  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl19  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl20  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl21  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl22  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl23  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl24  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl25  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl26  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl27  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl28  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl29  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl30  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl31  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl32  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl33  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl34  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl35  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl36  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl37  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl38  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl39  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl40  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl41  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl42  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl43  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl44  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl45  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl46  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl47  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl48  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl49  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl50  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl51  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl52  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl53  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl54  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl55  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl56  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl57  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl58  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl59  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl60  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl61  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl62  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl63  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl64  2047M &
wait
addfile.sh ordl ?/dbs/tpcc_disks/ordl65  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl66  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl67  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl68  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl69  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl70  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl71  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl72  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl73  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl74  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl75  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl76  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl77  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl78  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl79  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl80  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl81  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl82  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl83  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl84  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl85  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl86  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl87  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl88  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl89  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl90  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl91  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl92  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl93  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl94  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl95  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl96  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl97  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl98  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl99  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl100  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl101  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl102  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl103  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl104  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl105  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl106  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl107  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl108  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl109  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl110  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl111  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl112  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl113  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl114  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl115  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl116  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl117  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl118  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl119  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl120  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl121  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl122  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl123  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl124  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl125  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl126  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl127  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl128  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl129  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl130  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl131  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl132  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl133  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl134  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl135  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl136  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl137  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl138  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl139  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl140  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl141  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl142  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl143  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl144  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl145  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl146  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl147  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl148  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl149  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl150  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl151  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl152  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl153  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl154  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl155  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl156  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl157  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl158  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl159  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl160  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl161  2047M &
addfile.sh ordl ?/dbs/tpcc_disks/ordl162  2047M &

wait
```

build_dir/crts_stk.sh

```
#9600ware
# 185 datafiles, 2047MB each
#  2029M extent/datafile
# glennf

#================================================================+
# FILENAME
#      crts_stk.sh
# DESCRIPTION
#      creates tablespace STOCKS
```

```
#================================================================+


svrmgrl <<!
        connect system/manager
        create tablespace stocks datafile
           '?/dbs/tpcc_disks/stk1' size 2047M reuse
           extent management local uniform size 2029M nologging;
exit;
!
addfile.sh stocks ?/dbs/tpcc_disks/stk2 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk3 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk4 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk5 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk6 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk7 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk8 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk9 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk10 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk11 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk12 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk13 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk14 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk15 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk16 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk17 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk18 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk19 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk20 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk21 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk22 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk23 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk24 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk25 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk26 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk27 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk28 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk29 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk30 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk31 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk32 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk33 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk34 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk35 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk36 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk37 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk38 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk39 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk40 2047M &
wait
addfile.sh stocks ?/dbs/tpcc_disks/stk41 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk42 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk43 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk44 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk45 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk46 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk47 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk48 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk49 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk50 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk51 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk52 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk53 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk54 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk55 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk56 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk57 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk58 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk59 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk60 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk61 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk62 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk63 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk64 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk65 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk66 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk67 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk68 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk69 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk70 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk71 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk72 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk73 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk74 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk75 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk76 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk77 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk78 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk79 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk80 2047M &
wait
addfile.sh stocks ?/dbs/tpcc_disks/stk81 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk82 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk83 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk84 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk85 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk86 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk87 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk88 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk89 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk90 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk91 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk92 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk93 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk94 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk95 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk96 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk97 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk98 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk99 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk100 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk101 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk102 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk103 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk104 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk105 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk106 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk107 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk108 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk109 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk110 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk111 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk112 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk113 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk114 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk115 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk116 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk117 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk118 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk119 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk120 2047M &
wait
addfile.sh stocks ?/dbs/tpcc_disks/stk121 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk122 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk123 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk124 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk125 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk126 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk127 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk128 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk129 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk130 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk131 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk132 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk133 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk134 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk135 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk136 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk137 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk138 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk139 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk140 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk141 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk142 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk143 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk144 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk145 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk146 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk147 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk148 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk149 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk150 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk151 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk152 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk153 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk154 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk155 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk156 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk157 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk158 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk159 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk160 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk161 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk162 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk163 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk164 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk165 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk166 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk167 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk168 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk169 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk170 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk171 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk172 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk173 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk174 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk175 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk176 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk177 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk178 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk179 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk180 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk181 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk182 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk183 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk184 2047M &
addfile.sh stocks ?/dbs/tpcc_disks/stk185 2047M &
wait
```

build_dir/crts_temp.sh

```
#!/bin/ksh

#================================================================+
# FILENAME
#      crts_temp.sh
# DESCRIPTION
#      creates tablespace TEMP
#================================================================+


svrmgrl <<!
        connect system/manager
        create tablespace temp datafile
           '?/dbs/tpcc_disks/temp1' size 2047M reuse
        default storage (initial 50M next 50M maxextents unlimited);
        exit;
!

addfile.sh temp ?/dbs/tpcc_disks/temp2  2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp3  2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp4  2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp5  2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp6  2047M &
```

```
addfile.sh temp ?/dbs/tpcc_disks/temp7  2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp8  2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp9  2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp10 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp11 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp12 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp13 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp14 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp15 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp16 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp17 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp18 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp19 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp20 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp21 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp22 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp23 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp24 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp25 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp26 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp27 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp28 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp29 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp30 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp31 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp32 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp33 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp34 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp35 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp36 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp37 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp38 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp39 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp40 2047M &
wait
exit
addfile.sh temp ?/dbs/tpcc_disks/temp41 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp42 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp43 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp44 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp45 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp46 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp47 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp48 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp49 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp50 2047M &
wait
addfile.sh temp ?/dbs/tpcc_disks/temp51 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp52 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp53 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp54 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp55 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp56 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp57 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp58 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp59 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp60 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp61 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp62 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp63 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp64 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp65 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp66 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp67 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp68 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp69 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp70 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp71 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp72 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp73 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp74 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp75 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp76 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp77 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp78 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp79 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp80 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp81 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp82 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp83 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp84 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp85 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp86 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp87 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp88 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp89 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp90 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp91 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp92 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp93 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp94 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp95 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp96 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp97 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp98 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp99 2047M &
addfile.sh temp ?/dbs/tpcc_disks/temp100 2047M &


wait
```

build_dir/cust.sql

```
rem
rem ================================================================+
rem  CUSTOMER Table on CUST tablespace
rem   140 -  2G datafiles
rem    2010M extent each
rem ================================================================
rem

rem
rem DROP all first
rem
        drop cluster ccluster including tables;
        drop table customer;

set timing on

rem
rem CUSTOMER table
rem

        create cluster ccluster (
            c_id         number,
            c_d_id       number,
            c_w_id       number
        )
singletable
        hashkeys        288000000
        hash is         ((c_id*96000) + (c_w_id*10) + c_d_id)
        size            850
        initrans        3
        pctfree         0
        tablespace      cust
        storage (buffer_pool recycle);

        create table customer (
        c_id            number,
        c_d_id          number,
        c_w_id          number,
        c_discount      number,
        c_credit        char(2),
        c_last          varchar2(16),
        c_first         varchar2(16),
        c_credit_lim    number,
        c_balance       number,
        c_ytd_payment   number,
        c_payment_cnt   number,
        c_delivery_cnt  number,
        c_street_1      varchar2(20),
        c_street_2      varchar2(20),
        c_city          varchar2(20),
        c_state         char(2),
        c_zip           char(9),
        c_phone         char(16),
        c_since         date,
        c_middle        char(2),
        c_data          varchar2(500)
        )
        cluster ccluster (c_id, c_d_id, c_w_id);

rem
rem done
rem

        exit;
```

build_dir/dist.sql

```
rem
rem ================================================================+
rem DISTRICT table created on WARE tablespace
rem ================================================================
rem

rem
rem DROP all first
rem
        drop table district;
drop cluster dcluster including tables;

set timing on

rem
rem DISTRICT table
rem

create cluster dcluster (
d_w_idnumber,
d_idnumber
)
singletable
hashkeys96000
hash is(d_w_id - 1) * 10 + d_id
size1536
initrans3
pctfree0
        tablespace ware
        storage (initial 200M next 200M pctincrease 0);

        create table district (
        d_id            number,
        d_w_id          number,
        d_ytd           number,
        d_tax           number,
        d_next_o_id     number,
        d_name          varchar2(10),
        d_street_1      varchar2(20),
        d_street_2      varchar2(20),
        d_city          varchar2(20),
        d_state         char(2),
        d_zip           char(9)
      )
cluster dcluster (d_w_id, d_id);

rem
rem done
rem
```

```
        exit;
```

build_dir/hist.sql

```
rem
rem ============================================================+
rem HISTORY table created on HIST tablespace
rem  10 - 2G datafiles
rem ============================================================
rem

rem
rem DROP all first
rem
        drop table history;

set timing on

rem
rem HISTORY table
rem

       create table history (
        h_c_id          number,
        h_c_d_id        number,
        h_c_w_id        number,
        h_d_id          number,
        h_w_id          number,
        h_date          date,
        h_amount        number,
        h_data          varchar2(24)
        )
        tablespace hist
        initrans 4
        pctfree  5
        storage (freelist groups 43 freelists 9);

rem
rem done
rem

        exit;
```

build_dir/icust.sql

```
rem
rem ============================================================+
rem ICUSTOMER index created on ICUST1 tablespace.
rem  Needed for uniqueness only
rem   4 - 2G datafiles
rem ============================================================
rem

rem
rem DROP all first
rem
        drop index icustomer;

set timing on

rem
rem ICUST1 index
rem

       create unique index icustomer on customer(c_w_id, c_d_id, c_id)
        tablespace icust1
        initrans 3
parallel 32
        pctfree  1
        storage (freelist groups 13 freelists 22);

rem
rem done
rem

        exit;
```

build_dir/icust2.sql

```
rem
rem ============================================================+
rem ICUSTOMER2 index
rem  8 - 2G datafiles
rem ============================================================
rem

rem
rem DROP all first
rem
        drop index icustomer2;

set timing on

rem
rem ICUST2 index
rem

       create unique index icustomer2 on customer(c_last, c_w_id, c_d_id,
c_first,c_id)
        tablespace icust2
        initrans 3
parallel 32
        pctfree  1
        storage (freelist groups 13 freelists 22);

rem
rem done
rem

        exit;
```

build_dir/idist.sql

```
rem
rem ============================================================+
rem  IDISTRICT index created on WARE tablespace
rem ============================================================
rem

rem
rem DROP all first
rem
        drop index idistrict;

set timing on

rem
rem DISTRICT index
rem

       create unique index idistrict on district(d_w_id, d_id)
        tablespace ware
        initrans 3
parallel 10
        pctfree  5
        storage (initial 40M next 40M pctincrease 0
 maxextents unlimited freelist groups 13 freelists 22);

rem
rem done
rem

        exit;
```

build_dir/iitem.sql

```
rem
rem ============================================================+
rem IITEM index created on items tablespace
rem  Needed for uniqueness only
rem ============================================================
rem

rem
rem DROP all first
rem
        drop index iitem;

set timing on

rem
rem ITEM index
rem

       create unique index iitem on item(i_id)
        tablespace items
        initrans 4
        pctfree  5
        storage (initial 2M next 1M pctincrease 0
 maxextents unlimited freelist groups 13 freelists 22
                buffer_pool keep);

rem
rem done
rem

        exit;
```

build_dir/iordr.sql

```
rem
rem ============================================================+
rem IORDERS index created on IORD1 tablespace
rem  7 - 2g datafiles
rem ============================================================
rem

rem
rem DROP all first
rem
        drop index iorders;

set timing on

rem
rem ORDERS index
rem

       create unique index iorders on orders(o_w_id, o_d_id, o_id)
        tablespace iord1
        initrans 3
parallel 64
        pctfree  1
        storage (freelist groups 13 freelists 22);
```

```
rem
rem done
rem

        exit;
```

build_dir/iordr2.sql

```
rem
rem ================================================================+
rem IORDERS2 index created on IORD2 tablespace
rem  9 - 2G datafiles
rem ================================================================
rem

rem
rem DROP all first
rem
        drop index iorders2;

set timing on

rem
rem ORDERS index 2
rem

       create unique index iorders2 on orders(o_c_id, o_d_id, o_w_id, o_id)
        tablespace iord2
        initrans 4
parallel 64
        pctfree  25
        storage (freelist groups 13 freelists 22);

rem
rem done
rem

        exit;
```

build_dir/istok.sql

```
rem
rem ================================================================+
rem ISTOCK index created on ISTK
rem Needed for uniqueness only
rem  10 - 2G datafiles
rem ================================================================
rem

rem
rem DROP all first
rem
        drop index istock;

set timing on

rem
rem STOCK index
rem

       create unique index istock on stock(s_i_id, s_w_id)
        tablespace istk
        initrans 3
parallel 16
        pctfree  1
        storage (freelist groups 13 freelists 22);

rem
rem done
rem

        exit;
```

build_dir/item.sql

```
rem
rem ================================================================+
rem ITEM table and cluster created on ITEMS tablespace
rem  1 - 20M datafile.
rem ================================================================
rem

rem
rem DROP item cluster and table
rem
        drop cluster icluster including tables;
        drop table item;

        set timing on;

rem
rem ITEM table
rem

        create cluster icluster (
        i_id            number(6,0)
        )
singletable
        hashkeys        100000
        hash is         i_id
        size            120
        initrans        3
        pctfree         0
        tablespace      items
        storage (initial 14M next 720K pctincrease 0
                 buffer_pool keep);

        create table item (
        i_id            number(6,0),
        i_name          varchar2(24),
        i_price         number,
        i_data          varchar2(50),
        i_im_id         number
        )
        cluster icluster(i_id);


rem
rem done
rem

        exit;
```

build_dir/iware.sql

```
rem
rem ================================================================+
rem IWAREHOUSE index created on WARE tablespace
rem ================================================================
rem

rem
rem DROP all first
rem
        drop index iwarehouse;

set timing on

rem
rem WAREHOUSE index
rem

     create unique index iwarehouse on warehouse (w_id)
        tablespace ware
        initrans 3
pctfree 1
        storage (initial 30K next 5M pctincrease 0);

rem
rem done
rem

        exit;
```

build_dir/load_cust.sh

```
#!/bin/ksh


BUILD_HOME=$ORACLE_HOME/bench/tpc/tpcc/scripts/9600w/
BENCH_HOME=$ORACLE_HOME/bench/tpc
BENCH_GEN=$ORACLE_HOME/bench/gen
GEN_SQL=$BUILD_HOME/sql
TPCC_SOURCE=$BENCH_HOME/tpcc/source
TPCC_SQL=$BUILD_HOME/sql
TPCC_STORE=$BENCH_HOME/tpcc/stored_proc
TPCC_BLOCKS=$BENCH_HOME/tpcc/blocks
TPCC_SCRIPTS=$BENCH_HOME/tpcc/scripts
TPCC_UTILS=$BUILD_HOME/utils
AUDIT_SQL=$BENCH_HOME/tpcc/audit/sql
BUILD_SQL=sql
LOAD_SCRIPTS=${BUILD_HOME}
OUTDIR=${BUILD_HOME}/outdir
STEP=0
START=0
END=0
CONTINUE=1
PROGNAME=$0
MULT=9600

PATH=${PATH}:${TPCC_SOURCE}:${TPCC_UTILS}
export PATH


#
#  Load customer table (in parallel with loading stock table)
#

I=1
SW=1
EW=150
INC=150
while [ $I -le 64 ]
do
   tpccload -M $MULT -c -b $SW -e $EW > ${OUTDIR}/cust${I}.out 2>&1 &
   I=`expr $I + 1`
   SW=`expr $SW + $INC`
   EW=`expr $EW + $INC`
done
wait
```

build_dir/load_dist.sh

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

```
BUILD_HOME=$ORACLE_HOME/bench/tpc/tpcc/scripts/9600w/
BENCH_HOME=$ORACLE_HOME/bench/tpc
BENCH_GEN=$ORACLE_HOME/bench/gen
GEN_SQL=$BUILD_HOME/sql
TPCC_SOURCE=$BENCH_HOME/tpcc/source
TPCC_SQL=$BUILD_HOME/sql
TPCC_STORE=$BENCH_HOME/tpcc/stored_proc
TPCC_BLOCKS=$BENCH_HOME/tpcc/blocks
TPCC_SCRIPTS=$BENCH_HOME/tpcc/scripts
TPCC_UTILS=$BUILD_HOME/utils
AUDIT_SQL=$BENCH_HOME/tpcc/audit/sql
BUILD_SQL=sql
LOAD_SCRIPTS=${BUILD_HOME}
OUTDIR=${BUILD_HOME}/outdir
STEP=0
START=0
END=0
CONTINUE=1
PROGNAME=$0
MULT=9600

PATH=${PATH}:${TPCC_SOURCE}:${TPCC_UTILS}
export PATH


tpccload -M $MULT -d
```

build_dir/load_hist.sh

```
#!/bin/ksh


BUILD_HOME=$ORACLE_HOME/bench/tpc/tpcc/scripts/9600w/
BENCH_HOME=$ORACLE_HOME/bench/tpc
BENCH_GEN=$ORACLE_HOME/bench/gen
GEN_SQL=$BUILD_HOME/sql
TPCC_SOURCE=$BENCH_HOME/tpcc/source
TPCC_SQL=$BUILD_HOME/sql
TPCC_STORE=$BENCH_HOME/tpcc/stored_proc
TPCC_BLOCKS=$BENCH_HOME/tpcc/blocks
TPCC_SCRIPTS=$BENCH_HOME/tpcc/scripts
TPCC_UTILS=$BUILD_HOME/utils
AUDIT_SQL=$BENCH_HOME/tpcc/audit/sql
BUILD_SQL=sql
TPCC_LOADER=$BUILD_HOME/loader
LOAD_SCRIPTS=${BUILD_HOME}/scripts
OUTDIR=${BUILD_HOME}/outdir
LDIR=${BUILD_HOME}/data
STEP=0
START=0
END=0
CONTINUE=1
PROGNAME=$0
MULT=9600

PATH=${PATH}:${TPCC_SOURCE}:${TPCC_UTILS}
export PATH

if echo "\c" | grep c >/dev/null 2>&1; then
    N='-n'
else
    C='\c'
fi
export N C

while [ "$#" != "0" ]
do
   case $1 in
       -mu) shift
            if [ "$1" != "" ]
            then
               MULT=$1
               shift
            fi
            ;;
       -nd) shift
            NO_DB="y"
            ;;
       -nt) shift
            NO_TAB="y"
            ;;
       -nx) shift
            NO_IND="y"
             ;;
        *) echo "Bad arg: $1"
           exit 1;
           ;;
   esac
done

if [ "$MULT" = "" ]
then
   echo $N "Database multiplier (# of warehouses)? [1]" $C
   read MULT
   if [ "$MULT" = "" ]
   then
       MULT=1
   fi
fi

if [ ! -d $BUILD_HOME ]
then
   mkdir $BUILD_HOME
fi

if [ ! -d $LOAD_SCRIPTS ]
then
   mkdir $LOAD_SCRIPTS
fi

if [ ! -d $LDIR ]
then
   mkdir $LDIR
fi

if [ ! -d $OUTDIR ]
then
   mkdir $OUTDIR
fi
#
#  Load history table
#

#I=1
#while [ $I -le 10 ]
#do
#   mknod ${LDIR}/hist${I}.dat p
#   I=`expr $I + 1`
#done
#
I=1
SW=1
EW=300
INC=300
while [ $I -le 32 ]
do
   tpccload -M $MULT -h -b $SW -e $EW > ${LDIR}/hist${I}.dat 2> \
      ${OUTDIR}/hist${I}.out &
   I=`expr $I + 1`
   SW=`expr $SW + $INC`
   EW=`expr $EW + $INC`
done

sleep 30

#I=1
#while [ $I -le 10 ]
#do
#   sqlldr tpcc/tpcc control=$TPCC_LOADER/hist.ctl \
#          log=${OUTDIR}/hist${I}.log \
#          bad=${OUTDIR}/hist${I}.bad \
#          data=${LDIR}/hist${I}.dat \
#          file=${ORACLE_HOME}/dbs/tpcc_disks/hist_${I} \
#          discard=${OUTDIR}/hist${I}.dsc &
#   I=`expr $I + 1`
#done

wait

#I=1
#while [ $I -le 10 ]
#do
#   rm -f ${LDIR}/hist${I}.dat
#   I=`expr $I + 1`
#done
```

build_dir/load_item.sh

```
#!/bin/ksh


BUILD_HOME=$ORACLE_HOME/bench/tpc/tpcc/scripts/9600w/
BENCH_HOME=$ORACLE_HOME/bench/tpc
BENCH_GEN=$ORACLE_HOME/bench/gen
GEN_SQL=$BUILD_HOME/sql
TPCC_SOURCE=$BENCH_HOME/tpcc/source
TPCC_SQL=$BUILD_HOME/sql
TPCC_STORE=$BENCH_HOME/tpcc/stored_proc
TPCC_BLOCKS=$BENCH_HOME/tpcc/blocks
TPCC_SCRIPTS=$BENCH_HOME/tpcc/scripts
TPCC_UTILS=$BUILD_HOME/utils
AUDIT_SQL=$BENCH_HOME/tpcc/audit/sql
BUILD_SQL=sql
LOAD_SCRIPTS=${BUILD_HOME}
OUTDIR=${BUILD_HOME}/outdir
STEP=0
START=0
END=0
CONTINUE=1
PROGNAME=$0
MULT=9600

PATH=${PATH}:${TPCC_SOURCE}:${TPCC_UTILS}
export PATH


tpccload -M $MULT -i
```

build_dir/load_nord.sh

```
#!/bin/ksh


BUILD_HOME=$ORACLE_HOME/bench/tpc/tpcc/scripts/9600w/
BENCH_HOME=$ORACLE_HOME/bench/tpc
BENCH_GEN=$ORACLE_HOME/bench/gen
GEN_SQL=$BUILD_HOME/sql
TPCC_SOURCE=$BENCH_HOME/tpcc/source
TPCC_SQL=$BUILD_HOME/sql
TPCC_STORE=$BENCH_HOME/tpcc/stored_proc
TPCC_BLOCKS=$BENCH_HOME/tpcc/blocks
TPCC_SCRIPTS=$BENCH_HOME/tpcc/scripts
TPCC_UTILS=$BUILD_HOME/utils
AUDIT_SQL=$BENCH_HOME/tpcc/audit/sql
BUILD_SQL=sql
TPCC_LOADER=$BUILD_HOME/loader
LOAD_SCRIPTS=${BUILD_HOME}/scripts
```

```
OUTDIR=${BUILD_HOME}/outdir
LDIR=${BUILD_HOME}/data
STEP=0
START=0
END=0
CONTINUE=1
PROGNAME=$0
MULT=9600

PATH=${PATH}:${TPCC_SOURCE}:${TPCC_UTILS}
export PATH

if echo "\c" | grep c >/dev/null 2>&1; then
    N='-n'
else
    C='\c'
fi
export N C

while [ "$#" != "0" ]
do
   case $1 in
       -mu) shift
            if [ "$1" != "" ]
            then
               MULT=$1
               shift
            fi
            ;;
       -nd) shift
            NO_DB="y"
            ;;
       -nt) shift
            NO_TAB="y"
            ;;
       -nx) shift
            NO_IND="y"
             ;;
         *) echo "Bad arg: $1"
            exit 1;
            ;;
   esac
done

if [ "$MULT" = "" ]
then
   echo $N "Database multiplier (# of warehouses)? [1]" $C
   read MULT
   if [ "$MULT" = "" ]
   then
       MULT=1
   fi
fi

if [ ! -d $BUILD_HOME ]
then
   mkdir $BUILD_HOME
fi

if [ ! -d $LOAD_SCRIPTS ]
then
   mkdir $LOAD_SCRIPTS
fi

if [ ! -d $LDIR ]
then
   mkdir $LDIR
fi

if [ ! -d $OUTDIR ]
then
   mkdir $OUTDIR
fi

#
#   Load new-order table
#

#I=1
#while [ $I -le 10 ]
#do
#   mknod ${LDIR}/neword${I}.dat p
#   I=`expr $I + 1`
#done

I=1
SW=1
EW=150
INC=150
while [ $I -le 64 ]
do
  tpccload -M $MULT -n -b $SW -e $EW > ${LDIR}/neword${I}.dat 2> \
      ${OUTDIR}/neword${I}.out &
   I=`expr $I + 1`
   SW=`expr $SW + $INC`
   EW=`expr $EW + $INC`
done

#sleep 30
#
#I=1
#while [ $I -le 10 ]
#do
#   J=`expr $I % 1`
#   J=`expr $J + 1`
#   sqlldr tpcc/tpcc control=$TPCC_LOADER/neword.ctl \
#        log=${OUTDIR}/neword${I}.log \
#        bad=${OUTDIR}/neword${I}.bad data=${LDIR}/neword${I}.dat \
#        file=${ORACLE_HOME}/dbs/tpcc_disks/nord_${J} \
#        discard=${OUTDIR}/neword${I}.dsc &
#   I=`expr $I + 1`
#done

wait

#I=1
#while [ $I -le 10 ]
#do
#   rm -f ${LDIR}/neword${I}.dat
#   I=`expr $I + 1`
#done
```

build_dir/load_ordr.sh

```
#!/bin/ksh


BUILD_HOME=$ORACLE_HOME/bench/tpc/tpcc/scripts/9600w/
BENCH_HOME=$ORACLE_HOME/bench/tpc
BENCH_GEN=$ORACLE_HOME/bench/gen
GEN_SQL=$BUILD_HOME/sql
TPCC_SOURCE=$BENCH_HOME/tpcc/source
TPCC_SQL=$BUILD_HOME/sql
TPCC_STORE=$BENCH_HOME/tpcc/stored_proc
TPCC_BLOCKS=$BENCH_HOME/tpcc/blocks
TPCC_SCRIPTS=$BENCH_HOME/tpcc/scripts
TPCC_UTILS=$BUILD_HOME/utils
AUDIT_SQL=$BENCH_HOME/tpcc/audit/sql
BUILD_SQL=sql
TPCC_LOADER=$BUILD_HOME/loader
LOAD_SCRIPTS=${BUILD_HOME}/scripts
OUTDIR=${BUILD_HOME}/outdir
LDIR=${BUILD_HOME}/data
STEP=0
START=0
END=0
CONTINUE=1
PROGNAME=$0
MULT=9600

PATH=${PATH}:${TPCC_SOURCE}:${TPCC_UTILS}
export PATH

if echo "\c" | grep c >/dev/null 2>&1; then
    N='-n'
else
    C='\c'
fi
export N C

while [ "$#" != "0" ]
do
   case $1 in
       -mu) shift
            if [ "$1" != "" ]
            then
               MULT=$1
               shift
            fi
            ;;
       -nd) shift
            NO_DB="y"
            ;;
       -nt) shift
            NO_TAB="y"
            ;;
       -nx) shift
            NO_IND="y"
             ;;
         *) echo "Bad arg: $1"
            exit 1;
            ;;
   esac
done

if [ "$MULT" = "" ]
then
   echo $N "Database multiplier (# of warehouses)? [1]" $C
   read MULT
   if [ "$MULT" = "" ]
   then
       MULT=1
   fi
fi

if [ ! -d $BUILD_HOME ]
then
   mkdir $BUILD_HOME
fi

if [ ! -d $LOAD_SCRIPTS ]
then
   mkdir $LOAD_SCRIPTS
fi

if [ ! -d $LDIR ]
then
   mkdir $LDIR
fi

if [ ! -d $OUTDIR ]
then
   mkdir $OUTDIR
fi

#
#  Load order and order-line table
#

#I=1
#while [ $I -le 10 ]
#do
#   mknod ${LDIR}/order${I}.dat p
#   mknod ${LDIR}/ordline${I}.dat p
```

```
#   I=`expr $I + 1`
#done

I=1
SW=1
EW=300
INC=300
while [ $I -le 32 ]
do
   tpccload -M $MULT -o ${LDIR}/ordline${I}.dat -b $SW -e $EW > \
      ${LDIR}/order${I}.dat 2> ${OUTDIR}/order${I}.out &
   I=`expr $I + 1`
   SW=`expr $SW + $INC`
   EW=`expr $EW + $INC`
done


#sleep 30
#
#I=1
#while [ $I -le 10 ]
#do
#
#   J=`expr $I % 1`
#   J=`expr $J + 1`
#   K=`expr $I % 1`
#   K=`expr $K + 1`
#   sqlldr tpcc/tpcc control=$TPCC_LOADER/order.ctl \
#          log=${OUTDIR}/order${I}.log \
#          bad=${OUTDIR}/order${I}.bad data=${LDIR}/order${I}.dat \
#          file=${ORACLE_HOME}/dbs/tpcc_disks/ordr_${K} \
#          discard=${OUTDIR}/order${I}.dsc &
#   sqlldr tpcc/tpcc control=$TPCC_LOADER/ordline.ctl \
#          log=${OUTDIR}/ordline${I}.log \
#          bad=${OUTDIR}/ordline${I}.bad data=${LDIR}/ordline${I}.dat \
#          file=${ORACLE_HOME}/dbs/tpcc_disks/ordl_${J} \
#          discard=${OUTDIR}/ordline${I}.dsc &
#   I=`expr $I + 1`
#done

wait

#I=1
#while [ $I -le 10 ]
#do
#   rm -f ${LDIR}/order${I}.dat
#   rm -f ${LDIR}/ordline${I}.dat
#   I=`expr $I + 1`
#done
```

build_dir/load_stok.sh

```
#!/bin/ksh


BUILD_HOME=$ORACLE_HOME/bench/tpc/tpcc/scripts/9600w/
BENCH_HOME=$ORACLE_HOME/bench/tpc
BENCH_GEN=$ORACLE_HOME/bench/gen
GEN_SQL=$BUILD_HOME/sql
TPCC_SOURCE=$BENCH_HOME/tpcc/source
TPCC_SQL=$BUILD_HOME/sql
TPCC_STORE=$BENCH_HOME/tpcc/stored_proc
TPCC_BLOCKS=$BENCH_HOME/tpcc/blocks
TPCC_SCRIPTS=$BENCH_HOME/tpcc/scripts
TPCC_UTILS=$BUILD_HOME/utils
AUDIT_SQL=$BENCH_HOME/tpcc/audit/sql
BUILD_SQL=sql
LOAD_SCRIPTS=${BUILD_HOME}
OUTDIR=${BUILD_HOME}/outdir
STEP=0
START=0
END=0
CONTINUE=1
PROGNAME=$0
MULT=9600

PATH=${PATH}:${TPCC_SOURCE}:${TPCC_UTILS}
export PATH


#
#  Load stock table (in parallel with loading customer table)
#

I=1
SI=1
EI=1000
INC=1000
while [ $I -le 100 ]
do
   tpccload -M $MULT -S -j $SI -k $EI > ${OUTDIR}/stk${I}.out 2>&1 &
   I=`expr $I + 1`
   SI=`expr $SI + $INC`
   EI=`expr $EI + $INC`
done
wait
```

build_dir/load_ware.sh

```
#!/bin/ksh


BUILD_HOME=$ORACLE_HOME/bench/tpc/tpcc/scripts/9600w/
BENCH_HOME=$ORACLE_HOME/bench/tpc
BENCH_GEN=$ORACLE_HOME/bench/gen
GEN_SQL=$BUILD_HOME/sql
TPCC_SOURCE=$BENCH_HOME/tpcc/source
TPCC_SQL=$BUILD_HOME/sql
TPCC_STORE=$BENCH_HOME/tpcc/stored_proc
TPCC_BLOCKS=$BENCH_HOME/tpcc/blocks
TPCC_SCRIPTS=$BENCH_HOME/tpcc/scripts
TPCC_UTILS=$BUILD_HOME/utils
AUDIT_SQL=$BENCH_HOME/tpcc/audit/sql
BUILD_SQL=sql
LOAD_SCRIPTS=${BUILD_HOME}
OUTDIR=${BUILD_HOME}/outdir
STEP=0
START=0
END=0
CONTINUE=1
PROGNAME=$0
MULT=9600

PATH=${PATH}:${TPCC_SOURCE}:${TPCC_UTILS}
export PATH


tpccload -M $MULT -w
```

build_dir/nord.sql

```
rem
rem ================================================================+
rem NEW_ORDER (IOT)table created on NORD tablespace
rem  4 - 2G datafiles
rem ================================================================
rem

rem
rem DROP all first
rem
        drop table new_order;

set timing on


rem
rem NEW_ORDER table
rem

create table new_order ( no_w_id  number,
                         no_d_id  number,
                         no_o_id  number,
constraint inord primary key (no_w_id, no_d_id, no_o_id)
        )
organization index
        tablespace nord
        initrans 4
        pctfree  5
        storage (freelist groups 43 freelists 9);

rem
rem done
rem

        exit;
```

build_dir/ordl.sql

```
rem
rem ================================================================+
rem ORDER_LINE (IOT)table created on IORDL tablespace
rem  162 - 2G datafiles
rem ================================================================
rem

rem
rem DROP all first
rem
        drop table order_line;

set timing on

rem
rem ORDER_LINE table
rem

       create table order_line (
        ol_w_id         number,
        ol_d_id         number,
        ol_o_id         number,
        ol_number       number,
        ol_i_id         number,
        ol_delivery_d   date,
        ol_amount       number,
        ol_supply_w_id  number,
        ol_quantity     number,
        ol_dist_info    char(24),
constraint iordl primary key (ol_w_id, ol_d_id, ol_o_id, ol_number)
        )
organization index
        tablespace ordl
        initrans 4
        pctfree  5
        storage (freelist groups 43 freelists 9);

rem
rem done
rem

        exit;
```

build_dir/ordr.sql

```
rem
rem ============================================================+
rem ORDERS table created on ORD tablespace
rem  8 - 2G datafiles
rem ============================================================
rem

rem
rem DROP all first
rem
       drop table orders;

set timing on

rem
rem ORDERS table
rem

      create table orders (
       o_id            number,
       o_w_id          number,
       o_d_id          number,
       o_c_id          number,
       o_carrier_id    number,
       o_ol_cnt        number,
       o_all_local     number,
       o_entry_d       date
       )
       tablespace ord
       initrans 4
       pctfree  5
       storage (freelist groups 43 freelists 9);

rem
rem done
rem

       exit;
```

build_dir/realter_temp.sh

```
#!/bin/ksh


BUILD_HOME=$ORACLE_HOME/bench/tpc/tpcc/scripts/9600w/
BENCH_HOME=$ORACLE_HOME/bench/tpc
BENCH_GEN=$ORACLE_HOME/bench/gen
GEN_SQL=$BUILD_HOME/sql
TPCC_SOURCE=$BENCH_HOME/tpcc/source
TPCC_SQL=$BUILD_HOME/sql
TPCC_STORE=$BENCH_HOME/tpcc/stored_proc
TPCC_BLOCKS=$BENCH_HOME/tpcc/blocks
TPCC_SCRIPTS=$BENCH_HOME/tpcc/scripts
TPCC_UTILS=$BUILD_HOME/utils
AUDIT_SQL=$BENCH_HOME/tpcc/audit/sql
BUILD_SQL=sql
LOAD_SCRIPTS=${BUILD_HOME}
OUTDIR=${BUILD_HOME}/outdir
STEP=0
START=0
END=0
CONTINUE=1
PROGNAME=$0
MULT=9600

PATH=${PATH}:${TPCC_SOURCE}:${TPCC_UTILS}
export PATH


svrmgrl <<!
   connect internal
   alter tablespace temp
      default storage (initial 20K next 20K pctincrease 50);
   exit;
!
```

build_dir/redoroll.sh

```
#!/bin/ksh

# Written by: glennf
# Re/Create rollbacksegements


export kroll=/tmp/kroll$$.sql
export onroll=/tmp/onroll$$.sql
export crroll=/tmp/crroll$$.sql

print "connect internal" >$kroll
print "\n" >$onroll

((i=1))
while ((i<=1200))
do
print "alter rollback segment t$i offline;" >>$kroll
print "drop rollback segment t$i;" >>$kroll
print "CREATE ROLLBACK SEGMENT t$i" >>$crroll
print "TABLESPACE roll" >>$crroll
print "STORAGE (initial 100K next 100K minextents 2);" >>$crroll
print "alter rollback segment t$i online;" >>$onroll
((i=i+1))
done

svrmgrl <<!
spool tpcc_roll.out;

alter rollback segment s1 online;
alter rollback segment s2 online;
alter rollback segment s3 online;
alter rollback segment s4 online;

@$kroll
@$crroll
@$onroll

alter rollback segment s1 offline;
alter rollback segment s2 offline;
alter rollback segment s3 offline;
alter rollback segment s4 offline;

spool off;

exit;

!
```

build_dir/stok.sql

```
rem
rem ============================================================+
rem STOCK table and cluster created on STOCKS tablespace
rem  185 - 2G datafiles
rem   2029M extent per datafile
rem ============================================================
rem

rem
rem DROP all first
rem
        drop cluster scluster including tables;
        drop table stock;

set timing on

rem
rem STOCK table
rem

        create cluster scluster (
           s_i_id       number,
           s_w_id       number
        )
singletable
        hashkeys        960000000
        hash is         (s_i_id * 9600 + s_w_id)
        size            350
        initrans        3
        pctfree         0
        tablespace      stocks
        storage (freelist groups 4 freelists 11
                 buffer_pool keep);

        create table stock (
        s_i_id          number,
        s_w_id          number,
        s_quantity      number,
        s_ytd           number,
        s_order_cnt     number,
        s_remote_cnt    number,
        s_data          varchar2(50),
        s_dist_01       char(24),
        s_dist_02       char(24),
        s_dist_03       char(24),
        s_dist_04       char(24),
        s_dist_05       char(24),
        s_dist_06       char(24),
        s_dist_07       char(24),
        s_dist_08       char(24),
        s_dist_09       char(24),
        s_dist_10       char(24)
        )
        cluster scluster (s_i_id, s_w_id);

rem
rem done
rem

        exit;
```

build_dir/tpcc_misc.sh

```
#!/bin/ksh


BUILD_HOME=$ORACLE_HOME/bench/tpc/tpcc/scripts/9600w/
BENCH_HOME=$ORACLE_HOME/bench/tpc
BENCH_GEN=$ORACLE_HOME/bench/gen
GEN_SQL=$BUILD_HOME/sql
TPCC_SOURCE=$BENCH_HOME/tpcc/source
TPCC_SQL=$BUILD_HOME/sql
TPCC_STORE=$BENCH_HOME/tpcc/stored_proc
TPCC_BLOCKS=$BENCH_HOME/tpcc/blocks
TPCC_SCRIPTS=$BENCH_HOME/tpcc/scripts
TPCC_UTILS=$BUILD_HOME/utils
AUDIT_SQL=$BENCH_HOME/tpcc/audit/sql
BUILD_SQL=sql
LOAD_SCRIPTS=${BUILD_HOME}
OUTDIR=${BUILD_HOME}/outdir
STEP=0
START=0
```

```
END=0
CONTINUE=1
PROGNAME=$0
MULT=8750

PATH=${PATH}:${TPCC_SOURCE}:${TPCC_UTILS}
export PATH


$TPCC_UTILS/ext_all.sh > ${OUTDIR}/ext_all.out 2>&1

$TPCC_UTILS/space_init.sh
$TPCC_UTILS/space_get.sh 105000 8750
$TPCC_UTILS/space_rpt.sh ${OUTDIR}/space.rpt

exit

sqlplus system/manager <<!
   alter user tpcc temporary tablespace system;
   quit;
!

sqlplus sys/change_on_install <<!
   grant execute on dbms_lock to public;
   grant execute on dbms_pipe to public;
   grant select on v_\$parameter to public;
   quit;
!

sqlplus tpcc/tpcc @$BUILD_SQL/plsql_mon
sqlplus tpcc/tpcc @$BUILD_SQL/cre_tab
```

build_dir/tpcc_reports.sh

```
#!/bin/ksh


BUILD_HOME=$ORACLE_HOME/bench/tpc/tpcc/scripts/9600w/
BENCH_HOME=$ORACLE_HOME/bench/tpc
BENCH_GEN=$ORACLE_HOME/bench/gen
GEN_SQL=$BUILD_HOME/sql
TPCC_SOURCE=$BENCH_HOME/tpcc/source
TPCC_SQL=$BUILD_HOME/sql
TPCC_STORE=$BENCH_HOME/tpcc/stored_proc
TPCC_BLOCKS=$BENCH_HOME/tpcc/blocks
TPCC_SCRIPTS=$BENCH_HOME/tpcc/scripts
TPCC_UTILS=$BUILD_HOME/utils
AUDIT_SQL=$BENCH_HOME/tpcc/audit/sql
BUILD_SQL=sql
LOAD_SCRIPTS=${BUILD_HOME}
OUTDIR=${BUILD_HOME}/outdir
STEP=0
START=0
END=0
CONTINUE=1
PROGNAME=$0
MULT=9600

PATH=${PATH}:${TPCC_SOURCE}:${TPCC_UTILS}
export PATH


sqlplus sys/change_on_install @$GEN_SQL/orst_cre
sqlplus sys/change_on_install @$TPCC_SQL/c_stat
sqlplus sys/change_on_install @$GEN_SQL/pst_c
```

build_dir/tpcc_rol.sh

```
#
#
#=============================================================+
#        Copyright (c) 1998  Oracle Corp, Redwood Shores, CA  |
#                  OPEN SYSTEMS PERFORMANCE GROUP             |
#                       All Rights Reserved                   |
#=============================================================+
# FILENAME
#      tpccrol.sh
# DESCRIPTION
#      Script file for creating the rollback segments.
#=============================================================
#

svrmgrl <<!
   connect tpcc/tpcc;
   host date;
   set timing on;


CREATE ROLLBACK SEGMENT t1
TABLESPACE roll
STORAGE (initial 100K next 100K minextents 2);
CREATE ROLLBACK SEGMENT t2
TABLESPACE roll
STORAGE (initial 100K next 100K minextents 2);
CREATE ROLLBACK SEGMENT t3
TABLESPACE roll
STORAGE (initial 100K next 100K minextents 2);
CREATE ROLLBACK SEGMENT t4
TABLESPACE roll
STORAGE (initial 100K next 100K minextents 2);
CREATE ROLLBACK SEGMENT t5
TABLESPACE roll
STORAGE (initial 100K next 100K minextents 2);
CREATE ROLLBACK SEGMENT t6
TABLESPACE roll
STORAGE (initial 100K next 100K minextents 2);
CREATE ROLLBACK SEGMENT t7
TABLESPACE roll
STORAGE (initial 100K next 100K minextents 2);
CREATE ROLLBACK SEGMENT t8
TABLESPACE roll
STORAGE (initial 100K next 100K minextents 2);
CREATE ROLLBACK SEGMENT t9
TABLESPACE roll
STORAGE (initial 100K next 100K minextents 2);
CREATE ROLLBACK SEGMENT t10
TABLESPACE roll
STORAGE (initial 100K next 100K minextents 2);
CREATE ROLLBACK SEGMENT t11
TABLESPACE roll
STORAGE (initial 100K next 100K minextents 2);
CREATE ROLLBACK SEGMENT t12
TABLESPACE roll
STORAGE (initial 100K next 100K minextents 2);
CREATE ROLLBACK SEGMENT t13
TABLESPACE roll
STORAGE (initial 100K next 100K minextents 2);
CREATE ROLLBACK SEGMENT t14
TABLESPACE roll
STORAGE (initial 100K next 100K minextents 2);
CREATE ROLLBACK SEGMENT t15
TABLESPACE roll
STORAGE (initial 100K next 100K minextents 2);
CREATE ROLLBACK SEGMENT t16
TABLESPACE roll
STORAGE (initial 100K next 100K minextents 2);
CREATE ROLLBACK SEGMENT t17
TABLESPACE roll
STORAGE (initial 100K next 100K minextents 2);
CREATE ROLLBACK SEGMENT t18
TABLESPACE roll
STORAGE (initial 100K next 100K minextents 2);
CREATE ROLLBACK SEGMENT t19
TABLESPACE roll
STORAGE (initial 100K next 100K minextents 2);
CREATE ROLLBACK SEGMENT t20
TABLESPACE roll
STORAGE (initial 100K next 100K minextents 2);

!
```

build_dir/tpcc_stored_proc.sh

```
#!/bin/ksh


BUILD_HOME=$ORACLE_HOME/bench/tpc/tpcc/scripts/9600w/
BENCH_HOME=$ORACLE_HOME/bench/tpc
BENCH_GEN=$ORACLE_HOME/bench/gen
GEN_SQL=$BUILD_HOME/sql
TPCC_SOURCE=$BENCH_HOME/tpcc/source
TPCC_SQL=$BUILD_HOME/sql
TPCC_STORE=$BENCH_HOME/tpcc/stored_proc
TPCC_BLOCKS=$BENCH_HOME/tpcc/blocks
TPCC_SCRIPTS=$BENCH_HOME/tpcc/scripts
TPCC_UTILS=$BUILD_HOME/utils
AUDIT_SQL=$BENCH_HOME/tpcc/audit/sql
BUILD_SQL=sql
LOAD_SCRIPTS=${BUILD_HOME}
OUTDIR=${BUILD_HOME}/outdir
STEP=0
START=0
END=0
CONTINUE=1
PROGNAME=$0
MULT=9600

PATH=${PATH}:${TPCC_SOURCE}:${TPCC_UTILS}
export PATH


sqlplus tpcc/tpcc @$TPCC_BLOCKS/views
sqlplus tpcc/tpcc @$TPCC_BLOCKS/initpay
```

build_dir/ware.sql

```
rem
rem ============================================================
rem WAREHOUSE table and cluster created on WARE tablespace.
rem  1 - 500M datafile shared with (ware,dist) table and indexes.
rem ============================================================
rem


rem
rem DROP all first
rem
        drop table warehouse;
drop cluster wcluster including tables;

set timing on

rem
rem WAREHOUSE table
rem

create cluster wcluster (
w_idnumber(5,0)
)
singletable
hashkeys9600
hash isw_id
size1536
initrans3
pctfree0
        tablespace ware
```

```
        storage (initial 20M next 20M pctincrease 0);

        create table warehouse (
                w_id            number(5,0),
                w_ytd           number,
                w_tax           number,
                w_name          varchar2(10),
                w_street_1      varchar2(20),
                w_street_2      varchar2(20),
                w_city          varchar2(20),
                w_state         char(2),
                w_zip           char(9)
        )
cluster wcluster (w_id);

rem
rem done
rem

        exit;
```

build_dir/admin/afiedt.buf

```
alter database tpcc add logfile group 3
'/oracle/app/oracle/product/oracle814.64/dbs/tpcc_disks/log1' size 40979m
/
```

build_dir/admin/p_build.buf

```
#
#=====================================================================+
#        Copyright (c) 1998  Oracle Corp, Redwood Shores, CA          |
#                    OPEN SYSTEMS PERFORMANCE GROUP                   |
#                         All Rights Reserved                         |
#=====================================================================+
# FILENAME
#      create.ora
# DESCRIPTION
#      Oracle parameter file for creating TPC-C database.
#=====================================================================
#
#_disable_logging = TRUE
#_db_file_noncontig_mblock_read_count = 1
db_file_multiblock_read_count = 512
compatible= 8.1.4.0.0
control_files= ?/dbs/tpcc_disks/cntrl1
sort_area_size                  = 30000000
parallel_max_servers            = 300
recovery_parallelism            = 40
db_name                         = tpcc
db_files                        = 1023
_spin_count                     = 20000
_db_block_cache_protect         = false
#db_writer_processes             = 2
db_block_buffers                = 500000
buffer_pool_recycle             = (buffers:50000,  lru_latches:16)
buffer_pool_keep                = (buffers:100000,  lru_latches:16)
db_block_lru_latches            = 64
dml_locks                       = 1500
#_log_io_size                     = 100
#log_buffer                      = 10485760
log_buffer                      = 2097152
log_archive_start               = FALSE
log_checkpoint_interval         = 1000000000
log_checkpoints_to_alert        = TRUE
max_rollback_segments           = 600
processes                       = 600
sessions                        = 800
transactions                    = 800
transactions_per_rollback_segment = 3
rollback_segments               = (s1,s2,s3,s4,s5,s6,s7,s8,s9,s10,s11,s12,s13,
s14,s15,s16,s17,s18,s19,s20,s21,s22,s23,s24,s25,s26,s27,s28,s29,s30)
#shared_pool_size                = 15000000
shared_pool_size                = 500000000
cursor_space_for_time           = TRUE
```

build_dir/admin/p_create.ora

```
#
#
#=====================================================================+
#        Copyright (c) 1998  Oracle Corp, Redwood Shores, CA          |
#                    OPEN SYSTEMS PERFORMANCE GROUP                   |
#                         All Rights Reserved                         |
#=====================================================================+
# FILENAME
#      create.ora
# DESCRIPTION
#      Oracle parameter file for creating TPC-C database.
#=====================================================================
#

compatible= 8.1.3.0.0
control_files= ?/dbs/tpcc_disks/cntrl1
db_name                 = tpcc
db_files                = 1023
db_block_buffers        = 2000
dml_locks               = 500
log_buffer              = 32768
sessions                = 70
processes               = 50
transactions            = 50
```

build_dir/admin/sqlnet.log

```
************************************************************************
Fatal NI connect error 12547, connecting to:

(DESCRIPTION=(ADDRESS=(PROTOCOL=beq)(PROGRAM=/oracle/app/oracle/product/oracle814.64/
bin/oracle)(ARGV0=oraclebench)(ARGS='(DESCRIPTION=(LOCAL=YES)(ADDRESS=(PROTOCOL=beq))
)')(DETACH=NO))(CONNECT_DATA=(CID=(PROGRAM=)(HOST=stardcr)(USER=oracle))))

  VERSION INFORMATION:
TNS for Solaris: Version 8.0.5.0.0 - Production
Oracle Bequeath NT Protocol Adapter for Solaris: Version 8.0.5.0.0 - Production
  Time: 01-FEB-99 10:09:39
  Tracing not turned on.
  Tns error struct:
    nr err code: 12206
    TNS-12206: TNS:received a TNS error during navigation
    ns main err code: 12547
    TNS-12547: TNS:lost contact
    ns secondary err code: 12560
    nt main err code: 517
    TNS-00517: Lost contact
    nt secondary err code: 32
    nt OS err code: 0


************************************************************************
Fatal NI connect error 12547, connecting to:

(DESCRIPTION=(ADDRESS=(PROTOCOL=beq)(PROGRAM=/oracle/app/oracle/product/oracle814.64/
bin/oracle)(ARGV0=oraclebench)(ARGS='(DESCRIPTION=(LOCAL=YES)(ADDRESS=(PROTOCOL=beq))
)')(DETACH=NO))(CONNECT_DATA=(CID=(PROGRAM=)(HOST=stardcr)(USER=oracle))))

  VERSION INFORMATION:
TNS for Solaris: Version 8.0.5.0.0 - Production
Oracle Bequeath NT Protocol Adapter for Solaris: Version 8.0.5.0.0 - Production
  Time: 01-FEB-99 10:09:39
  Tracing not turned on.
  Tns error struct:
    nr err code: 12206
    TNS-12206: TNS:received a TNS error during navigation
    ns main err code: 12547
    TNS-12547: TNS:lost contact
    ns secondary err code: 12560
    nt main err code: 517
    TNS-00517: Lost contact
    nt secondary err code: 32
    nt OS err code: 0


************************************************************************
Fatal NI connect error 12547, connecting to:

(DESCRIPTION=(ADDRESS=(PROTOCOL=beq)(PROGRAM=/oracle/app/oracle/product/oracle814.64/
bin/oracle)(ARGV0=oraclebench)(ARGS='(DESCRIPTION=(LOCAL=YES)(ADDRESS=(PROTOCOL=beq))
)')(DETACH=NO))(CONNECT_DATA=(CID=(PROGRAM=)(HOST=stardcr)(USER=oracle))))

  VERSION INFORMATION:
TNS for Solaris: Version 8.0.5.0.0 - Production
Oracle Bequeath NT Protocol Adapter for Solaris: Version 8.0.5.0.0 - Production
  Time: 01-FEB-99 10:09:57
  Tracing not turned on.
  Tns error struct:
    nr err code: 12206
    TNS-12206: TNS:received a TNS error during navigation
    ns main err code: 12547
    TNS-12547: TNS:lost contact
    ns secondary err code: 12560
    nt main err code: 517
    TNS-00517: Lost contact
    nt secondary err code: 32
    nt OS err code: 0


************************************************************************
Fatal NI connect error 12547, connecting to:

(DESCRIPTION=(ADDRESS=(PROTOCOL=beq)(PROGRAM=/oracle/app/oracle/product/oracle814.64/
bin/oracle)(ARGV0=oraclebench)(ARGS='(DESCRIPTION=(LOCAL=YES)(ADDRESS=(PROTOCOL=beq))
)')(DETACH=NO))(CONNECT_DATA=(CID=(PROGRAM=)(HOST=stardcr)(USER=oracle))))

  VERSION INFORMATION:
TNS for Solaris: Version 8.0.5.0.0 - Production
Oracle Bequeath NT Protocol Adapter for Solaris: Version 8.0.5.0.0 - Production
  Time: 01-FEB-99 10:09:57
  Tracing not turned on.
  Tns error struct:
    nr err code: 12206
    TNS-12206: TNS:received a TNS error during navigation
    ns main err code: 12547
    TNS-12547: TNS:lost contact
    ns secondary err code: 12560
    nt main err code: 517
    TNS-00517: Lost contact
    nt secondary err code: 32
    nt OS err code: 0


************************************************************************
Fatal NI connect error 12547, connecting to:

(DESCRIPTION=(ADDRESS=(PROTOCOL=beq)(PROGRAM=/oracle/app/oracle/product/oracle814.64/
bin/oracle)(ARGV0=oraclebench)(ARGS='(DESCRIPTION=(LOCAL=YES)(ADDRESS=(PROTOCOL=beq))
)')(DETACH=NO))(CONNECT_DATA=(CID=(PROGRAM=)(HOST=stardcr)(USER=oracle))))

  VERSION INFORMATION:
TNS for Solaris: Version 8.0.5.0.0 - Production
Oracle Bequeath NT Protocol Adapter for Solaris: Version 8.0.5.0.0 - Production
  Time: 07-FEB-99 20:34:04
```

```
  Tracing not turned on.
  Tns error struct:
    nr err code: 12206
    TNS-12206: TNS:received a TNS error during navigation
    ns main err code: 12547
    TNS-12547: TNS:lost contact
    ns secondary err code: 12560
    nt main err code: 517
    TNS-00517: Lost contact
    nt secondary err code: 32
    nt OS err code: 0


************************************************************************
Fatal NI connect error 12547, connecting to:

(DESCRIPTION=(ADDRESS=(PROTOCOL=beq)(PROGRAM=/oracle/app/oracle/product/oracle814.64/
bin/oracle)(ARGV0=oraclebench)(ARGS='(DESCRIPTION=(LOCAL=YES)(ADDRESS=(PROTOCOL=beq))
)')(DETACH=NO))(CONNECT_DATA=(CID=(PROGRAM=)(HOST=stardcr)(USER=oracle))))

  VERSION INFORMATION:
TNS for Solaris: Version 8.0.5.0.0 - Production
Oracle Bequeath NT Protocol Adapter for Solaris: Version 8.0.5.0.0 - Production
  Time: 07-FEB-99 20:34:05
  Tracing not turned on.
  Tns error struct:
    nr err code: 12206
    TNS-12206: TNS:received a TNS error during navigation
    ns main err code: 12547
    TNS-12547: TNS:lost contact
    ns secondary err code: 12560
    nt main err code: 517
    TNS-00517: Lost contact
    nt secondary err code: 32
    nt OS err code: 0


************************************************************************
Fatal NI connect error 12547, connecting to:

(DESCRIPTION=(ADDRESS=(PROTOCOL=beq)(PROGRAM=/oracle/app/oracle/product/oracle814.64/
bin/oracle)(ARGV0=oraclebench)(ARGS='(DESCRIPTION=(LOCAL=YES)(ADDRESS=(PROTOCOL=beq))
)')(DETACH=NO))(CONNECT_DATA=(CID=(PROGRAM=)(HOST=stardcr)(USER=oracle))))

  VERSION INFORMATION:
TNS for Solaris: Version 8.0.5.0.0 - Production
Oracle Bequeath NT Protocol Adapter for Solaris: Version 8.0.5.0.0 - Production
  Time: 07-FEB-99 20:36:26
  Tracing not turned on.
  Tns error struct:
    nr err code: 12206
    TNS-12206: TNS:received a TNS error during navigation
    ns main err code: 12547
    TNS-12547: TNS:lost contact
    ns secondary err code: 12560
    nt main err code: 517
    TNS-00517: Lost contact
    nt secondary err code: 32
    nt OS err code: 0


************************************************************************
Fatal NI connect error 12547, connecting to:

(DESCRIPTION=(ADDRESS=(PROTOCOL=beq)(PROGRAM=/oracle/app/oracle/product/oracle814.64/
bin/oracle)(ARGV0=oraclebench)(ARGS='(DESCRIPTION=(LOCAL=YES)(ADDRESS=(PROTOCOL=beq))
)')(DETACH=NO))(CONNECT_DATA=(CID=(PROGRAM=)(HOST=stardcr)(USER=oracle))))

  VERSION INFORMATION:
TNS for Solaris: Version 8.0.5.0.0 - Production
Oracle Bequeath NT Protocol Adapter for Solaris: Version 8.0.5.0.0 - Production
  Time: 07-FEB-99 20:36:26
  Tracing not turned on.
  Tns error struct:
    nr err code: 12206
    TNS-12206: TNS:received a TNS error during navigation
    ns main err code: 12547
    TNS-12547: TNS:lost contact
    ns secondary err code: 12560
    nt main err code: 517
    TNS-00517: Lost contact
    nt secondary err code: 32
    nt OS err code: 0
```

build_dir/loader/dist.ctl

```
--
-- $Header: cust.ctl 7030100.1 95/08/07 15:46:36 plai Generic<base> $ Copyr (c) 1994
Oracle
--
-- ============================================================+
--         Copyright (c) 1994  Oracle Corp, Redwood Shores, CA       |
--                    OPEN SYSTEMS PERFORMANCE GROUP                 |
--                         All Rights Reserved                       |
-- ============================================================+
--  FILENAME
--      cust.ctl
--  DESCRIPTION
--      This is a SQL*Loader control file.  It is used for
--      loading customers to the tpcc database.
--  USAGE
--      sqlldr[st] <user_name>/<password> <SQL*Loader control file>
-- ============================================================*/

OPTIONS (DIRECT = TRUE, PARALLEL = TRUE)

UNRECOVERABLE

LOAD DATA
APPEND

INTO TABLE district
APPEND
FIELDS TERMINATED BY WHITESPACE OPTIONALLY ENCLOSED BY '"'
(

 D_ID                                  integer external,
 D_W_ID                                integer external,
 D_YTD                                 integer external,
 D_TAX                                 float external,
 D_NEXT_O_ID                           integer external,
 D_NAME                                CHAR(10),
 D_STREET_1                            CHAR(20),
 D_STREET_2                            CHAR(20),
 D_CITY                                CHAR(20),
 D_STATE                               CHAR(2),
 D_ZIP                                 CHAR(9)
)
```

build_dir/loader/hist.ctl

```
--
-- $Header: hist.ctl 7030100.1 95/08/07 15:47:23 plai Generic<base> $ Copyr (c) 1994
Oracle
--
-- ============================================================+
--         Copyright (c) 1994  Oracle Corp, Redwood Shores, CA       |
--                    OPEN SYSTEMS PERFORMANCE GROUP                 |
--                         All Rights Reserved                       |
-- ============================================================+
--  FILENAME
--      hist.ctl
--  DESCRIPTION
--      This is a SQL*Loader control file.  It is used for
--      loading history rows to the tpcc database.
--  USAGE
--      sqlldr[st] <user_name>/<password> <SQL*Loader control file>
-- ============================================================*/

OPTIONS (DIRECT = TRUE, PARALLEL = TRUE)

UNRECOVERABLE

LOAD DATA
APPEND

INTO TABLE history
APPEND
FIELDS TERMINATED BY WHITESPACE OPTIONALLY ENCLOSED BY '"'
(
   h_c_id              integer external,
   h_c_d_id            integer external,
   h_c_w_id            integer external,
   h_d_id              integer external,
   h_w_id              integer external,
   h_date              date "DD-Mon-YYYY",
   h_amount            integer external,
   h_data              char(24)
)
```

build_dir/loader/neword.ctl

```
--
-- $Header: neword.ctl 7030100.1 95/08/07 15:47:44 plai Generic<base> $ Copyr (c)
1994 Oracle
--
-- ============================================================+
--         Copyright (c) 1994  Oracle Corp, Redwood Shores, CA       |
--                    OPEN SYSTEMS PERFORMANCE GROUP                 |
--                         All Rights Reserved                       |
-- ============================================================+
--  FILENAME
--      neword.ctl
--  DESCRIPTION
--      This is a SQL*Loader control file.  It is used for
--      loading new orders to the tpcc database.
--  USAGE
--      sqlldr[st] <user_name>/<password> <SQL*Loader control file>
-- ============================================================*/

OPTIONS (DIRECT = TRUE, PARALLEL = TRUE)

UNRECOVERABLE

LOAD DATA
APPEND

INTO TABLE new_order
APPEND
FIELDS TERMINATED BY WHITESPACE OPTIONALLY ENCLOSED BY '"'
(
   no_o_id             integer external,
   no_d_id             integer external,
   no_w_id             integer external
)
```

build_dir/loader/order.ctl

```
--
-- $Header: order.ctl 7030100.1 95/08/07 15:54:01 plai Generic<base> $ Copyr (c) 1994
Oracle
--
-- ============================================================+
--         Copyright (c) 1994  Oracle Corp, Redwood Shores, CA       |
--                    OPEN SYSTEMS PERFORMANCE GROUP                 |
```

```
--                       All Rights Reserved                       |
-- ================================================================+
--  FILENAME
--      order.ctl
--  DESCRIPTION
--      This is a SQL*Loader control file.  It is used for
--      loading orders to the tpcc database.
--  USAGE
--      sqlldr[st] <user_name>/<password> <SQL*Loader control file>
-- ================================================================*/

OPTIONS (DIRECT = TRUE, PARALLEL = TRUE)

UNRECOVERABLE

LOAD DATA
APPEND

INTO TABLE orders
APPEND
FIELDS TERMINATED BY WHITESPACE OPTIONALLY ENCLOSED BY '"'
(
   o_id               integer external,
   o_d_id             integer external,
   o_w_id             integer external,
   o_c_id             integer external,
   o_entry_d          date "DD-Mon-YYYY",
   o_carrier_id       integer external,
   o_ol_cnt           integer external,
   o_all_local        integer external
)
```

build_dir/loader/ordline.ctl

```
--
-- $Header: ordline.ctl 7030100.1 95/08/07 15:54:11 plai Generic<base> $ Copyr (c)
1994 Oracle
--
-- ================================================================+
--         Copyright (c) 1994  Oracle Corp, Redwood Shores, CA       |
--                     OPEN SYSTEMS PERFORMANCE GROUP                |
--                          All Rights Reserved                      |
-- ================================================================+
--  FILENAME
--      ordline.ctl
--  DESCRIPTION
--      This is a SQL*Loader control file.  It is used for
--      loading order lines to the tpcc database.
--  USAGE
--      sqlldr[st] <user_name>/<password> <SQL*Loader control file>
-- ================================================================*/

OPTIONS (DIRECT = TRUE, PARALLEL = TRUE)

UNRECOVERABLE

LOAD DATA
APPEND

INTO TABLE order_line
APPEND
FIELDS TERMINATED BY WHITESPACE OPTIONALLY ENCLOSED BY '"'
(
   ol_o_id            integer external,
   ol_d_id            integer external,
   ol_w_id            integer external,
   ol_number          integer external,
   ol_delivery_d      date "DD-Mon-YYYY",
   ol_i_id            integer external,
   ol_supply_w_id     integer external,
   ol_quantity        integer external,
   ol_amount          integer external,
   ol_dist_info       char(24)
)
```

build_dir/loader/stock.ctl

```
--
-- $Header: stock.ctl 7030100.1 95/08/07 15:54:18 plai Osd<base> $ Copyr (c) 1994
Oracle
--
-- ================================================================+
--         Copyright (c) 1994  Oracle Corp, Redwood Shores, CA       |
--                     OPEN SYSTEMS PERFORMANCE GROUP                |
--                          All Rights Reserved                      |
-- ================================================================+
--  FILENAME
--      stock.ctl
--  DESCRIPTION
--      This is a SQL*Loader control file.  It is used for
--      loading stocks to the tpcc database.
--  USAGE
--      sqlldr[st] <user_name>/<password> <SQL*Loader control file>
-- ================================================================*/

OPTIONS (DIRECT = TRUE, PARALLEL = TRUE)

UNRECOVERABLE

LOAD DATA
APPEND

INTO TABLE stock
APPEND
FIELDS TERMINATED BY WHITESPACE OPTIONALLY ENCLOSED BY '"'
(
   s_i_id             integer external,
   s_w_id             integer external,
   s_quantity         integer external,
   s_dist_01          char(24),
   s_dist_02          char(24),
   s_dist_03          char(24),
   s_dist_04          char(24),
   s_dist_05          char(24),
   s_dist_06          char(24),
   s_dist_07          char(24),
   s_dist_08          char(24),
   s_dist_09          char(24),
   s_dist_10          char(24),
   s_ytd              integer external,
   s_order_cnt        integer external,
   s_remote_cnt       integer external,
   s_data             char(50)
)
```

build_dir/loader/tpcc.h

```
/*
 * $Header: tpcc.h 7030100.1 95/07/19 15:10:55 plai Generic<base> $ Copyr (c) 1993
Oracle
 */
/*================================================================+
 |         Copyright (c) 1995  Oracle Corp, Redwood Shores, CA     |
 |                     OPEN SYSTEMS PERFORMANCE GROUP              |
 |                          All Rights Reserved                    |
 +================================================================+
 | FILENAME
 |    tpcc.h
 | DESCRIPTION
 |    Include file for TPC-C benchmark programs.
 +================================================================*/

#ifndef TPCC_H
#define TPCC_H


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

#include <oratypes.h>
#include <oci.h>
#include <ocidfn.h>

typedef struct cda_def csrdef;
typedef struct cda_def ldadef;


/* TPC-C transaction functions */

extern int TPCinit ();
extern int TPCnew ();
extern int TPCpay ();
extern int TPCord ();
extern int TPCdel ();
extern int TPCsto ();
extern int TPCexit ();
extern int TPCdumpinit ();
extern int TPCdumpnew ();
extern int TPCdumppay ();
extern int TPCdumpord ();
extern int TPCdumpdel ();
extern int TPCdumpsto ();
extern int TPCdumpexit ();


/* Error codes */

#define OCI_HTYPE_STM           OCI_HTYPE_STMT
#define OCI_ATTR_ROWCNT         OCI_ATTR_ROW_COUNT
#define OCI_HTYPE_ERR           OCI_HTYPE_ERROR
#define OCI_ATTR_SRVRCTXT       OCI_ATTR_SERVER
#define OCI_ATTR_USERCTXT       OCI_ATTR_SESSION

#define RECOVERR -10
#define IRRECERR -20
#define NOERR    111
#define DEL_ERROR -666
#define DEL_DATE_LEN 7
#define NDISTS 10
#define NITEMS 15
#define SQL_BUF_SIZE 8192
#endif
```

build_dir/loader/tpccload.c

```
#ifdef RCSID
static char *RCSid =
   "$Header: tpccload.c 7030100.1 96/05/13 16:20:36 plai Generic<base> $ Copyr (c)
1993 Oracle";
#endif /* RCSID */

/*================================================================+
 |        Copyright (c) 1994  Oracle Corp, Redwood Shores, CA      |
 |                     OPEN SYSTEMS PERFORMANCE GROUP              |
 |                          All Rights Reserved                    |
 +================================================================+
 | FILENAME
 |    tpccload.c
 | DESCRIPTION
 |    Load or generate TPC-C database tables.
 |    Usage: tpccload -M <# of warehouses> [options]
 |              options: -A  load all tables
```

```
 |                      -w  load warehouse table
 |                      -d  load district table
 |                      -c  load customer table
 |                      -i  load item table
 |                      -s  load stock table (cluster around s_w_id)
 |                      -S  load stock table (cluster around s_i_id)
 |                      -h  load history table
 |                      -n  load new-order table
 |                      -o <oline file> load order and order-line table
 |                      -b <ware#>  beginning warehouse number
 |                      -e <ware#>  ending warehouse number
 |                      -j <item#>  beginning item number (with -S)
 |                      -k <item#>  ending item number (with -S)
 |                      -g  generate rows to standard output
 +================================================================*/

#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#include <unistd.h>
#include <time.h>
#include <sys/types.h>
#include "tpcc.h"

#define DISTARR 10/* district insert array size*/
#define CUSTARR 100/* customer insert array size*/
#define STOCARR 100/* stock insert array size*/
#define ITEMARR 100/* item insert array size*/
#define HISTARR 100             /* history insert array size    */
#define ORDEARR 100             /* order insert array size      */
#define NEWOARR 100             /* new order insert array size  */

#define DISTFAC 10/* max. disctrict id*/
#define CUSTFAC 3000/* max. customer id*/
#define STOCFAC 100000/* max. stock id*/
#define ITEMFAC 100000/* max. item id*/
#define HISTFAC 30000           /* history / warehouse  */
#define ORDEFAC 3000            /* order / district     */
#define NEWOFAC 900             /* new order / district */

#define C       0               /* constant in non-uniform dist. eqt. */
#define CNUM1   1               /* first constant in non-uniform dist. eqt. */
#define CNUM2   2               /* second constant in non-uniform dist. eqt. */
#define CNUM3   3               /* third constant in non-uniform dist. eqt. */

#define SEED    2               /* seed for random functions */

#define SQLTXTW "INSERT INTO warehouse (w_id, w_ytd, w_tax, w_name, w_street_1,
w_street_2, w_city, w_state, w_zip) VALUES (:w_id, 30000000, :w_tax, :w_name,
:w_street_1, \
   :w_street_2, :w_city, :w_state, :w_zip)"

#define SQLTXTD "INSERT INTO district (d_id, d_w_id, d_ytd, d_tax, d_next_o_id,
d_name, d_street_1, d_street_2, d_city, d_state, d_zip) VALUES (:d_id,
:d_w_id,3000000, :d_tax, \
     3001, :d_name, :d_street_1, :d_street_2, :d_city, :d_state, :d_zip)"

#define SQLTXTC "INSERT INTO customer (C_ID, C_D_ID, C_W_ID, C_FIRST, C_MIDDLE,
C_LAST, C_STREET_1, C_STREET_2, C_CITY, C_STATE, C_ZIP, C_PHONE, C_SINCE, C_CREDIT,
C_CREDIT_LIM, C_DISCOUNT, C_BALANCE, C_YTD_PAYMENT, C_PAYMENT_CNT, C_DELIVERY_CNT,
C_DATA) VALUES (:c_id, :c_d_id, :c_w_id, \
   :c_first, 'OE', :c_last, :c_street_1, :c_street_2, :c_city, :c_state, \
   :c_zip, :c_phone, SYSDATE, :c_credit, 5000000, :c_discount, -1000, 1000, 1, \
   0, :c_data)"

#define SQLTXTH "INSERT INTO history (h_c_id, h_c_d_id, h_c_w_id, h_d_id, h_w_id,
h_date, h_amount, h_data) VALUES (:h_c_id, :h_c_d_id, :h_c_w_id, \
   :h_d_id, :h_w_id, SYSDATE, 1000, :h_data)"

#define SQLTXTS "INSERT INTO stock (s_i_id, s_w_id, s_quantity,s_dist_01, s_dist_02,
s_dist_03, s_dist_04, s_dist_05 , s_dist_06, s_dist_07, s_dist_08, s_dist_09,
s_dist_10, s_ytd, s_order_cnt, s_remote_cnt, s_data) \
VALUES (:s_i_id, :s_w_id, :s_quantity, \
   :s_dist_01, :s_dist_02, :s_dist_03, :s_dist_04, :s_dist_05, :s_dist_06, \
   :s_dist_07, :s_dist_08, :s_dist_09, :s_dist_10, 0, 0, 0, :s_data)" \

#define SQLTXTI "INSERT INTO item (I_ID,I_IM_ID,I_NAME,I_PRICE,I_DATA) VALUES (:i_id,
:i_im_id, :i_name, :i_price, \
   :i_data)"

#define SQLTXTO1 "INSERT INTO orders (O_ID,
O_D_ID,O_W_ID,O_C_ID,O_ENTRY_D,O_CARRIER_ID,O_OL_CNT,O_ALL_LOCAL) \
   VALUES (:o_id, :o_d_id, :o_w_id, :o_c_id, \
   SYSDATE, :o_carrier_id, :o_ol_cnt, 1)"

#define SQLTXTO2 "INSERT INTO orders (O_ID,
O_D_ID,O_W_ID,O_C_ID,O_ENTRY_D,O_CARRIER_ID,O_OL_CNT,O_ALL_LOCAL) \
   VALUES (:o_id, :o_d_id, :o_w_id, :o_c_id, \
   SYSDATE, 11, :o_ol_cnt, 1)"

#define SQLTXTOL1 "INSERT INTO order_line (OL_O_ID, OL_D_ID, OL_W_ID, OL_NUMBER,
OL_DELIVERY_D, OL_I_ID, OL_SUPPLY_W_ID, OL_QUANTITY, OL_AMOUNT, OL_DIST_INFO) \
   VALUES (:ol_o_id, :ol_d_id, \
   :ol_w_id, :ol_number, SYSDATE, :ol_i_id, :ol_supply_w_id, 5, 0, \
   :ol_dist_info)"

#define SQLTXTOL2 "INSERT INTO order_line (OL_O_ID, OL_D_ID, OL_W_ID, OL_NUMBER,
OL_DELIVERY_D, OL_I_ID, OL_SUPPLY_W_ID, OL_QUANTITY, OL_AMOUNT, OL_DIST_INFO) \
   VALUES (:ol_o_id, :ol_d_id, \
   :ol_w_id, :ol_number, to_date('01-Jan-1811'), :ol_i_id, :ol_supply_w_id, 5,
:ol_amount, \
   :ol_dist_info)"

#define SQLTXTNO "INSERT INTO new_order (no_o_id, no_d_id, no_w_id) VALUES (:no_o_id,
:no_d_id, :no_w_id)"

ldadef tpclda;
csrdef curw, curd, curc, curh, curs, curi, curo1, curo2, curol1, curol2, curno;
unsigned long tpchda[256];

static char *lastname[] = {
   "BAR",
   "OUGHT",
   "ABLE",
   "PRI",
   "PRES",
   "ESE",
   "ANTI",
   "CALLY",
   "ATION",
   "EING"
};

char num9[10];
char num16[17];
char str2[3];
char str24[15][25];
int randperm3000[3000];



myusage()

{

   fprintf (stderr, "\n");
   fprintf (stderr, "Usage:\ttpccload -M <multiplier> [options]\n");
   fprintf (stderr, "options:\n");
   fprintf (stderr, "\t-A :\tload all tables\n");
   fprintf (stderr, "\t-w :\tload warehouse table\n");
   fprintf (stderr, "\t-d :\tload district table\n");
   fprintf (stderr, "\t-c :\tload customer table\n");
   fprintf (stderr, "\t-i :\tload item table\n");
   fprintf (stderr, "\t-s :\tload stock table (cluster around s_w_id)\n");
   fprintf (stderr, "\t-S :\tload stock table (cluster around s_i_id)\n");
   fprintf (stderr, "\t-h :\tload history table\n");
   fprintf (stderr, "\t-n :\tload new-order table\n");
   fprintf (stderr, "\t-o <oline file> :\tload order and order-line table\n");
   fprintf (stderr, "\t-b <ware#> :\tbeginning warehouse number\n");
   fprintf (stderr, "\t-e <ware#> :\tending warehouse number\n");
   fprintf (stderr, "\t-j <item#> :\tbeginning item number (with -S)\n");
   fprintf (stderr, "\t-k <item#> :\tending item number (with -S)\n");
   fprintf (stderr, "\t-g :\tgenerate rows to standard output\n");
   fprintf (stderr, "\n");
   exit(1);

}



errrpt (lda, cur)

csrdef *lda;
csrdef *cur;

{

   text msg[2048];

   if (cur->rc) {
      oerhms (lda, cur->rc, msg, 2048);
      fprintf (stderr, "TPC-C load error: %s\n", msg);
   }

}



quit ()

{

   if (oclose (&curw))
      errrpt (&tpclda, &curw);

   if (oclose (&curd))
      errrpt (&tpclda, &curd);

   if (oclose (&curc))
      errrpt (&tpclda, &curc);

   if (oclose (&curh))
      errrpt (&tpclda, &curh);

   if (oclose (&curs))
      errrpt (&tpclda, &curs);

   if (oclose (&curi))
      errrpt (&tpclda, &curi);

   if (oclose (&curo1))
      errrpt (&tpclda, &curo1);

   if (oclose (&curo2))
      errrpt (&tpclda, &curo2);

   if (oclose (&curol1))
      errrpt (&tpclda, &curol1);

   if (oclose (&curol2))
      errrpt (&tpclda, &curol2);

   if (oclose (&curno))
      errrpt (&tpclda, &curno);

   if (ologof (&tpclda))
      fprintf (stderr, "TPC-C load error: Error in logging off\n");

}



main (argc, argv)

int argc;
char *argv[];

{

   char *uid="tpcc/tpcc";
   text sqlbuf[1024];
```

```
int scale=0;
int i, j;
int loop;
int loopcount;
int cid;
int dwid;
int cdid;
int cwid;
int sid;
int swid;
int olcnt;
int nrows;
int row;

int w_id;
char w_name[11];
char w_street_1[21];
char w_street_2[21];
char w_city[21];
char w_state[2];
char w_zip[9];
int w_tax;

int d_id[10];
int d_w_id[10];
char d_name[10][11];
char d_street_1[10][21];
char d_street_2[10][21];
char d_city[10][21];
char d_state[10][2];
char d_zip[10][9];
int d_tax[10];

int c_id[100];
int c_d_id[100];
int c_w_id[100];
char c_first[100][17];
char c_last[100][17];
char c_street_1[100][21];
char c_street_2[100][21];
char c_city[100][21];
char c_state[100][2];
char c_zip[100][9];
char c_phone[100][16];
char c_credit[100][2];
int c_discount[100];
char c_data[100][501];

int i_id[100];
int i_im_id[100];
int i_price[100];
char i_name[100][25];
char i_data[100][51];

int s_i_id[100];
int s_w_id[100];
int s_quantity[100];
char s_dist_01[100][24];
char s_dist_02[100][24];
char s_dist_03[100][24];
char s_dist_04[100][24];
char s_dist_05[100][24];
char s_dist_06[100][24];
char s_dist_07[100][24];
char s_dist_08[100][24];
char s_dist_09[100][24];
char s_dist_10[100][24];
char s_data[100][51];

int h_w_id[100];
int h_d_id[100];
int h_c_id[100];
char h_data[100][25];

int o_id[100];
int o_d_id[100];
int o_w_id[100];
int o_c_id[100];
int o_carrier_id[100];
int o_ol_cnt[100];

int ol_o_id[15];
int ol_d_id[15];
int ol_w_id[15];
int ol_number[15];
int ol_i_id[15];
int ol_supply_w_id[15];
int ol_amount[15];
char ol_dist_info[15][24];

int no_o_id[100];
int no_d_id[100];
int no_w_id[100];

char sdate[30];

double begin_time, end_time;
double begin_cpu, end_cpu;
double gettime(), getcpu();

extern int getopt();
extern char *optarg;
extern int optind, opterr;

char*argstr="M:AwdcisShno:b:e:j:k:g";
int opt;
int do_A=0;
int do_w=0;
int do_d=0;
int do_i=0;
int do_c=0;
int do_s=0;
int do_S=0;
int do_h=0;
int do_o=0;
int do_n=0;
int gen=0;
int bware=1;
int eware=0;
int bitem=1;
int eitem=0;

FILE *olfp=NULL;
char olfname[100];

/*---------------------------------------------------------------+
 | Parse command line -- look for scale factor.|
 +---------------------------------------------------------------*/

if (argc == 1) {
   myusage ();
}

while ((opt = getopt (argc, argv, argstr)) != -1) {
   switch (opt) {
      case '?': myusage ();
                break;
      case 'M': scale = atoi (optarg);
                break;
      case 'A': do_A = 1;
                break;
      case 'w': do_w = 1;
                break;
      case 'd': do_d = 1;
                break;
      case 'c': do_c = 1;
                break;
      case 'i': do_i = 1;
                break;
      case 's': do_s = 1;
                break;
      case 'S': do_S = 1;
                break;
      case 'h': do_h = 1;
                break;
      case 'n': do_n = 1;
                break;
      case 'o': do_o = 1;
                strcpy (olfname, optarg);
                break;
      case 'b': bware = atoi (optarg);
                break;
      case 'e': eware = atoi (optarg);
                break;
      case 'j': bitem = atoi (optarg);
                break;
      case 'k': eitem = atoi (optarg);
                break;
      case 'g': gen = 1;
                break;
      default: fprintf (stderr, "THIS SHOULD NEVER HAPPEN!!!\n");
               fprintf (stderr, "(reached default case in getopt ())\n");
               myusage ();
   }
}

/*---------------------------------------------------------------*|
|Rudimentary error checking |
|*---------------------------------------------------------------*/

if (scale  < 1) {
   fprintf (stderr, "Invalid scale factor: '%d'\n", scale);
   myusage ();
}

if (!(do_A || do_w || do_d || do_c || do_i || do_s || do_S || do_h || do_o ||
      do_n)) {
   fprintf (stderr, "What should I load???\n");
   myusage ();
}

if (gen && (do_A || (do_w + do_d + do_c + do_i + do_s + do_S + do_h + do_o +
                     do_n > 1))) {
   fprintf (stderr, "Can only generate table one at a time\n");
   myusage ();
}

if (do_S && (do_A || do_s)) {
   fprintf (stderr, "Cluster stock table around s_w_id or s_i_id?\n");
   myusage ();
}

if (eware <= 0)
   eware = scale;
if (eitem <= 0)
   eitem = STOCFAC;

if (do_S) {
   if ((bitem  < 1) || (bitem > STOCFAC)) {
      fprintf (stderr, "Invalid beginning item number: '%d'\n", bitem);
      myusage ();
   }

   if ((eitem  < bitem) || (eitem > STOCFAC)) {
      fprintf (stderr, "Invalid ending item number: '%d'\n", eitem);
      myusage ();
   }
}

if ((bware  < 1) || (bware > scale)) {
   fprintf (stderr, "Invalid beginning warehouse number: '%d'\n", bware);
   myusage ();
}

if ((eware  < bware) || (eware > scale)) {
   fprintf (stderr, "Invalid ending warehouse number: '%d'\n", eware);
   myusage ();
}
```

```
   if (gen && do_o) {
      if ((olfp = fopen (olfname, "w")) == NULL) {
         fprintf (stderr, "Can't open '%s' for writing order lines\n", olfname);
         myusage ();
      }
   }

/*---------------------------------------------------------------+
 | Prepare to insert into database.|
 +---------------------------------------------------------------*/

   sysdate (sdate);
   if (!gen) {

      /* log on to Oracle */

      if (orlon (&tpclda, (ub1 *) tpchda, (text *) uid, -1, (text *) 0, -1, 0)) {
         fprintf (stderr, "TPC-C load error: Error in logging on\n");
         errrpt (&tpclda, &tpclda);
         exit (1);
      }

      fprintf (stderr, "\nConnected to Oracle userid '%s'.\n", uid);

      /* turn off auto-commit */

      if (ocof (&tpclda)) {
         errrpt (&tpclda, &tpclda);
         ologof (&tpclda);
         exit (1);
      }

      /* open cursors */

      if (oopen (&curw, &tpclda, (text *) 0, -1, -1, (text *) uid, -1)) {
         errrpt (&tpclda, &curw);
         ologof (&tpclda);
         exit (1);
      }

      if (oopen (&curd, &tpclda, (text *) 0, -1, -1, (text *) uid, -1)) {
         errrpt (&tpclda, &curd);
         oclose (&curw);
         ologof (&tpclda);
         exit (1);
      }

      if (oopen (&curc, &tpclda, (text *) 0, -1, -1, (text *) uid, -1)) {
         errrpt (&tpclda, &curc);
         oclose (&curw);
         oclose (&curd);
         ologof (&tpclda);
         exit (1);
      }

      if (oopen (&curh, &tpclda, (text *) 0, -1, -1, (text *) uid, -1)) {
         errrpt (&tpclda, &curh);
         oclose (&curw);
         oclose (&curd);
         oclose (&curc);
         ologof (&tpclda);
         exit (1);
      }

      if (oopen (&curs, &tpclda, (text *) 0, -1, -1, (text *) uid, -1)) {
         errrpt (&tpclda, &curs);
         oclose (&curw);
         oclose (&curd);
         oclose (&curc);
         oclose (&curh);
         ologof (&tpclda);
         exit (1);
      }

      if (oopen (&curi, &tpclda, (text *) 0, -1, -1, (text *) uid, -1)) {
         errrpt (&tpclda, &curi);
         oclose (&curw);
         oclose (&curd);
         oclose (&curc);
         oclose (&curh);
         oclose (&curs);
         ologof (&tpclda);
         exit (1);
      }

      if (oopen (&curo1, &tpclda, (text *) 0, -1, -1, (text *) uid, -1)) {
         errrpt (&tpclda, &curo1);
         oclose (&curw);
         oclose (&curd);
         oclose (&curc);
         oclose (&curh);
         oclose (&curs);
         oclose (&curi);
         ologof (&tpclda);
         exit (1);
      }

      if (oopen (&curo2, &tpclda, (text *) 0, -1, -1, (text *) uid, -1)) {
         errrpt (&tpclda, &curo2);
         oclose (&curw);
         oclose (&curd);
         oclose (&curc);
         oclose (&curh);
         oclose (&curs);
         oclose (&curi);
         oclose (&curo1);
         ologof (&tpclda);
         exit (1);
      }

      if (oopen (&curol1, &tpclda, (text *) 0, -1, -1, (text *) uid, -1)) {
         errrpt (&tpclda, &curol1);
         oclose (&curw);
         oclose (&curd);
         oclose (&curc);
         oclose (&curh);
         oclose (&curs);
         oclose (&curi);
         oclose (&curo1);
         oclose (&curo2);
         ologof (&tpclda);
         exit (1);
      }

      if (oopen (&curol2, &tpclda, (text *) 0, -1, -1, (text *) uid, -1)) {
         errrpt (&tpclda, &curol2);
         oclose (&curw);
         oclose (&curd);
         oclose (&curc);
         oclose (&curh);
         oclose (&curs);
         oclose (&curi);
         oclose (&curo1);
         oclose (&curo2);
         oclose (&curol1);
         ologof (&tpclda);
         exit (1);
      }

      if (oopen (&curno, &tpclda, (text *) 0, -1, -1, (text *) uid, -1)) {
         errrpt (&tpclda, &curno);
         oclose (&curw);
         oclose (&curd);
         oclose (&curc);
         oclose (&curh);
         oclose (&curs);
         oclose (&curi);
         oclose (&curo1);
         oclose (&curo2);
         oclose (&curol1);
         oclose (&curol2);
         ologof (&tpclda);
         exit (1);
      }

      /* parse statements */

      sprintf ((char *) sqlbuf, SQLTXTW);
      if (oparse (&curw, sqlbuf, -1, 0, 1)) {
         errrpt (&tpclda, &curw);
         quit ();
         exit (1);
      }

      sprintf ((char *) sqlbuf, SQLTXTD);
      if (oparse (&curd, sqlbuf, -1, 0, 1)) {
         errrpt (&tpclda, &curd);
         quit ();
         exit (1);
      }

      sprintf ((char *) sqlbuf, SQLTXTC);
      if (oparse (&curc, sqlbuf, -1, 0, 1)) {
         errrpt (&tpclda, &curc);
         quit ();
         exit (1);
      }

      sprintf ((char *) sqlbuf, SQLTXTH);
      if (oparse (&curh, sqlbuf, -1, 0, 1)) {
         errrpt (&tpclda, &curh);
         quit ();
         exit (1);
      }

      sprintf ((char *) sqlbuf, SQLTXTS);
      if (oparse (&curs, sqlbuf, -1, 0, 1)) {
         errrpt (&tpclda, &curs);
         quit ();
         exit (1);
      }

      sprintf ((char *) sqlbuf, SQLTXTI);
      if (oparse (&curi, sqlbuf, -1, 0, 1)) {
         errrpt (&tpclda, &curi);
         quit ();
         exit (1);
      }

      sprintf ((char *) sqlbuf, SQLTXTO1);
      if (oparse (&curo1, sqlbuf, -1, 0, 1)) {
         errrpt (&tpclda, &curo1);
         quit ();
         exit (1);
      }

      sprintf ((char *) sqlbuf, SQLTXTO2);
      if (oparse (&curo2, sqlbuf, -1, 0, 1)) {
         errrpt (&tpclda, &curo2);
         quit ();
         exit (1);
      }

      sprintf ((char *) sqlbuf, SQLTXTOL1);
      if (oparse (&curol1, sqlbuf, -1, 0, 1)) {
         errrpt (&tpclda, &curol1);
         quit ();
         exit (1);
      }

      sprintf ((char *) sqlbuf, SQLTXTOL2);
      if (oparse (&curol2, sqlbuf, -1, 0, 1)) {
         errrpt (&tpclda, &curol2);
         quit ();
         exit (1);
      }
```

```
sprintf ((char *) sqlbuf, SQLTXTNO);
if (oparse (&curno, sqlbuf, -1, 0, 1)) {
   errrpt (&tpclda, &curno);
   quit ();
   exit (1);
}

/* bind variables */

/* warehouse */

if (obndrv (&curw, (text *) ":w_id", -1, (ub1 *) &w_id, sizeof (w_id),
           SQLT_INT, -1, (sb2 *) 0, (text *) 0, -1, -1)) {
   errrpt (&tpclda, &curw);
   quit ();
   exit (1);
}

if (obndrv (&curw, (text *) ":w_name", -1, (ub1 *) w_name, 11,
           SQLT_STR, -1, (sb2 *) 0, (text *) 0, -1, -1)) {
   errrpt (&tpclda, &curw);
   quit ();
   exit (1);
}

if (obndrv (&curw, (text *) ":w_street_1", -1, (ub1 *) w_street_1, 21,
           SQLT_STR, -1, (sb2 *) 0, (text *) 0, -1, -1)) {
   errrpt (&tpclda, &curw);
   quit ();
   exit (1);
}

if (obndrv (&curw, (text *) ":w_street_2", -1, (ub1 *) w_street_2, 21,
           SQLT_STR, -1, (sb2 *) 0, (text *) 0, -1, -1)) {
   errrpt (&tpclda, &curw);
   quit ();
   exit (1);
}

if (obndrv (&curw, (text *) ":w_city", -1, (ub1 *) w_city, 21,
           SQLT_STR, -1, (sb2 *) 0, (text *) 0, -1, -1)) {
   errrpt (&tpclda, &curw);
   quit ();
   exit (1);
}

if (obndrv (&curw, (text *) ":w_state", -1, (ub1 *) w_state, 2,
           SQLT_CHR, -1, (sb2 *) 0, (text *) 0, -1, -1)) {
   errrpt (&tpclda, &curw);
   quit ();
   exit (1);
}

if (obndrv (&curw, (text *) ":w_zip", -1, (ub1 *) w_zip, 9,
           SQLT_CHR, -1, (sb2 *) 0, (text *) 0, -1, -1)) {
   errrpt (&tpclda, &curw);
   quit ();
   exit (1);
}

if (obndrv (&curw, (text *) ":w_tax", -1, (ub1 *) &w_tax, sizeof (w_tax),
           SQLT_INT, -1, (sb2 *) 0, (text *) 0, -1, -1)) {
   errrpt (&tpclda, &curw);
   quit ();
   exit (1);
}

/* district */

if (obndrv (&curd, (text *) ":d_id", -1, (ub1 *) d_id, sizeof (int),
           SQLT_INT, -1, (sb2 *) 0, (text *) 0, -1, -1)) {
   errrpt (&tpclda, &curd);
   quit ();
   exit (1);
}

if (obndrv (&curd, (text *) ":d_w_id", -1, (ub1 *) d_w_id, sizeof (int),
           SQLT_INT, -1, (sb2 *) 0, (text *) 0, -1, -1)) {
   errrpt (&tpclda, &curd);
   quit ();
   exit (1);
}

if (obndrv (&curd, (text *) ":d_name", -1, (ub1 *) d_name, 11,
           SQLT_STR, -1, (sb2 *) 0, (text *) 0, -1, -1)) {
   errrpt (&tpclda, &curd);
   quit ();
   exit (1);
}

if (obndrv (&curd, (text *) ":d_street_1", -1, (ub1 *) d_street_1, 21,
           SQLT_STR, -1, (sb2 *) 0, (text *) 0, -1, -1)) {
   errrpt (&tpclda, &curd);
   quit ();
   exit (1);
}

if (obndrv (&curd, (text *) ":d_street_2", -1, (ub1 *) d_street_2, 21,
           SQLT_STR, -1, (sb2 *) 0, (text *) 0, -1, -1)) {
   errrpt (&tpclda, &curd);
   quit ();
   exit (1);
}

if (obndrv (&curd, (text *) ":d_city", -1, (ub1 *) d_city, 21,
           SQLT_STR, -1, (sb2 *) 0, (text *) 0, -1, -1)) {
   errrpt (&tpclda, &curd);
   quit ();
   exit (1);
}

if (obndrv (&curd, (text *) ":d_state", -1, (ub1 *) d_state, 2,
           SQLT_CHR, -1, (sb2 *) 0, (text *) 0, -1, -1)) {
   errrpt (&tpclda, &curd);
   quit ();
   exit (1);
}

if (obndrv (&curd, (text *) ":d_zip", -1, (ub1 *) d_zip, 9,
           SQLT_CHR, -1, (sb2 *) 0, (text *) 0, -1, -1)) {
   errrpt (&tpclda, &curd);
   quit ();
   exit (1);
}

if (obndrv (&curd, (text *) ":d_tax", -1, (ub1 *) d_tax, sizeof (int),
           SQLT_INT, -1, (sb2 *) 0, (text *) 0, -1, -1)) {
   errrpt (&tpclda, &curd);
   quit ();
   exit (1);
}

/* customer */

if (obndrv (&curc, (text *) ":c_id", -1, (ub1 *) c_id, sizeof (int),
           SQLT_INT, -1, (sb2 *) 0, (text *) 0, -1, -1)) {
   errrpt (&tpclda, &curc);
   quit ();
   exit (1);
}

if (obndrv (&curc, (text *) ":c_d_id", -1, (ub1 *) c_d_id, sizeof (int),
           SQLT_INT, -1, (sb2 *) 0, (text *) 0, -1, -1)) {
   errrpt (&tpclda, &curc);
   quit ();
   exit (1);
}

if (obndrv (&curc, (text *) ":c_w_id", -1, (ub1 *) c_w_id, sizeof (int),
           SQLT_INT, -1, (sb2 *) 0, (text *) 0, -1, -1)) {
   errrpt (&tpclda, &curc);
   quit ();
   exit (1);
}

if (obndrv (&curc, (text *) ":c_first", -1, (ub1 *) c_first, 17,
           SQLT_STR, -1, (sb2 *) 0, (text *) 0, -1, -1)) {
   errrpt (&tpclda, &curc);
   quit ();
   exit (1);
}

if (obndrv (&curc, (text *) ":c_last", -1, (ub1 *) c_last, 17,
           SQLT_STR, -1, (sb2 *) 0, (text *) 0, -1, -1)) {
   errrpt (&tpclda, &curc);
   quit ();
   exit (1);
}

if (obndrv (&curc, (text *) ":c_street_1", -1, (ub1 *) c_street_1, 21,
           SQLT_STR, -1, (sb2 *) 0, (text *) 0, -1, -1)) {
   errrpt (&tpclda, &curc);
   quit ();
   exit (1);
}

if (obndrv (&curc, (text *) ":c_street_2", -1, (ub1 *) c_street_2, 21,
           SQLT_STR, -1, (sb2 *) 0, (text *) 0, -1, -1)) {
   errrpt (&tpclda, &curc);
   quit ();
   exit (1);
}

if (obndrv (&curc, (text *) ":c_city", -1, (ub1 *) c_city, 21,
           SQLT_STR, -1, (sb2 *) 0, (text *) 0, -1, -1)) {
   errrpt (&tpclda, &curc);
   quit ();
   exit (1);
}

if (obndrv (&curc, (text *) ":c_state", -1, (ub1 *) c_state, 2,
           SQLT_CHR, -1, (sb2 *) 0, (text *) 0, -1, -1)) {
   errrpt (&tpclda, &curc);
   quit ();
   exit (1);
}

if (obndrv (&curc, (text *) ":c_zip", -1, (ub1 *) c_zip, 9,
           SQLT_CHR, -1, (sb2 *) 0, (text *) 0, -1, -1)) {
   errrpt (&tpclda, &curc);
   quit ();
   exit (1);
}

if (obndrv (&curc, (text *) ":c_phone", -1, (ub1 *) c_phone, 16,
           SQLT_CHR, -1, (sb2 *) 0, (text *) 0, -1, -1)) {
   errrpt (&tpclda, &curc);
   quit ();
   exit (1);
}

if (obndrv (&curc, (text *) ":c_credit", -1, (ub1 *) c_credit, 2,
           SQLT_CHR, -1, (sb2 *) 0, (text *) 0, -1, -1)) {
   errrpt (&tpclda, &curc);
   quit ();
   exit (1);
}

if (obndrv (&curc, (text *) ":c_discount", -1, (ub1 *) c_discount,
           sizeof (int), SQLT_INT, -1, (sb2 *) 0, (text *) 0, -1,
           -1)) {
   errrpt (&tpclda, &curc);
   quit ();
   exit (1);
}

if (obndrv (&curc, (text *) ":c_data", -1, (ub1 *) c_data, 501,
           SQLT_STR, -1, (sb2 *) 0, (text *) 0, -1, -1)) {
```

```
   errrpt (&tpclda, &curc);
   quit ();
   exit (1);
}

/* item */

if (obndrv (&curi, (text *) ":i_id", -1, (ub1 *) i_id, sizeof (int),
           SQLT_INT, -1, (sb2 *) 0, (text *) 0, -1, -1)) {
   errrpt (&tpclda, &curi);
   quit ();
   exit (1);
}

if (obndrv (&curi, (text *) ":i_im_id", -1, (ub1 *) i_im_id, sizeof (int),
           SQLT_INT, -1, (sb2 *) 0, (text *) 0, -1, -1)) {
   errrpt (&tpclda, &curi);
   quit ();
   exit (1);
}

if (obndrv (&curi, (text *) ":i_name", -1, (ub1 *) i_name, 25,
           SQLT_STR, -1, (sb2 *) 0, (text *) 0, -1, -1)) {
   errrpt (&tpclda, &curi);
   quit ();
   exit (1);
}

if (obndrv (&curi, (text *) ":i_price", -1, (ub1 *) i_price,
           sizeof (int), SQLT_INT, -1, (sb2 *) 0, (text *) 0, -1,
           -1)) {
   errrpt (&tpclda, &curi);
   quit ();
   exit (1);
}

if (obndrv (&curi, (text *) ":i_data", -1, (ub1 *) i_data, 51,
           SQLT_STR, -1, (sb2 *) 0, (text *) 0, -1, -1)) {
   errrpt (&tpclda, &curi);
   quit ();
   exit (1);
}

/* stock */

if (obndrv (&curs, (text *) ":s_i_id", -1, (ub1 *) s_i_id, sizeof (int),
           SQLT_INT, -1, (sb2 *) 0, (text *) 0, -1, -1)) {
   errrpt (&tpclda, &curs);
   quit ();
   exit (1);
}

if (obndrv (&curs, (text *) ":s_w_id", -1, (ub1 *) s_w_id, sizeof (int),
           SQLT_INT, -1, (sb2 *) 0, (text *) 0, -1, -1)) {
   errrpt (&tpclda, &curs);
   quit ();
   exit (1);
}

if (obndrv (&curs, (text *) ":s_quantity", -1, (ub1 *) s_quantity,
           sizeof (int), SQLT_INT, -1, (sb2 *) 0, (text *) 0, -1, -1)) {
   errrpt (&tpclda, &curs);
   quit ();
   exit (1);
}

if (obndrv (&curs, (text *) ":s_dist_01", -1, (ub1 *) s_dist_01, 24,
           SQLT_CHR, -1, (sb2 *) 0, (text *) 0, -1, -1)) {
   errrpt (&tpclda, &curs);
   quit ();
   exit (1);
}

if (obndrv (&curs, (text *) ":s_dist_02", -1, (ub1 *) s_dist_02, 24,
           SQLT_CHR, -1, (sb2 *) 0, (text *) 0, -1, -1)) {
   errrpt (&tpclda, &curs);
   quit ();
   exit (1);
}

if (obndrv (&curs, (text *) ":s_dist_03", -1, (ub1 *) s_dist_03, 24,
           SQLT_CHR, -1, (sb2 *) 0, (text *) 0, -1, -1)) {
   errrpt (&tpclda, &curs);
   quit ();
   exit (1);
}

if (obndrv (&curs, (text *) ":s_dist_04", -1, (ub1 *) s_dist_04, 24,
           SQLT_CHR, -1, (sb2 *) 0, (text *) 0, -1, -1)) {
   errrpt (&tpclda, &curs);
   quit ();
   exit (1);
}

if (obndrv (&curs, (text *) ":s_dist_05", -1, (ub1 *) s_dist_05, 24,
           SQLT_CHR, -1, (sb2 *) 0, (text *) 0, -1, -1)) {
   errrpt (&tpclda, &curs);
   quit ();
   exit (1);
}

if (obndrv (&curs, (text *) ":s_dist_06", -1, (ub1 *) s_dist_06, 24,
           SQLT_CHR, -1, (sb2 *) 0, (text *) 0, -1, -1)) {
   errrpt (&tpclda, &curs);
   quit ();
   exit (1);
}

if (obndrv (&curs, (text *) ":s_dist_07", -1, (ub1 *) s_dist_07, 24,
           SQLT_CHR, -1, (sb2 *) 0, (text *) 0, -1, -1)) {
   errrpt (&tpclda, &curs);
   quit ();
   exit (1);
}

if (obndrv (&curs, (text *) ":s_dist_08", -1, (ub1 *) s_dist_08, 24,
           SQLT_CHR, -1, (sb2 *) 0, (text *) 0, -1, -1)) {
   errrpt (&tpclda, &curs);
   quit ();
   exit (1);
}

if (obndrv (&curs, (text *) ":s_dist_09", -1, (ub1 *) s_dist_09, 24,
           SQLT_CHR, -1, (sb2 *) 0, (text *) 0, -1, -1)) {
   errrpt (&tpclda, &curs);
   quit ();
   exit (1);
}

if (obndrv (&curs, (text *) ":s_dist_10", -1, (ub1 *) s_dist_10, 24,
           SQLT_CHR, -1, (sb2 *) 0, (text *) 0, -1, -1)) {
   errrpt (&tpclda, &curs);
   quit ();
   exit (1);
}

if (obndrv (&curs, (text *) ":s_data", -1, (ub1 *) s_data, 51,
           SQLT_STR, -1, (sb2 *) 0, (text *) 0, -1, -1)) {
   errrpt (&tpclda, &curs);
   quit ();
   exit (1);
}

/* history */

if (obndrv (&curh, (text *) ":h_c_id", -1, (ub1 *) h_c_id, sizeof (int),
           SQLT_INT, -1, (sb2 *) 0, (text *) 0, -1, -1)) {
   errrpt (&tpclda, &curh);
   quit ();
   exit (1);
}

if (obndrv (&curh, (text *) ":h_c_d_id", -1, (ub1 *) h_d_id, sizeof (int),
           SQLT_INT, -1, (sb2 *) 0, (text *) 0, -1, -1)) {
   errrpt (&tpclda, &curh);
   quit ();
   exit (1);
}

if (obndrv (&curh, (text *) ":h_c_w_id", -1, (ub1 *) h_w_id, sizeof (int),
           SQLT_INT, -1, (sb2 *) 0, (text *) 0, -1, -1)) {
   errrpt (&tpclda, &curh);
   quit ();
   exit (1);
}

if (obndrv (&curh, (text *) ":h_d_id", -1, (ub1 *) h_d_id, sizeof (int),
           SQLT_INT, -1, (sb2 *) 0, (text *) 0, -1, -1)) {
   errrpt (&tpclda, &curh);
   quit ();
   exit (1);
}

if (obndrv (&curh, (text *) ":h_w_id", -1, (ub1 *) h_w_id, sizeof (int),
           SQLT_INT, -1, (sb2 *) 0, (text *) 0, -1, -1)) {
   errrpt (&tpclda, &curh);
   quit ();
   exit (1);
}

if (obndrv (&curh, (text *) ":h_data", -1, (ub1 *) h_data, 25,
           SQLT_STR, -1, (sb2 *) 0, (text *) 0, -1, -1)) {
   errrpt (&tpclda, &curh);
   quit ();
   exit (1);
}

/* order_line (delivered) */

if (obndrv (&curol1, (text *) ":ol_o_id", -1, (ub1 *) ol_o_id,
           sizeof (int), SQLT_INT, -1, (sb2 *) 0, (text *) 0, -1, -1)) {
   errrpt (&tpclda, &curol1);
   quit ();
   exit (1);
}

if (obndrv (&curol1, (text *) ":ol_d_id", -1, (ub1 *) ol_d_id,
           sizeof (int), SQLT_INT, -1, (sb2 *) 0, (text *) 0, -1, -1)) {
   errrpt (&tpclda, &curol1);
   quit ();
   exit (1);
}

if (obndrv (&curol1, (text *) ":ol_w_id", -1, (ub1 *) ol_w_id,
           sizeof (int), SQLT_INT, -1, (sb2 *) 0, (text *) 0, -1, -1)) {
   errrpt (&tpclda, &curol1);
   quit ();
   exit (1);
}

if (obndrv (&curol1, (text *) ":ol_number", -1, (ub1 *) ol_number,
    sizeof (int), SQLT_INT, -1, (sb2 *) 0, (text *) 0, -1, -1)) {
   errrpt (&tpclda, &curol1);
   quit ();
   exit (1);
}

if (obndrv (&curol1, (text *) ":ol_i_id", -1, (ub1 *) ol_i_id,
    sizeof (int), SQLT_INT, -1, (sb2 *) 0, (text *) 0, -1, -1)) {
   errrpt (&tpclda, &curol1);
   quit ();
   exit (1);
}

if (obndrv (&curol1, (text *) ":ol_supply_w_id", -1,
           (ub1 *) ol_supply_w_id, sizeof (int), SQLT_INT, -1,
           (sb2 *) 0, (text *) 0, -1, -1)) {
   errrpt (&tpclda, &curol1);
```

```
   quit ();
   exit (1);
}

if (obndrv (&curol1, (text *) ":ol_dist_info", -1, (ub1 *) ol_dist_info,
           24, SQLT_CHR, -1, (sb2 *) 0, (text *) 0, -1, -1)) {
   errrpt (&tpclda, &curol1);
   quit ();
   exit (1);
}

/* order_line (not delivered) */

if (obndrv (&curol2, (text *) ":ol_o_id", -1, (ub1 *) ol_o_id,
           sizeof (int), SQLT_INT, -1, (sb2 *) 0, (text *) 0, -1, -1)) {
   errrpt (&tpclda, &curol2);
   quit ();
   exit (1);
}

if (obndrv (&curol2, (text *) ":ol_d_id", -1, (ub1 *) ol_d_id,
           sizeof (int), SQLT_INT, -1, (sb2 *) 0, (text *) 0, -1, -1)) {
   errrpt (&tpclda, &curol2);
   quit ();
   exit (1);
}

if (obndrv (&curol2, (text *) ":ol_w_id", -1, (ub1 *) ol_w_id,
           sizeof (int), SQLT_INT, -1, (sb2 *) 0, (text *) 0, -1, -1)) {
   errrpt (&tpclda, &curol2);
   quit ();
   exit (1);
}

if (obndrv (&curol2, (text *) ":ol_number", -1, (ub1 *) ol_number,
    sizeof (int), SQLT_INT, -1, (sb2 *) 0, (text *) 0, -1, -1)) {
   errrpt (&tpclda, &curol2);
   quit ();
   exit (1);
}

if (obndrv (&curol2, (text *) ":ol_i_id", -1, (ub1 *) ol_i_id,
    sizeof (int), SQLT_INT, -1, (sb2 *) 0, (text *) 0, -1, -1)) {
   errrpt (&tpclda, &curol2);
   quit ();
   exit (1);
}

if (obndrv (&curol2, (text *) ":ol_supply_w_id", -1,
           (ub1 *) ol_supply_w_id, sizeof (int), SQLT_INT, -1,
           (sb2 *) 0, (text *) 0, -1, -1)) {
   errrpt (&tpclda, &curol2);
   quit ();
   exit (1);
}

if (obndrv (&curol2, (text *) ":ol_amount", -1, (ub1 *) ol_amount,
    sizeof (int), SQLT_INT, -1, (sb2 *) 0, (text *) 0, -1, -1)) {
   errrpt (&tpclda, &curol2);
   quit ();
   exit (1);
}

if (obndrv (&curol2, (text *) ":ol_dist_info", -1, (ub1 *) ol_dist_info,
           24, SQLT_CHR, -1, (sb2 *) 0, (text *) 0, -1, -1)) {
   errrpt (&tpclda, &curol2);
   quit ();
   exit (1);
}

/* orders (delivered) */

if (obndrv (&curo1, (text *) ":o_id", -1, (ub1 *) o_id, sizeof (int),
           SQLT_INT, -1, (sb2 *) 0, (text *) 0, -1, -1)) {
   errrpt (&tpclda, &curo1);
   quit ();
   exit (1);
}

if (obndrv (&curo1, (text *) ":o_d_id", -1, (ub1 *) o_d_id, sizeof (int),
           SQLT_INT, -1, (sb2 *) 0, (text *) 0, -1, -1)) {
   errrpt (&tpclda, &curo1);
   quit ();
   exit (1);
}

if (obndrv (&curo1, (text *) ":o_w_id", -1, (ub1 *) o_w_id, sizeof (int),
           SQLT_INT, -1, (sb2 *) 0, (text *) 0, -1, -1)) {
   errrpt (&tpclda, &curo1);
   quit ();
   exit (1);
}

if (obndrv (&curo1, (text *) ":o_c_id", -1, (ub1 *) o_c_id, sizeof (int),
           SQLT_INT, -1, (sb2 *) 0, (text *) 0, -1, -1)) {
   errrpt (&tpclda, &curo1);
   quit ();
   exit (1);
}

if (obndrv (&curo1, (text *) ":o_carrier_id", -1, (ub1 *) o_carrier_id,
    sizeof (int), SQLT_INT, -1, (sb2 *) 0, (text *) 0, -1, -1)) {
   errrpt (&tpclda, &curo1);
   quit ();
   exit (1);
}

if (obndrv (&curo1, (text *) ":o_ol_cnt", -1, (ub1 *) o_ol_cnt,
    sizeof (int), SQLT_INT, -1, (sb2 *) 0, (text *) 0, -1, -1)) {
   errrpt (&tpclda, &curo1);
   quit ();
   exit (1);
}

   /* orders (not delivered) */

   if (obndrv (&curo2, (text *) ":o_id", -1, (ub1 *) o_id, sizeof (int),
              SQLT_INT, -1, (sb2 *) 0, (text *) 0, -1, -1)) {
      errrpt (&tpclda, &curo2);
      quit ();
      exit (1);
   }

   if (obndrv (&curo2, (text *) ":o_d_id", -1, (ub1 *) o_d_id, sizeof (int),
              SQLT_INT, -1, (sb2 *) 0, (text *) 0, -1, -1)) {
      errrpt (&tpclda, &curo2);
      quit ();
      exit (1);
   }

   if (obndrv (&curo2, (text *) ":o_w_id", -1, (ub1 *) o_w_id, sizeof (int),
              SQLT_INT, -1, (sb2 *) 0, (text *) 0, -1, -1)) {
      errrpt (&tpclda, &curo2);
      quit ();
      exit (1);
   }

   if (obndrv (&curo2, (text *) ":o_c_id", -1, (ub1 *) o_c_id, sizeof (int),
              SQLT_INT, -1, (sb2 *) 0, (text *) 0, -1, -1)) {
      errrpt (&tpclda, &curo2);
      quit ();
      exit (1);
   }

   if (obndrv (&curo2, (text *) ":o_ol_cnt", -1, (ub1 *) o_ol_cnt,
              sizeof (int), SQLT_INT, -1, (sb2 *) 0, (text *) 0, -1, -1)) {
      errrpt (&tpclda, &curo2);
      quit ();
      exit (1);
   }

   /* new order */

   if (obndrv (&curno, (text *) ":no_o_id", -1, (ub1 *) no_o_id,
              sizeof (int), SQLT_INT, -1, (sb2 *) 0, (text *) 0, -1, -1)) {
      errrpt (&tpclda, &curno);
      quit ();
      exit (1);
   }

   if (obndrv (&curno, (text *) ":no_d_id", -1, (ub1 *) no_d_id,
              sizeof (int), SQLT_INT, -1, (sb2 *) 0, (text *) 0, -1, -1)) {
      errrpt (&tpclda, &curno);
      quit ();
      exit (1);
   }

   if (obndrv (&curno, (text *) ":no_w_id", -1, (ub1 *) no_w_id,
              sizeof (int), SQLT_INT, -1, (sb2 *) 0, (text *) 0, -1, -1)) {
      errrpt (&tpclda, &curno);
      quit ();
      exit (1);
   }
  }

/*---------------------------------------------------------------+
 | Initialize random number generator|
 +---------------------------------------------------------------*/

  srand (SEED);
  srand48 (SEED);
  initperm ();


/*---------------------------------------------------------------+
 | Load the WAREHOUSE table.|
 +---------------------------------------------------------------*/

  if (do_A || do_w) {
     nrows = eware - bware + 1;

     fprintf (stderr, "Loading/generating warehouse: w%d - w%d (%d rows)\n",
              bware, eware, nrows);

     begin_time = gettime ();
     begin_cpu = getcpu ();

     for (loop = bware; loop <= eware; loop++) {

        w_tax = (rand () % 2001);
        randstr (w_name, 6, 10);
        randstr (w_street_1, 10, 20);
        randstr (w_street_2, 10, 20);
        randstr (w_city, 10, 20);
        randstr (str2, 2, 2);
        randnum (num9, 9);
        num9[4] = num9[5] = num9[6] = num9[7] = num9[8] = '1';

        if (gen) {
           printf ("%d 30000000 %d %s %s %s %s %s %s\n", loop, w_tax,
                   w_name, w_street_1, w_street_2, w_city, str2, num9);
           fflush (stdout);
        }
        else {
           w_id = loop;
           strncpy (w_state, str2, 2);
           strncpy (w_zip, num9, 9);

           if (oexec (&curw)) {
              errrpt (&tpclda, &curw);
              orol (&tpclda);
              fprintf (stderr, "Aborted at warehouse %d\n", loop);
              quit ();
              exit (1);
           }
           else if (ocom (&tpclda)) {
              errrpt (&tpclda, &tpclda);
              orol (&tpclda);
```

```
               fprintf (stderr, "Aborted at warehouse %d\n", loop);
               quit ();
               exit (1);
            }
         }
      }

      end_time = gettime ();
      end_cpu = getcpu ();
      fprintf (stderr, "Done.  %d rows loaded/generated in %10.2f sec. (%10.2f
cpu)\n\n",
               nrows, end_time - begin_time, end_cpu - begin_cpu);
   }

/*---------------------------------------------------------------+
 | Load the DISTRICT table.|
 +---------------------------------------------------------------*/

   if (do_A || do_d) {
      nrows = (eware - bware + 1) * DISTFAC;

      fprintf (stderr, "Loading/generating district: w%d - w%d (%d rows)\n",
               bware, eware, nrows);

      begin_time = gettime ();
      begin_cpu = getcpu ();

      dwid = bware - 1;

      for (row = 0; row < nrows; ) {
         dwid++;

         for (i = 0; i < DISTARR; i++, row++) {
            d_tax[i] = (rand () % 2001);
            randstr (d_name[i], 6, 10);
            randstr (d_street_1[i], 10, 20);
            randstr (d_street_2[i], 10, 20);
            randstr (d_city[i], 10, 20);
            randstr (str2, 2, 2);
            randnum (num9, 9);
            num9[4] = num9[5] = num9[6] = num9[7] = num9[8] = '1';

            if (gen) {
               /* printf ("%d %d %s %s %s %s %s %s %d 30000.0 3001\n",
                       i + 1, dwid, d_name[i], d_street_1[i], d_street_2[i],
                       d_city[i], str2, num9, d_tax[i]); */
      /* Reordered columns */
               printf ("%d %d 3000000 %d 3001 %s %s %s %s %s %s\n",
                       i + 1, dwid, d_tax[i], d_name[i], d_street_1[i],
      d_street_2[i], d_city[i], str2, num9 );
            }
            else {
               d_id[i] = i + 1;
               d_w_id[i] = dwid;
               strncpy (d_state[i], str2, 2);
               strncpy (d_zip[i], num9, 9);
            }
         }

         if (gen) {
            fflush (stdout);
         }
         else {
            if (oexn (&curd, DISTARR, 0)) {
               errrpt (&tpclda, &curd);
               orol (&tpclda);
               fprintf (stderr, "Aborted at warehouse %d, district 1\n", dwid);
               quit ();
               exit (1);
            }
            else if (ocom (&tpclda)) {
               errrpt (&tpclda, &tpclda);
               orol (&tpclda);
               fprintf (stderr, "Aborted at warehouse %d, district 1\n", dwid);
               quit ();
               exit (1);
            }
         }
      }

      end_time = gettime ();
      end_cpu = getcpu ();
      fprintf (stderr, "Done.  %d rows loaded/generated in %10.2f sec. (%10.2f
cpu)\n\n",
               nrows, end_time - begin_time, end_cpu - begin_cpu);
   }

/*---------------------------------------------------------------+
 | Load the CUSTOMER table.|
 +---------------------------------------------------------------*/

   if (do_A || do_c) {
      nrows = (eware - bware + 1) * CUSTFAC * DISTFAC;

      fprintf (stderr, "Loading/generating customer: w%d - w%d (%d rows)\n   ",
               bware, eware, nrows);

      begin_time = gettime ();
      begin_cpu = getcpu ();

      cid = 0;
      cdid = 1;
      cwid = bware;
      loopcount = 0;

      for (row = 0; row < nrows; ) {
         for (i = 0; i < CUSTARR; i++, row++) {
            cid++;
            if (cid > CUSTFAC) {        /* cycle cust id */
               cid = 1;                 /* cheap mod */
               cdid++;                  /* shift district cycle */
               if (cdid > DISTFAC) {
                  cdid = 1;
                  cwid++;               /* shift warehouse cycle */
               }
            }
            c_id[i] = cid;
            c_d_id[i] = cdid;
            c_w_id[i] = cwid;
            if (cid <= 1000)
               randlastname (c_last[i], cid - 1);
            else
               randlastname (c_last[i], NURand (255, 0, 999, CNUM1));
            c_credit[i][1] = 'C';
            if (rand () % 10)
               c_credit[i][0] = 'G';
            else
               c_credit[i][0] = 'B';
            c_discount[i] = (rand () % 5001);
            randstr (c_first[i], 8, 16);
            randstr (c_street_1[i], 10, 20);
            randstr (c_street_2[i], 10, 20);
            randstr (c_city[i], 10, 20);
            randstr (str2, 2, 2);
            randnum (num9, 9);
            num9[4] = num9[5] = num9[6] = num9[7] = num9[8] = '1';
            randnum (num16, 16);
            randstr (c_data[i], 300, 500);

            if (gen) {
               printf ("%d %d %d %s OE %s %s %s %s %s %s %s %s %s %cC 5000000 %d -1000
1000 1 0 %s\n",
                       cid, cdid, cwid, c_first[i], c_last[i],
                       c_street_1[i], c_street_2[i], c_city[i], str2, num9,
                       num16, sdate, c_credit[i][0], c_discount[i], c_data[i]);
            }
            else {
               strncpy (c_state[i], str2, 2);
               strncpy (c_zip[i], num9, 9);
               strncpy (c_phone[i], num16, 16);
            }
         }

         if (gen) {
            fflush (stdout);
         }
         else {
            if (oexn (&curc, CUSTARR, 0)) {
               errrpt (&tpclda, &curc);
               orol (&tpclda);
               fprintf (stderr, "Aborted at w_id %d, d_id %d, c_id %d\n",
                        c_w_id[0], c_d_id[0], c_id[0]);
               quit ();
               exit (1);
            }
            else if (ocom (&tpclda)) {
               errrpt (&tpclda, &tpclda);
               orol (&tpclda);
               fprintf (stderr, "Aborted at w_id %d, d_id %d, c_id %d\n",
                        c_w_id[0], c_d_id[0], c_id[0]);
               quit ();
               exit (1);
            }
         }

         if ((++loopcount) % 50)
            fprintf (stderr, ".");
         else
            fprintf (stderr, " %d rows committed\n   ", row);
      }

      end_time = gettime ();
      end_cpu = getcpu ();
      fprintf (stderr, "Done.  %d rows loaded/generated in %10.2f sec. (%10.2f
cpu)\n\n",
               nrows, end_time - begin_time, end_cpu - begin_cpu);
   }


/*---------------------------------------------------------------+
 | Load the ITEM table.|
 +---------------------------------------------------------------*/

   if (do_A || do_i) {
      nrows = ITEMFAC;

      fprintf (stderr, "Loading/generating item: (%d rows)\n   ", nrows);

      begin_time = gettime ();
      begin_cpu = getcpu ();

      loopcount = 0;

      for (row = 0; row < nrows; ) {
         for (i = 0; i < ITEMARR; i++, row++) {
            i_im_id[i] = (rand () % 10000) + 1;
            i_price[i] = ((rand () % 9901) + 100);
            randstr (i_name[i], 14, 24);
            randdatastr (i_data[i], 26, 50);

            if (gen) {
               printf ("%d %d %s %d %s\n", row + 1, i_im_id[i], i_name[i],
                       i_price[i], i_data[i]);
            }
            else {
               i_id[i] = row + 1;
            }
         }

         if (gen) {
            fflush (stdout);
         }
         else {
            if (oexn (&curi, ITEMARR, 0)) {
               errrpt (&tpclda, &curi);
               orol (&tpclda);
               fprintf (stderr, "Aborted at i_id %d\n", i_id[0]);
               quit ();
```

```
            exit (1);
         }
         else if (ocom (&tpclda)) {
            errrpt (&tpclda, &tpclda);
            orol (&tpclda);
            fprintf (stderr, "Aborted at i_id %d\n", i_id[0]);
            quit ();
            exit (1);
         }
      }

      if ((++loopcount) % 50)
         fprintf (stderr, ".");
      else
         fprintf (stderr, " %d rows committed\n   ", row);
   }

   end_time = gettime ();
   end_cpu = getcpu ();
   fprintf (stderr, "Done.  %d rows loaded/generated in %10.2f sec. (%10.2f
cpu)\n\n",
            nrows, end_time - begin_time, end_cpu - begin_cpu);
}


/*---------------------------------------------------------------+
 | Load the STOCK table.|
 +---------------------------------------------------------------*/

   if (do_A || do_s) {

      nrows = (eware - bware + 1) * STOCFAC;

      fprintf (stderr, "Loading/generating stock: w%d - w%d (%d rows)\n   ",
               bware, eware, nrows);

      begin_time = gettime ();
      begin_cpu = getcpu ();

      sid = 0;
      swid = bware;
      loopcount = 0;

      for (row = 0; row < nrows; ) {
         for (i = 0; i < STOCARR; i++, row++) {
            if (++sid > STOCFAC) {        /* cheap mod */
               sid = 1;
               swid++;
            }
            s_quantity[i] = (rand () % 91) + 10;
            randstr (str24[0], 24, 24);
            randstr (str24[1], 24, 24);
            randstr (str24[2], 24, 24);
            randstr (str24[3], 24, 24);
            randstr (str24[4], 24, 24);
            randstr (str24[5], 24, 24);
            randstr (str24[6], 24, 24);
            randstr (str24[7], 24, 24);
            randstr (str24[8], 24, 24);
            randstr (str24[9], 24, 24);
            randdatastr (s_data[i], 26, 50);

            if (gen) {
               printf ("%d %d %d %s %s %s %s %s %s %s %s %s %s 0 0 0 %s\n",
                       sid, swid, s_quantity[i], str24[0], str24[1], str24[2],
                       str24[3], str24[4], str24[5], str24[6], str24[7],
                       str24[8], str24[9], s_data[i]);
            }
            else {
               s_i_id[i] = sid;
               s_w_id[i] = swid;
               strncpy (s_dist_01[i], str24[0], 24);
               strncpy (s_dist_02[i], str24[1], 24);
               strncpy (s_dist_03[i], str24[2], 24);
               strncpy (s_dist_04[i], str24[3], 24);
               strncpy (s_dist_05[i], str24[4], 24);
               strncpy (s_dist_06[i], str24[5], 24);
               strncpy (s_dist_07[i], str24[6], 24);
               strncpy (s_dist_08[i], str24[7], 24);
               strncpy (s_dist_09[i], str24[8], 24);
               strncpy (s_dist_10[i], str24[9], 24);
            }
         }

         if (gen) {
            fflush (stdout);
         }
         else {
            if (oexn (&curs, STOCARR, 0)) {
               errrpt (&tpclda, &curs);
               orol (&tpclda);
               fprintf (stderr, "Aborted at w_id %d, s_i_id %d\n", s_w_id[0],
                        s_i_id[0]);
               quit ();
               exit (1);
            }
            else if (ocom (&tpclda)) {
               errrpt (&tpclda, &tpclda);
               orol (&tpclda);
               fprintf (stderr, "Aborted at w_id %d, s_i_id %d\n", s_w_id[0],
                        s_i_id[0]);
               quit ();
               exit (1);
            }
         }

         if ((++loopcount) % 50)
            fprintf (stderr, ".");
         else
            fprintf (stderr, " %d rows committed\n   ", row);
      }

      end_time = gettime ();
      end_cpu = getcpu ();
      fprintf (stderr, "Done.  %d rows loaded/generated in %10.2f sec. (%10.2f
cpu)\n\n",
               nrows, end_time - begin_time, end_cpu - begin_cpu);
   }

/*---------------------------------------------------------------+
 | Load the STOCK table (cluster around s_i_id).|
 +---------------------------------------------------------------*/

   if (do_S) {

      nrows = (eitem - bitem + 1) * (eware - bware + 1);

      fprintf (stderr, "Loading/generating stock: i%d - i%d, w%d - w%d (%d rows)\n
",
               bitem, eitem, bware, eware, nrows);

      begin_time = gettime ();
      begin_cpu = getcpu ();

      sid = bitem;
      swid = bware - 1;
      loopcount = 0;

      for (row = 0; row < nrows; ) {
         for (i = 0; i < STOCARR; i++, row++) {
            if (++swid > eware) {          /* cheap mod */
               swid = bware;
               sid++;
            }
            s_quantity[i] = (rand () % 91) + 10;
            randstr (str24[0], 24, 24);
            randstr (str24[1], 24, 24);
            randstr (str24[2], 24, 24);
            randstr (str24[3], 24, 24);
            randstr (str24[4], 24, 24);
            randstr (str24[5], 24, 24);
            randstr (str24[6], 24, 24);
            randstr (str24[7], 24, 24);
            randstr (str24[8], 24, 24);
            randstr (str24[9], 24, 24);
            randdatastr (s_data[i], 26, 50);

            if (gen) {
               printf ("%d %d %d %s %s %s %s %s %s %s %s %s %s 0 0 0 %s\n",
                       sid, swid, s_quantity[i], str24[0], str24[1], str24[2],
                       str24[3], str24[4], str24[5], str24[6], str24[7],
                       str24[8], str24[9], s_data[i]);
            }
            else {
               s_i_id[i] = sid;
               s_w_id[i] = swid;
               strncpy (s_dist_01[i], str24[0], 24);
               strncpy (s_dist_02[i], str24[1], 24);
               strncpy (s_dist_03[i], str24[2], 24);
               strncpy (s_dist_04[i], str24[3], 24);
               strncpy (s_dist_05[i], str24[4], 24);
               strncpy (s_dist_06[i], str24[5], 24);
               strncpy (s_dist_07[i], str24[6], 24);
               strncpy (s_dist_08[i], str24[7], 24);
               strncpy (s_dist_09[i], str24[8], 24);
               strncpy (s_dist_10[i], str24[9], 24);
            }
         }

         if (gen) {
            fflush (stdout);
         }
         else {
            if (oexn (&curs, STOCARR, 0)) {
               errrpt (&tpclda, &curs);
               orol (&tpclda);
               fprintf (stderr, "Aborted at w_id %d, s_i_id %d\n", s_w_id[0],
                        s_i_id[0]);
               quit ();
               exit (1);
            }
            else if (ocom (&tpclda)) {
               errrpt (&tpclda, &tpclda);
               orol (&tpclda);
               fprintf (stderr, "Aborted at w_id %d, s_i_id %d\n", s_w_id[0],
                        s_i_id[0]);
               quit ();
               exit (1);
            }
         }

         if ((++loopcount) % 50)
            fprintf (stderr, ".");
         else
            fprintf (stderr, " %d rows committed\n   ", row);
      }

      end_time = gettime ();
      end_cpu = getcpu ();
      fprintf (stderr, "Done.  %d rows loaded/generated in %10.2f sec. (%10.2f
cpu)\n\n",
               nrows, end_time - begin_time, end_cpu - begin_cpu);
   }

/*---------------------------------------------------------------+
 | Load the HISTORY table.|
 +---------------------------------------------------------------*/

   if (do_A || do_h) {
      nrows = (eware - bware + 1) * HISTFAC;

      fprintf (stderr, "Loading/generating history: w%d - w%d (%d rows)\n   ",
               bware, eware, nrows);

      begin_time = gettime ();
      begin_cpu = getcpu ();

      cid = 0;
```

```
      cdid = 1;
      cwid = bware;
      loopcount = 0;

      for (row = 0; row < nrows; ) {
         for (i = 0; i < HISTARR; i++, row++) {
            cid++;
            if (cid > CUSTFAC) {        /* cycle cust id */
               cid = 1;                 /* cheap mod */
               cdid++;                  /* shift district cycle */
               if (cdid > DISTFAC) {
                  cdid = 1;
                  cwid++;               /* shift warehouse cycle */
               }
            }
            h_c_id[i] = cid;
            h_d_id[i] = cdid;
            h_w_id[i] = cwid;
            randstr (h_data[i], 12, 24);
            if (gen) {
               printf ("%d %d %d %d %d %s 1000 %s\n", cid, cdid, cwid, cdid,
                       cwid, sdate, h_data[i]);
            }
         }

         if (gen) {
            fflush (stdout);
         }
         else {
            if (oexn (&curh, HISTARR, 0)) {
               errrpt (&tpclda, &curh);
               orol (&tpclda);
               fprintf (stderr, "Aborted at w_id %d, d_id %d, c_id %d\n",
                        h_w_id[0], h_d_id[0], h_c_id[0]);
               quit ();
               exit (1);
            }
            else if (ocom (&tpclda)) {
               errrpt (&tpclda, &tpclda);
               orol (&tpclda);
               fprintf (stderr, "Aborted at w_id %d, d_id %d, c_id %d\n",
                        h_w_id[0], h_d_id[0], h_c_id[0]);
               quit ();
               exit (1);
            }
         }

         if ((++loopcount) % 50)
            fprintf (stderr, ".");
         else
            fprintf (stderr, " %d rows committed\n   ", row);
      }

      end_time = gettime ();
      end_cpu = getcpu ();
      fprintf (stderr, "Done.  %d rows loaded/generated in %10.2f sec. (%10.2f
cpu)\n\n",
               nrows, end_time - begin_time, end_cpu - begin_cpu);
   }

/*---------------------------------------------------------------+
 | Load the ORDERS and ORDER-LINE table.|
 +---------------------------------------------------------------*/

   if (do_A || do_o) {
      nrows = (eware - bware + 1) * ORDEFAC * DISTFAC;

      fprintf (stderr, "Loading/generating orders and order-line: w%d - w%d (%d ord,
-%d ordl)\n   ",
               bware, eware, nrows, nrows * 10);

      begin_time = gettime ();
      begin_cpu = getcpu ();

      cid = 0;
      cdid = 1;
      cwid = bware;
      loopcount = 0;

      for (row = 0; row < nrows; ) {
         for (i = 0; i < ORDEARR; i++, row++) {
            cid++;
            if (cid > ORDEFAC) {        /* cycle cust id */
               cid = 1;                 /* cheap mod */
               cdid++;                  /* shift district cycle */
               if (cdid > DISTFAC) {
                  cdid = 1;
                  cwid++;               /* shift warehouse cycle */
               }
            }
            o_carrier_id[i] = rand () % 10 + 1;
            o_ol_cnt[i] = olcnt = rand () % 11 + 5;

            if (gen) {
               if (cid < 2101) {
                  printf ("%d %d %d %d %s %d %d 1\n", cid, cdid, cwid,
                          randperm3000[cid - 1], sdate,o_carrier_id[i],
                          o_ol_cnt[i]);
               }
               else {
             /* set carrierid to 11 instead of null */
                  printf ("%d %d %d %d %s 11 %d 1\n", cid, cdid, cwid,
                          randperm3000[cid - 1], sdate, o_ol_cnt[i]);
               }
            }
            else {
               o_id[i] = cid;
               o_d_id[i] = cdid;
               o_w_id[i] = cwid;
               o_c_id[i] = randperm3000[cid - 1];
            }

            for (j = 0; j < o_ol_cnt[i]; j++) {
               ol_i_id[j] = sid = lrand48 () % 100000 + 1;
               if (cid < 2101)
                  ol_amount[j] = 0;
               else
                  ol_amount[j] = (lrand48 () % 999999 + 1) ;
               randstr (str24[j], 24, 24);

               if (gen) {
                  if (cid < 2101) {
                     fprintf (olfp, "%d %d %d %d %s %d %d 5 %ld %s\n", cid,
                              cdid, cwid, j + 1, sdate, ol_i_id[j], cwid,
                              ol_amount[j], str24[j]);
                  }
                  else {
             /* Insert a default date instead of null date */
                     fprintf (olfp, "%d %d %d %d 01-Jan-1811 %d %d 5 %ld %s\n", cid,
                              cdid, cwid, j + 1, ol_i_id[j], cwid,
                              ol_amount[j], str24[j]);
                  }
               }
               else {
                  ol_o_id[j] = cid;
                  ol_d_id[j] = cdid;
                  ol_w_id[j] = cwid;
                  ol_number[j] = j + 1;
                  ol_supply_w_id[j] = cwid;
                  strncpy (ol_dist_info[j], str24[j], 24);
               }
            }

            if (gen) {
               fflush (olfp);
            }
            else {
               if (cid < 2101) {
                  if (oexn (&curol1, olcnt, 0)) {
                     errrpt (&tpclda, &curol1);
                     orol (&tpclda);
                     fprintf (stderr, "Aborted at w_id %d, d_id %d, o_id %d\n",
                              cwid, cdid, cid);
                     quit ();
                     exit (1);
                  }
                  else if (ocom (&tpclda)) {
                     errrpt (&tpclda, &tpclda);
                     orol (&tpclda);
                     fprintf (stderr, "Aborted at w_id %d, d_id %d, o_id %d\n",
                            cwid, cdid, cid);
                     quit ();
                     exit (1);
                  }
                  else {
                     if (oexn (&curol2, olcnt, 0)) {
                        errrpt (&tpclda, &curol2);
                        orol (&tpclda);
                        fprintf (stderr, "Aborted at w_id %d, d_id %d, o_id %d\n",
                                 cwid, cdid, cid);
                        quit ();
                        exit (1);
                     }
                     else if (ocom (&tpclda)) {
                        errrpt (&tpclda, &tpclda);
                        orol (&tpclda);
                        fprintf (stderr, "Aborted at w_id %d, d_id %d, o_id %d\n",
                              cwid, cdid, cid);
                        quit ();
                        exit (1);
                     }
                  }
               }
            }

            if (gen) {
               fflush (stdout);
            }
            else {
               if (cid < 2101) {
                  if (oexn (&curo1, ORDEARR, 0)) {
                     errrpt (&tpclda, &curo1);
                     orol (&tpclda);
                     fprintf (stderr, "Aborted at w_id %d, d_id %d, o_id %d\n   ",
                              cwid, cdid, cid);
                     quit ();
                     exit (1);
                  }
                  else if (ocom (&tpclda)) {
                     errrpt (&tpclda, &tpclda);
                     orol (&tpclda);
                     fprintf (stderr, "Aborted at w_id %d, d_id %d, o_id %d\n   ",
                              cwid, cdid, cid);
                     quit ();
                     exit (1);
                  }
               }
               else {
                  if (oexn (&curo2, ORDEARR, 0)) {
                     errrpt (&tpclda, &curo2);
                     orol (&tpclda);
                     fprintf (stderr, "Aborted at w_id %d, d_id %d, o_id %d\n   ",
                              cwid, cdid, cid);
                     quit ();
                     exit (1);
                  }
                  else if (ocom (&tpclda)) {
                     errrpt (&tpclda, &tpclda);
                     orol (&tpclda);
                     fprintf (stderr, "Aborted at w_id %d, d_id %d, o_id %d\n   ",
                              cwid, cdid, cid);
                     quit ();
                     exit (1);
                  }
               }
            }
```

```
         if ((++loopcount) % 50)
            fprintf (stderr, ".");
         else
            fprintf (stderr, " %d orders committed\n   ", row);
      }

      end_time = gettime ();
      end_cpu = getcpu ();
      fprintf (stderr, "Done.  %d orders loaded/generated in %10.2f sec. (%10.2f
cpu)\n\n",
               nrows, end_time - begin_time, end_cpu - begin_cpu);
   }

/*---------------------------------------------------------------+
 | Load the NEW-ORDER table.|
 +---------------------------------------------------------------*/

   if (do_A || do_n) {
      nrows = (eware - bware + 1) * NEWOFAC * DISTFAC;

      fprintf (stderr, "Loading/generating new-order: w%d - w%d (%d rows)\n   ",
               bware, eware, nrows);

      begin_time = gettime ();
      begin_cpu = getcpu ();

      cid = 0;
      cdid = 1;
      cwid = bware;
      loopcount = 0;

      for (row = 0; row < nrows; ) {
         for (i = 0; i < NEWOARR; i++, row++) {
            cid++;
            if (cid > NEWOFAC) {
               cid = 1;
               cdid++;
               if (cdid > DISTFAC) {
                  cdid = 1;
                  cwid++;
               }
            }

            if (gen) {
               printf ("%d %d %d\n", cid + 2100, cdid, cwid);
            }
            else {
               no_o_id[i] = cid + 2100;
               no_d_id[i] = cdid;
               no_w_id[i] = cwid;
            }
         }

         if (gen) {
            fflush (stdout);
         }
         else {
            if (oexn (&curno, NEWOARR, 0)) {
               errrpt (&tpclda, &curno);
               orol (&tpclda);
               fprintf (stderr, "Aborted at w_id %d, d_id %d, o_id %d\n   ",
                        cwid, cdid, cid + 2100);
               quit ();
               exit (1);
            }
            else if (ocom (&tpclda)) {
               errrpt (&tpclda, &tpclda);
               orol (&tpclda);
               fprintf (stderr, "Aborted at w_id %d, d_id %d, o_id %d\n   ",
                        cwid, cdid, cid + 2100);
               quit ();
               exit (1);
            }
         }

         if ((++loopcount) % 45)
            fprintf (stderr, ".");
         else
            fprintf (stderr, " %d rows committed\n   ", row);
      }

      end_time = gettime ();
      end_cpu = getcpu ();
      fprintf (stderr, "Done.  %d rows loaded/generated in %10.2f sec. (%10.2f
cpu)\n\n",
               nrows, end_time - begin_time, end_cpu - begin_cpu);
   }

/*---------------------------------------------------------------+
 | clean up and exit.|
 +---------------------------------------------------------------*/

   if (olfp)
      fclose (olfp);
   if (!gen)
      quit ();
   exit (0);

}



initperm ()

{

   int i;
   int pos;
   int temp;

   /* init randperm3000 */

   for (i = 0; i < 3000; i++)
      randperm3000[i] = i + 1;

   for (i = 3000; i > 0; i--) {
      pos = rand () % i;
      temp = randperm3000[i - 1];
      randperm3000[i - 1] = randperm3000[pos];
      randperm3000[pos] = temp;
   }

}



randstr (str, x, y)

char *str;
int x;
int y;

{

   int i, j;
   int len;

   len = (rand () % (y - x + 1)) + x;
   for (i = 0; i < len; i++) {
      j = rand () % 62;
      if (j < 26)
         str[i] = (char) (j + 'a');
      else if (j < 52)
         str[i] = (char) (j - 26 + 'A');
      else
         str[i] = (char) (j - 52 + '0');
   }
   str[len] = '\0';

}



randdatastr (str, x, y)

char *str;
int x;
int y;

{

   int i, j;
   int len;
   int pos;

   len = (rand () % (y - x + 1)) + x;
   for (i = 0; i < len; i++) {
      j = rand () % 62;
      if (j < 26)
         str[i] = (char) (j + 'a');
      else if (j < 52)
         str[i] = (char) (j - 26 + 'A');
      else
         str[i] = (char) (j - 52 + '0');
   }
   str[len] = '\0';
   if ((rand () % 10) == 0) {
      pos = (rand () % (len - 8));
      str[pos] = 'O';
      str[pos + 1] = 'R';
      str[pos + 2] = 'I';
      str[pos + 3] = 'G';
      str[pos + 4] = 'I';
      str[pos + 5] = 'N';
      str[pos + 6] = 'A';
      str[pos + 7] = 'L';
   }

}



randnum (str, len)

char *str;
int len;

{

   int i;

   for (i = 0; i < len; i++)
      str[i] = (char) (rand () % 10 + '0');
   str[len] = '\0';

}



randlastname (str, id)

char *str;
int id;

{

   id = id % 1000;
   strcpy (str, lastname[id / 100]);
   strcat (str, lastname[(id / 10) % 10]);
   strcat (str, lastname[id % 10]);

}



NURand (A, x, y, cnum)

int A, x, y, cnum;
```

```
{

   int a, b;

   a = lrand48 () % (A + 1);
   b = (lrand48 () % (y - x + 1)) + x;
   return ((((a | b) + cnum) % (y - x + 1)) + x);

}



sysdate (sdate)

char *sdate;

{

   time_t tp;
   struct tm *tmptr;

   time (&tp);
   tmptr = localtime (&tp);
   strftime (sdate, 29, "%d-%b-%Y", tmptr);

}
```

loader/ware.ctl

```
--
-- $Header: cust.ctl 7030100.1 95/08/07 15:46:36 plai Generic<base> $ Copyr (c) 1994
Oracle
--
-- +---------------------------------------------------------------+
--         Copyright (c) 1994  Oracle Corp, Redwood Shores, CA       |
--                     OPEN SYSTEMS PERFORMANCE GROUP                |
--                          All Rights Reserved                      |
-- +---------------------------------------------------------------+
--  FILENAME
--      cust.ctl
--  DESCRIPTION
--      This is a SQL*Loader control file.  It is used for
--      loading customers to the tpcc database.
--  USAGE
--      sqlldr[st] <user_name>/<password> <SQL*Loader control file>
-- +---------------------------------------------------------------*/

OPTIONS (DIRECT = TRUE, PARALLEL = TRUE)

UNRECOVERABLE

LOAD DATA
APPEND

INTO TABLE warehouse
APPEND
FIELDS TERMINATED BY WHITESPACE OPTIONALLY ENCLOSED BY '"'
(

 W_ID                                  integer external,
 W_YTD                                 integer external,
 W_TAX                                 float external,
 W_NAME                                CHAR(10)
 W_STREET_1                            CHAR(20)
 W_STREET_2                            CHAR(20)
 W_CITY                                CHAR(20)
 W_STATE                               CHAR(2)
 W_ZIP                                 CHAR(9)
)
```

build_dir/sql/tpcc_ana.sql

```
rem
rem +---------------------------------------------------------------+
rem         Copyright (c) 1995  Oracle Corp, Redwood Shores, CA      |
rem                     OPEN SYSTEMS PERFORMANCE GROUP                |
rem                          All Rights Reserved                      |
rem +---------------------------------------------------------------+
rem  FILENAME
rem       tpcc_ana.sql
rem  DESCRIPTION
rem       Analyze all tables and indexes of TPC-C database.
rem +---------------------------------------------------------------
rem

set timing on;
analyze table warehouse compute statistics;
analyze table district compute statistics;
analyze table item estimate statistics;
analyze table history estimate statistics;
analyze table customer estimate statistics;
analyze table stock estimate statistics;
analyze table orders estimate statistics;
rem analyze table new_order estimate statistics;
rem analyze table order_line estimate statistics;
analyze cluster icluster estimate statistics;
analyze cluster scluster estimate statistics;
analyze cluster ccluster estimate statistics;
analyze index iwarehouse compute statistics;
analyze index idistrict compute statistics;
analyze index icustomer estimate statistics;
analyze index icustomer2 estimate statistics;
analyze index istock estimate statistics;
analyze index iitem estimate statistics;
analyze index iorders estimate statistics;
analyze index iorders2 estimate statistics;
analyze index inew_order estimate statistics;
analyze index iorder_line estimate statistics;
quit;
```

build_dir/utils/Makefile

```
#
# $Header: Makefile 7030100.1 96/05/21 14:49:09 plai Generic<base> $ Copyr (c) 1995
Oracle
#
#
#+---------------------------------------------------------------+
#        Copyright (c) 1996  Oracle Corp, Redwood Shores, CA       |
#                     OPEN SYSTEMS PERFORMANCE GROUP                |
#                          All Rights Reserved                      |
#+---------------------------------------------------------------+
# FILENAME
#      Makefile
# DESCRIPTION
#      Makefile bench/tpc/tpcc/scripts/utils directory
#+---------------------------------------------------------------
#
#

all: setup

include $(ORACLE_HOME)/bench/buildtools/prefix.mk

setup:
$(CHMOD) 755 *.sh

files:

compile:

load:

cleanup:
```

build_dir/utils/bsize.sh

```
#
# $Header: bsize.sh 7010000.1 95/01/12 16:01:21 plai Generic<base> $ Copyr (c) 1994
Oracle
#

#+---------------------------------------------------------------+
#            Copyright (c) 1994  Oracle Corp, Belmont, CA         |
#                     OPEN SYSTEMS PERFORMANCE GROUP                |
#                          All Rights Reserved                      |
#+---------------------------------------------------------------+
# FILENAME
#       bsize.sh
# DESCRIPTION
#       Get Oracle data block size.
#  Usage: bsize.sh
#+---------------------------------------------------------------*/

svrmgrl > /tmp/bsize.$$ <<!
   connect internal
   show parameter db_block_size
   exit
!

awk '/db_block_size/ {print $3}' < /tmp/bsize.$$
rm -f /tmp/bsize.$$
```

build_dir/utils/create_cache_views.sh

```
#!/bin/sh
# set -x
#
# This script creates four views that when queried will return
# the total number of buffers in the buffer cache and the total
# number of cloned buffers from each of the database's tablespaces.
#
# This assumes that each table and index is in its own tablespace.
# If this is not the case, another query can be used which uses the
# database's object tables to decipher the different objects.  However,
# this query is slower.
#
# This script assumes 7.3.x.  If you are using V7.2.x or below, please
# replace svrmgrl with sqldba lmode=y.
#
# Modification History:
#
# wbattist      16-Jun-1996     Create two additional views to keep
#                               track of the number of clones in each
#                               tablespace.
#
# wbattist      24-May-1995     Add the state check for the cbf view
#                               to ensure that cloned blocks are not
#                               counted.
#
svrmgrl <<EOF
set echo on
connect internal
drop view cbf;
create view cbf as
 select distinct(dbarfil) file#, count(1) blocks
 from x\$bh
   where dbarfil > 0 and state <> 3
```

```
 group by dbarfil;
drop view cbt;
create view cbt as
  select ts\$.name name,sum(cbf.blocks) buffers
  from cbf, file\$, ts\$
    where cbf.file#=file\$.file# and file\$.ts#=ts\$.ts#
  group by file\$.ts#, ts\$.name;
drop view cbfcln;
create view cbfcln as
 select distinct(dbarfil) file#, count(1) blocks
 from x\$bh
   where dbarfil > 0
 group by dbarfil;
drop view cbtcln;
create view cbtcln as
  select ts\$.name name,sum(cbfcln.blocks) buffers
  from cbfcln, file\$, ts\$
    where cbfcln.file#=file\$.file# and file\$.ts#=ts\$.ts#
  group by file\$.ts#, ts\$.name;
EOF
```

build_dir/utils/dfile.sh

```
#
# $Header: dfile.sh 7010000.1 95/01/12 16:01:49 plai Generic<base> $ Copyr (c) 1994
Oracle
#

#=============================================================+
#            Copyright (c) 1994  Oracle Corp, Belmont, CA     |
#                  OPEN SYSTEMS PERFORMANCE GROUP             |
#                       All Rights Reserved                   |
#=============================================================+
# FILENAME
#       dfile.sh
# DESCRIPTION
#       List all datafiles.
#  Usage: dfile.sh
#=============================================================*/

svrmgrl > /tmp/bsize.$$ <<!
   connect internal
   show parameter db_block_size
   exit
!

BSIZE=`awk '/db_block_size/ {print $3}' < /tmp/bsize.$$`
rm -f /tmp/bsize.$$

sqlplus sys/change_on_install <<!
   set pagesize 1000
   select file_id, substr(file_name,1,35) file_name,
          substr(tablespace_name,1,8) tspace, blocks,
          blocks * $BSIZE / 1048576 size_MB
   from   dba_data_files
   order by file_id;
   exit;
!
```

build_dir/utils/dfile_init.sh

```
#
# $Header: dfile_init.sh 7030100.1 96/04/04 20:58:51 plai Generic<base> $ Copyr (c)
1995 Oracle
#

#=============================================================+
#        Copyright (c) 1996  Oracle Corp, Redwood Shores, CA  |
#                  OPEN SYSTEMS PERFORMANCE GROUP             |
#                       All Rights Reserved                   |
#=============================================================+
# FILENAME
#     dfile_init.sh
# DESCRIPTION
#     Initialize oracle datafiles to physical disks and nodes
#     mapping
# USAGE
#     dfile_init.sh [<mapping file>]
#=============================================================*/

DEFFILE=dfile.map
DF=/dev/null

if [ $1 ]
then
   DFILE=$1
else
   DFILE=$DEFFILE
fi

if [ ! -f $DFILE ]
then
   echo "$0: file '$DFILE' doesn't exist!"
   exit 1
fi

sqlplus sys/change_on_install >> $DF <<!
   DROP TABLE save_dfile;

   CREATE TABLE save_dfile
   (
      file#           NUMBER,
      group#          NUMBER,
      gname           VARCHAR2(20),
      node#           NUMBER,
      nname           VARCHAR2(20),
      disk#           NUMBER,
      dname           VARCHAR2(20)
   );

   EXIT;
!

cat > l1$$.ctl <<!
LOAD DATA
INFILE *
INTO TABLE save_dfile
APPEND
FIELDS TERMINATED BY WHITESPACE
(
   file#      integer external,
   group#     integer external,
   gname      char(20),
   node#      integer external,
   nname      char(20),
   disk#      integer external,
   dname      char(20)
)
BEGINDATA
!

cat l1$$.ctl $DFILE > l$$.ctl
rm -f l1$$.ctl

sqlldr sys/change_on_install control=l$$.ctl rows=100 >> $DF

if [ -s l$$.dsc -o -s l$$.bad ]
then
   echo "SQL*Loader failure: l$$"
else
   rm -f l$$.ctl l$$.bad l$$.dsc l$$.log l$$.LOG
fi
```

build_dir/utils/dml.sh

```
#
# $Header: dml.sh 7030100.1 96/05/02 10:22:52 plai Generic<base> $ Copyr (c) 1995
Oracle
#

#=============================================================+
#        Copyright (c) 1996  Oracle Corp, Redwood Shores, CA  |
#                  OPEN SYSTEMS PERFORMANCE GROUP             |
#                       All Rights Reserved                   |
#=============================================================+
# FILENAME
#     dml.sh
# DESCRIPTION
#     Disable table locks for TPC-C tables.
# USAGE
#     dml.sh
#=============================================================*/

sqlplus tpcc/tpcc <<!
   alter table warehouse  disable table lock;
   alter table district   disable table lock;
   alter table customer   disable table lock;
   alter table history    disable table lock;
   alter table item       disable table lock;
   alter table stock      disable table lock;
   alter table orders     disable table lock;
   alter table new_order  disable table lock;
   alter table order_line disable table lock;
   quit;
!
```

build_dir/utils/ext_all.sh

```
#
# $Header: ext_all.sh 7030100.1 95/07/17 13:44:35 plai Generic<base> $ Copyr (c) 1995
Oracle
#

#=============================================================+
#            Copyright (c) 1995  Oracle Corp, Belmont, CA     |
#                  OPEN SYSTEMS PERFORMANCE GROUP             |
#                       All Rights Reserved                   |
#=============================================================+
# FILENAME
#       ext_all.sh
# DESCRIPTION
#       List all extents of TPC-C database.
#  Usage: ext_all.sh
#=============================================================*/

extent.sh WARE
freeext.sh WARE

extent.sh ITEMS
freeext.sh ITEMS

extent.sh HIST
freeext.sh HIST

extent.sh STOCKS
freeext.sh STOCKS

extent.sh CUST
freeext.sh CUST
```

```
extent.sh ORD
freeext.sh ORD

extent.sh NORD
freeext.sh NORD

extent.sh ORDL
freeext.sh ORDL

extent.sh ISTK
freeext.sh ISTK

extent.sh ICUST1
freeext.sh ICUST1

extent.sh ICUST2
freeext.sh ICUST2

extent.sh IORD1
freeext.sh IORD1

extent.sh IORD2
freeext.sh IORD2

extent.sh INORD
freeext.sh INORD

extent.sh IORDL
freeext.sh IORDL
```

build_dir/utils/extent.sh

```
#
# $Header: extent.sh 7010000.1 95/01/12 16:02:18 plai Generic<base> $ Copyr (c) 1994
Oracle
#

#=============================================================+
#            Copyright (c) 1994  Oracle Corp, Belmont, CA     |
#                   OPEN SYSTEMS PERFORMANCE GROUP            |
#                        All Rights Reserved                  |
#=============================================================+
# FILENAME
#       extent.sh
# DESCRIPTION
#       List all extents in the specified tablespace
#       (or all tablespaces if none is specified).
#  Usage: extent.sh [<tablespace_name in cap>]
#=============================================================*/

svrmgrl > /tmp/bsize.$$ <<!
   connect internal
   show parameter db_block_size
   exit
!

BSIZE=`awk '/db_block_size/ {print $3}' < /tmp/bsize.$$`
rm -f /tmp/bsize.$$

if [ $1 ]
then

   sqlplus sys/change_on_install <<!
      select substr(tablespace_name,1,8) tspace,
             substr(segment_name,1,10) segment, substr(segment_type,1,8) type,
             extent_id, file_id, blocks, blocks * $BSIZE / 1048576 size_MB
      from   dba_extents
      where  tablespace_name = '$1'
      order by tablespace_name, segment_name, extent_id, file_id;

      select substr(tablespace_name,1,8) tspace,
             substr(segment_name,1,10) segment,
             sum(blocks) tot_blk, sum(blocks) * $BSIZE / 1048576 size_MB
      from   dba_extents
      where  tablespace_name = '$1'
      group by tablespace_name, segment_name
      order by tablespace_name, segment_name;

      exit;
!

else

   sqlplus sys/change_on_install <<!
      select substr(tablespace_name,1,8) tspace,
             substr(segment_name,1,10) segment, substr(segment_type,1,8) type,
             extent_id, file_id, blocks, blocks * $BSIZE / 1048576 size_MB
      from   dba_extents
      order by tablespace_name, segment_name, extent_id, file_id;

      select substr(tablespace_name,1,8) tspace,
             substr(segment_name,1,10) segment,
             sum(blocks) tot_blk, sum(blocks) * $BSIZE / 1048576 size_MB
      from   dba_extents
      group by tablespace_name, segment_name
      order by tablespace_name, segment_name;

      exit;
!

fi
```

build_dir/utils/fio.sh

```
#
# $Header: fio.sh 7030100.1 96/04/04 19:25:50 plai Generic<base> $ Copyr (c) 1995
Oracle
#

#=============================================================+
#        Copyright (c) 1996  Oracle Corp, Redwood Shores, CA  |
#                    OPEN SYSTEMS PERFORMANCE GROUP           |
#                         All Rights Reserved                 |
#=============================================================+
# FILENAME
#       fio.sh
# DESCRIPTION
#       Show I/Os from/to all datafiles.
#  Usage: fio.sh
#=============================================================*/

sqlplus sys/change_on_install <<!
   set pagesize 1000
   select file_id, substr(file_name,1,35) file_name,
          phyrds, phywrts
   from   dba_data_files t1, v\$filestat t2
   where  t1.file_id = t2.file#
   order by file_id;
   exit;
!
```

build_dir/utils/freeext.sh

```
#
# $Header: freeext.sh 7010000.1 95/01/12 16:02:56 plai Generic<base> $ Copyr (c) 1994
Oracle
#

#=============================================================+
#            Copyright (c) 1994  Oracle Corp, Belmont, CA     |
#                   OPEN SYSTEMS PERFORMANCE GROUP            |
#                        All Rights Reserved                  |
#=============================================================+
# FILENAME
#       freeext.sh
# DESCRIPTION
#       List all free extents in the specified tablespace
#       (or all tablespaces if none is specified).
#  Usage: freeext.sh [<tablespace_name in cap>]
#=============================================================*/

svrmgrl > /tmp/bsize.$$ <<!
   connect internal
   show parameter db_block_size
   exit
!

BSIZE=`awk '/db_block_size/ {print $3}' < /tmp/bsize.$$`
rm -f /tmp/bsize.$$

if [ $1 ]
then

   sqlplus sys/change_on_install <<!
      select substr(tablespace_name,1,8) tspace, file_id, block_id, blocks,
             blocks * $BSIZE / 1048576 size_MB
      from   dba_free_space
      where  tablespace_name = '$1'
      order by tablespace_name, file_id, block_id;

      select substr(tablespace_name,1,8) tspace, sum(blocks) tot_blk,
             sum(blocks) * $BSIZE / 1048576 size_MB
      from   dba_free_space
      where  tablespace_name = '$1'
      group by tablespace_name
      order by tablespace_name;

      exit;
!

else

   sqlplus sys/change_on_install <<!
      select substr(tablespace_name,1,8) tspace, file_id, block_id, blocks,
             blocks * $BSIZE / 1048576 size_MB
      from dba_free_space
      order by tablespace_name, file_id, block_id;

      select substr(tablespace_name,1,8) tspace, sum(blocks) tot_blk,
             sum(blocks) * $BSIZE / 1048576 size_MB
      from   dba_free_space
      group by tablespace_name
      order by tablespace_name;

      exit;
!

fi
```

build_dir/utils/space_get.sh

```
#
# $Header: space_get.sh 7030100.2 96/05/02 10:10:46 plai Generic<base> $ Copyr (c)
1994 Oracle
#

#=============================================================+
#         Copyright (c) 1995  Oracle Corp, Redwood Shores, CA |
#                   OPEN SYSTEMS PERFORMANCE GROUP            |
```

```
#                       All Rights Reserved                       |
#=================================================================+
# FILENAME
#       space_get.sh
# DESCRIPTION
#       Get sizes of tables, indexes and tablespaces.
#  Usage: space_get.sh [<tpm> <# of warehouses>]
#=================================================================*/

if [ $1 ]
then
   TPM=$1
   if [ $2 ]
   then
      NWARE=$2
   else
      echo "Usage: space_get.sh [<tpm> <# of warehouses>]"
      exit 0;
   fi
else
   TPM=115
   NWARE=10
fi

svrmgrl > /tmp/bsize.$$ <<!
   connect internal
   show parameter db_block_size
   exit
!

BSIZE=`awk '/db_block_size/ {print $3}' < /tmp/bsize.$$`
rm -f /tmp/bsize.$$

sqlplus sys/change_on_install <<!

   delete from tpcc_data;
   delete from tpcc_space;
   delete from tpcc_totspace;

   insert into tpcc_data
      select substr(table_name,1,11), 'TABLE',
             substr(tablespace_name,1,6), blocks,
             round(blocks * 0.05), 0,
             blocks + round(blocks * 0.05)
      from   dba_tables
      where  owner = 'TPCC' AND tablespace_name <> 'SYSTEM';

   insert into tpcc_data
      select substr(segment_name,1,11), substr(segment_type,1,5),
             substr(tablespace_name,1,6), sum(blocks),
             round(sum(blocks) * 0.05), 0,
             sum(blocks) + round(sum(blocks) * 0.05)
      from   dba_extents
      where  owner = 'TPCC' AND segment_type = 'INDEX' AND
             tablespace_name <> 'SYSTEM'
      group by segment_name, segment_type, tablespace_name;

   insert into tpcc_data
      select 'SYSTEM', 'SYS', 'SYSTEM', sum(blocks), 0, 0, sum(blocks)
      from   dba_data_files
      where  tablespace_name = 'SYSTEM';

   insert into tpcc_data
      select 'ROLL_SEG', 'SYS', substr(tablespace_name,1,6),
             sum(blocks), 0, 0, sum(blocks)
      from   dba_data_files
      where  tablespace_name like 'ROLL%'
      group by tablespace_name;

   update tpcc_data
      set five_pct = 0,
          daily_grow = round(blocks * $TPM / 62.5 / $NWARE),
          total = blocks + round(blocks * $TPM / 62.5 / $NWARE)
      where segment = 'HISTORY' OR segment = 'ORDERS' OR
            segment = 'ORDER_LINE';

   insert into tpcc_space
      select substr(tablespace_name,1,6), sum(blocks), 0,
             0, 0, 0
      from   dba_data_files
      group by tablespace_name;

   update tpcc_space
      set required =
      (
         select sum(total)
         from   tpcc_data
         where  tpcc_data.tspace = tpcc_space.tspace
      )
      where tspace in
      (
         select tspace from tpcc_data
      );

   update tpcc_space
      set static =
      (
         select sum(total)
         from   tpcc_data
         where  tpcc_data.tspace = tpcc_space.tspace
      )
      where tspace in
      (
         select tspace from tpcc_data
      );

   update tpcc_space
      set static = 0,
          dynamic =
      (
         select sum(blocks)
         from   tpcc_data
         where  tpcc_data.tspace = tpcc_space.tspace
      )
      where tspace in ('HIST', 'ORD', 'ORDL');

   update tpcc_space
      set oversize = blocks - required;

   insert into tpcc_totspace
      select $TPM, $NWARE, sum(static), sum(dynamic), sum(oversize), 0, 0, 0
      from   tpcc_space;

   update tpcc_totspace
      set daily_grow =
      (
         select sum(daily_grow)
         from   tpcc_data
      );

   update tpcc_totspace
      set space180 = static + 180 * daily_grow;

   exit;
!
```

build_dir/utils/space_get.sh.ops

```
#!/bin/sh
#
# ident "@(#)space_get.sh1.195/12/20SMI"
#
#=================================================================+
#         Copyright (c) 1995  Oracle Corp, Redwood Shores, CA     |
#                   OPEN SYSTEMS PERFORMANCE GROUP                |
#                        All Rights Reserved                      |
#=================================================================+
# FILENAME
#       space_get.sh
# DESCRIPTION
#       Get sizes of tables, indexes and tablespaces.
#  Usage: space_get.sh [<tpm> <# of warehouses>]
#=================================================================*/

if [ $# -lt 2 ]
then
      echo "Usage: space_get.sh <tpm> <# of warehouses>"
      exit 1;
else
TPM=$1
NWARE=$2

fi

svrmgrl > /tmp/bsize.$$ <<!
   connect internal
   show parameter db_block_size
   exit
!

BSIZE=`awk '/db_block_size/ {print $3}' < /tmp/bsize.$$`
rm -f /tmp/bsize.$$

sqlplus sys/change_on_install <<!

   delete from tpcc_data;
   delete from tpcc_space;
   delete from tpcc_totspace;

   insert into tpcc_data
      select substr(table_name,1,11), 'TABLE',
             substr(tablespace_name,1,14),
             blocks,
             round(blocks * 0.05), 0,
             blocks + round(blocks * 0.05)
      from   dba_tables
      where  owner = 'TPCC' AND tablespace_name <> 'SYSTEM' AND
             tablespace_name is not null;

      insert into tpcc_data
      select substr(table_name,1,11), 'TABLE',
             substr(tablespace_name,1,14),
             sum(blocks),
             round(sum(blocks) * 0.05) , 0,
             sum(blocks) + round(sum(blocks) * 0.05)
      from   dba_tab_partitions group by table_name,tablespace_name;


   insert into tpcc_data
      select substr(segment_name,1,11), substr(segment_type,1,5),
             substr(tablespace_name,1,14), sum(blocks),
             round(sum(blocks) * 0.05), 0,
             sum(blocks) + round(sum(blocks) * 0.05)
      from   dba_extents
      where  owner = 'TPCC' AND segment_type = 'INDEX' OR
segment_type = 'INDEX PARTITION'
group by segment_name, tablespace_name,segment_type;
remAND tablespace_name <> 'SYSTEM' OR  tablespace_name is null
rem group by segment_name, segment_type, tablespace_name;

   insert into tpcc_data
      select 'SYSTEM', 'SYS', 'SYSTEM', sum(blocks), 0, 0, sum(blocks)
      from   dba_data_files
      where  tablespace_name = 'SYSTEM';

   insert into tpcc_data
      select 'ROLL_SEG', 'SYS', 'ROLL', sum(blocks), 0, 0, sum(blocks)
      from   dba_data_files
      where  tablespace_name in ('TABLESPACE21', 'TABLESPACE22');

   update tpcc_data
      set five_pct = 0,
          daily_grow = round(blocks * $TPM / 62.5 / $NWARE),
          total = blocks + round(blocks * $TPM / 62.5 / $NWARE)
```

```
      where segment = 'HISTORY' OR segment = 'ORDERS' OR
            segment = 'ORDER_LINE';

   insert into tpcc_space
      select substr(tablespace_name,1,14), sum(blocks), 0,
             0, 0, 0
      from   dba_data_files
      group by tablespace_name;

   update tpcc_space
      set required =
      (
         select sum(total)
         from   tpcc_data
         where  tpcc_data.tspace = tpcc_space.tspace
      )
      where tspace in
      (
         select segment from tpcc_data
      );

   update tpcc_space
      set static =
      (
         select sum(total)
         from   tpcc_data
         where  tpcc_data.tspace = tpcc_space.tspace
      )
      where tspace in
      (
         select tspace from tpcc_data
      );

   update tpcc_space
      set static = 0,
          dynamic =
      (
         select sum(blocks)
         from   tpcc_data
         where  tpcc_data.tspace = tpcc_space.tspace
      )
      where tspace in ('TABLESPACE2', 'TABLESPACE3', 'TABLESPACE6', 'TABLESPACE7',
'TABLESPACE8', 'TABLESPACE9');

   update tpcc_space
      set oversize = blocks - required;

   insert into tpcc_totspace
      select $TPM, $NWARE, sum(static), sum(dynamic), sum(oversize), 0, 0, 0
      from   tpcc_space;

   update tpcc_totspace
      set daily_grow =
      (
         select sum(daily_grow)
         from   tpcc_data
      );

   update tpcc_totspace
      set space180 = static + 180 * daily_grow;

   exit;
!
```

build_dir/utils/space_init.sh

```
#
# $Header: space_init.sh 7030100.1 95/07/17 14:01:06 plai Generic<base> $ Copyr (c)
1994 Oracle
#

#=============================================================+
#         Copyright (c) 1995  Oracle Corp, Redwood Shores, CA      |
#                   OPEN SYSTEMS PERFORMANCE GROUP                 |
#                        All Rights Reserved                       |
#=============================================================+
# FILENAME
#       space_init.sh
# DESCRIPTION
#       Create tables for space calculations.
#  Usage: space_init.sh
#=============================================================*/

sqlplus sys/change_on_install <<!

   drop table tpcc_data;
   drop table tpcc_space;
   drop table tpcc_totspace;

   create table tpcc_data (
      segment      varchar2(11),
      type         varchar2(5),
      tspace       varchar2(6),
      blocks       number,
      five_pct     number,
      daily_grow   number,
      total        number
   );

   create table tpcc_space (
      tspace       varchar2(6),
      blocks       number,
      required     number,
      static       number,
      dynamic      number,
      oversize     number
   );

   create table tpcc_totspace (
      tpm          number,
      nware        number,
      static       number,
      dynamic      number,
      oversize     number,
      daily_grow   number,
      daily_spre   number,
      space180     number
   );

   create unique index itpcc_data on tpcc_data (segment);
   create unique index itpcc_space on tpcc_space (tspace);

   quit;
!
```

build_dir/utils/space_rpt.sh

```
#
# $Header: space_rpt.sh 7030100.1 95/07/17 14:01:54 plai Generic<base> $ Copyr (c)
1994 Oracle
#

#=============================================================+
#         Copyright (c) 1995  Oracle Corp, Redwood Shores, CA      |
#                   OPEN SYSTEMS PERFORMANCE GROUP                 |
#                        All Rights Reserved                       |
#=============================================================+
# FILENAME
#       space_rpt.sh
# DESCRIPTION
#       Generate space report and save it in the specified file
#       (or space.rpt if none is specified).
#  Usage: space_rpt.sh [report_file_name]
#=============================================================*/

if [ $1 ]
then
   RPTFILE=$1
else
   RPTFILE="space.rpt"
fi

cat > space_in.$$ <<!
   set space 2
   set pagesize 2000
   set echo off
   set termout off
   set verify off
   set feedback off
   spool $RPTFILE

   select tpm, nware from tpcc_totspace;

   select * from tpcc_data order by segment;

   select * from tpcc_space order by tspace;

   select static, dynamic, oversize, daily_grow, daily_spre, space180
      from tpcc_totspace;

   spool off;
   quit;
!

sqlplus sys/change_on_install @space_in.$$ > /dev/null 2>&1

rm space_in.$$
```

build_dir/utils/space_upd.sh

```
#
# $Header: space_upd.sh 7030100.1 95/07/17 14:02:17 plai Generic<base> $ Copyr (c)
1995 Oracle
#

#=============================================================+
#         Copyright (c) 1995  Oracle Corp, Redwood Shores, CA      |
#                   OPEN SYSTEMS PERFORMANCE GROUP                 |
#                        All Rights Reserved                       |
#=============================================================+
# FILENAME
#       space_upd.sh
# DESCRIPTION
#       Update space related to TPM and number of warehouses.
#  Usage: space_upd.sh [<tpm> <# of warehouses>]
#=============================================================*/

if [ $1 ]
then
   TPM=$1
   if [ $2 ]
   then
      NWARE=$2
   else
      echo "Usage: space_get.sh [<tpm> <# of warehouses>]"
      exit 0;
   fi
else
   echo "Using defaults: TPM = 115, NWARE = 10"
   TPM=115
   NWARE=10
fi

svrmgrl > /tmp/bsize.$$ <<!
   connect internal
```

```
   show parameter db_block_size
   exit
!

BSIZE=`awk '/db_block_size/ {print $3}' < /tmp/bsize.$$`
rm -f /tmp/bsize.$$

sqlplus sys/change_on_install <<!

   update tpcc_data
      set five_pct = 0,
          daily_grow = round(blocks * $TPM / 62.5 / $NWARE),
          total = blocks + round(blocks * $TPM / 62.5 / $NWARE)
      where segment = 'HISTORY' OR segment = 'ORDERS' OR
            segment = 'ORDER_LINE';

   update tpcc_space
      set required =
          (
             select sum(total)
             from   tpcc_data
             where  tpcc_data.tspace = tpcc_space.tspace
          )
      where tspace in ('HIST', 'ORD', 'ORDL');

   update tpcc_space
      set static = 0,
          oversize = blocks - required,
          dynamic =
          (
             select sum(blocks)
             from   tpcc_data
             where  tpcc_data.tspace = tpcc_space.tspace
          )
      where tspace in ('HIST', 'ORD', 'ORDL');

   update tpcc_totspace
      set tpm = $TPM,
          nware = $NWARE,
          dynamic =
          (
             select sum(dynamic)
             from   tpcc_space
          ),
          oversize =
          (
             select sum(oversize)
             from   tpcc_space
          ),
          daily_grow =
          (
             select sum(daily_grow)
             from   tpcc_data
          );

   update tpcc_totspace
      set space180 = static + 180 * daily_grow;

   exit;
!
```

build_dir/utils/switchlog.sh

```
#
# $Header: switchlog.sh 7030100.1 96/05/02 10:20:11 plai Generic<base> $ Copyr (c)
1995 Oracle
#

#=============================================================+
#        Copyright (c) 1996  Oracle Corp, Redwood Shores, CA  |
#                   OPEN SYSTEMS PERFORMANCE GROUP            |
#                        All Rights Reserved                  |
#=============================================================+
# FILENAME
#     switchlog.sh
# DESCRIPTION
#     Switch to next log file twice.
# USAGE
#     switchlog.sh
#=============================================================*/

svrmgrl lmode=y <<!
   connect internal;
   alter system switch logfile;
   alter system switch logfile;
   exit;
!
```

build_dir/utils/undml.sh

```
#
# $Header: undml.sh 7030100.2 96/05/02 10:29:30 plai Generic<base> $ Copyr (c) 1995
Oracle
#

#=============================================================+
#        Copyright (c) 1996  Oracle Corp, Redwood Shores, CA  |
#                   OPEN SYSTEMS PERFORMANCE GROUP            |
#                        All Rights Reserved                  |
#=============================================================+
# FILENAME
#     undml.sh
# DESCRIPTION
#     Enable table locks for TPC-C tables.
# USAGE
#     undml.sh
#=============================================================*/

sqlplus tpcc/tpcc <<!
   alter table warehouse  enable table lock;
   alter table district   enable table lock;
   alter table customer   enable table lock;
   alter table history    enable table lock;
   alter table item       enable table lock;
   alter table stock      enable table lock;
   alter table orders     enable table lock;
   alter table new_order  enable table lock;
   alter table order_line enable table lock;
   quit;
!
```

Appendix C. Tunable Parameters

This Appendix contains the configuration information for the operating system, the RDBMS and Tuxedo.

Operating System Configuration Values

The Solaris kernel configuration parameters set in the file /etc/system are given below.

Solaris Configuration File for Sun Starfire Enterprise 10000

```
set msgsys:msginfo_msgmap=200
set msgsys:msginfo_msgmni=100
set msgsys:msginfo_msgtql=80
set msgsys:msginfo_msgseg=2048
set shmsys:shminfo_shmmax=68719476736
set shmsys:shminfo_shmseg=200
set semsys:seminfo_semmap=100
set semsys:seminfo_semmni=1000
set semsys:seminfo_semmns=4000
set semsys:seminfo_semmnu=800
set semsys:seminfo_semmsl=512
set semsys:seminfo_semume=100

* BEGIN RAID Manager addition
* DO NOT EDIT from BEGIN above to END below...
forceload: drv/sd
forceload: drv/rdnexus
forceload: drv/rdriver
* END RAID Manager addition

set maxphys=1048576
* vxvm_START (do not remove)
forceload: drv/vxio
forceload: drv/vxspec
* vxvm_END (do not remove)
set vxio:vol_maxio=8192
set vxio:vol_maxkiocount=8192
set vxio:voliomem_chunk_size=1048576
set vxio:voliomem_kvmap_size=15728640

set autoup=900
```

Solaris configuration file for the client systems:

```
set pt_cnt=4096
set shmsys:shminfo_shmmax=0xffffffff
set shmsys:shminfo_shmseg=600
set shmsys:shminfo_shmmni=10
set msgsys:msginfo_msgmni=4096
set msgsys:msginfo_msgmax=2048
set msgsys:msginfo_msgmnb=200000
set msgsys:msginfo_msgmap=200000
set msgsys:msginfo_msgseg=10000
set msgsys:msginfo_msgssz=2048
set msgsys:msginfo_msgtql=5000
set semsys:seminfo_semmns=5000
set semsys:seminfo_semmni=5000
set semsys:seminfo_semmsl=5000
set semsys:seminfo_semmap=5000
set semsys:seminfo_semume=1
set semsys:seminfo_semmnu=5000
set autoup = 300
```

Oracle initialization File

```
_bump_highwater_mark_count = 100
_db_aging_stay_count = 1
_db_block_cache_protect           = FALSE
_db_block_hash_buckets            = 33554432
_db_file_noncontig_mblock_read_count = 1
_enable_list_io = FALSE
_log_simultaneous_copies = 128
_spin_count       = 20000
background_core_dump = PARTIAL
buffer_pool_keep    = (buffers:12582912, lru_latches:40)
buffer_pool_recycle = (buffers:200000,  lru_latches:40)
compatible                        = 8.1.4.0.0
control_files   = (?/dbs/tpcc_disks/cntrl1)
cpu_count                         = 64
cursor_space_for_time             = TRUE
db_block_buffers                  = 16777216
db_block_lru_latches              = 120
db_block_max_dirty_target = 8388608
db_file_multiblock_read_count = 1
db_files                          = 1000
db_name                           = tpcc
db_writer_processes = 10
distributed_transactions          = 0
dml_locks                         = 2300
enqueue_resources=35000
fast_start_io_target = 0
hash_join_enabled                 = FALSE
log_archive_start                 = FALSE
log_buffer = 20971520
log_checkpoint_interval = 0
log_checkpoint_timeout = 1500
log_checkpoints_to_alert          = TRUE
max_rollback_segments             = 1250
parallel_max_servers              = 300
processes                         = 2300
recovery_parallelism              = 64
rollback_segments                 =
(t1,t2,t3,t4,t5,t6,t7,t8,t9,t10,t11,t12,t13,t14,t15,t16,t17,t18,t19,t20,t21,t22,t23,t
24,t25,t26,t27,t28,t29,t30,t31,t32,t33,t34,t35,t36,t37,t38,t39,t40,t41,t42,t43,t44,t4
5,t46,t47,t48,t49,t50,t51,t52,t53,t54,t55,t56,t57,t58,t59,t60,t61,t62,t63,t64,t65,t66
,t67,t68,t69,t70,t71,t72,t73,t74,t75,t76,t77,t78,t79,t80,t81,t82,t83,t84,t85,t86,t87,
t88,t89,t90,t91,t92,t93,t94,t95,t96,t97,t98,t99,t100,t101,t102,t103,t104,t105,t106,t1
07,t108,t109,t110,t111,t112,t113,t114,t115,t116,t117,t118,t119,t120,t121,t122,t123,t1
24,t125,t126,t127,t128,t129,t130,t131,t132,t133,t134,t135,t136,t137,t138,t139,t140,t1
41,t142,t143,t144,t145,t146,t147,t148,t149,t150,t151,t152,t153,t154,t155,t156,t157,t1
58,t159,t160,t161,t162,t163,t164,t165,t166,t167,t168,t169,t170,t171,t172,t173,t174,t1
75,t176,t177,t178,t179,t180,t181,t182,t183,t184,t185,t186,t187,t188,t189,t190,t191,t1
92,t193,t194,t195,t196,t197,t198,t199,t200)
sessions                          = 2300
shared_pool_size                  = 300000000
timed_statistics                  = FALSE
transaction_auditing = FALSE
transactions                      = 3000
transactions_per_rollback_segment = 1
```

Tuxedo initialization file

```
#
# The tuxconfig file is the same for each of the
# 32 clients.
#
*RESOURCES
IPCKEY 40001
MASTER c1
PERM 0666
MODEL SHM
LDBAL Y
MAXACCESSERS 4000
MAXSERVERS 500
MAXSERVICES 100
SCANUNIT 30
SANITYSCAN 5
BLOCKTIME 10
BBLQUERY 60

*MACHINES
c1 LMID=c1
 ROOTDIR="/export/home/tuxedo"
 APPDIR="/export/home/dbbench/tuxedo"
 TUXCONFIG="/export/home/dbbench/tuxedo/tuxconfig.c1"
 ULOGPFX="/export/home/dbbench/tuxedo/ULOGc1"

*GROUPS
group1 LMID=c1 GRPNO=1

*SERVERS

tpcc_srv_del SRVGRP=group1 SRVID=1 RQADDR=delq1 REPLYQ=N CLOPT="-A  -- 1"
tpcc_srv_del SRVGRP=group1 SRVID=2 RQADDR=delq2 REPLYQ=N CLOPT="-A  -- 2"

tpcc_srv_newo  SRVGRP=group1  SRVID=2001  MIN=9 REPLYQ=Y

tpcc_srv_ords SRVGRP=group1 SRVID=12 MIN=1 REPLYQ=Y

tpcc_srv_paym SRVGRP=group1 SRVID=13 MIN=3 REPLYQ=Y

tpcc_srv_stock SRVGRP=group1 SRVID=16 MIN=7 REPLYQ=Y

*SERVICES
NEWO
PAYM
ORDS
DEL
STOCK
```

Appendix D. Disk Storage

This Appendix contains the 180-day space calculations.

```
These calculations are used to determine the storage requirements
for 8 hours worth of logical logs as well as the 180day space
requirements.

Using the oracle statistic "redo blocks written", one can
derive the how man redo blocks are written per new order
transaction.  This data was gathered over the entire run
at full load of 115395.73 tpmC.


Compute redo blocks per NewOrder
--------------------------------
Total number of redo blocks written(oracle):  165539724
Total number of new order transactions:       5906423

Redo Blocks per NewOrder = 165539724/5906423 = 28.0270


8 Hours Log Space
-----------------
redo block size     = 512 bytes
redo size/tpmC      = (28.0270 * 512)/1024 = 14.0135 KB

8 hours log space = (14.0135 * 115395.73 * 8 * 60)/1024^2 = 740.2487 GB
```

TPM	115,395.73
Warehouses	9,600

SEGMENT	TYPE	TSPACE	BLOCKS	FIVE_PCT	DAILY_GROW	TOTAL
CUSTOMER	TABLE	CUST	144,000,001	7,200,000	0	151,200,001
DISTRICT	TABLE	WARE	96,001	4,800	0	100,801
HISTORY	TABLE	HIST	8,632,695	431,635	1,660,294	10,724,624
ICUSTOMER	INDEX	ICUST1	4,070,400	203,520	0	4,273,920
ICUSTOMER2	INDEX	ICUST2	8,192,000	409,600	0	8,601,600
IDISTRICT	INDEX	WARE	21,466	1,073	0	22,539
IITEM	INDEX	ITEMS	1,025	51	0	1,076
INEW_ORDER	INDEX	INORD	734,720	36,736	0	771,456
IORDERS	INDEX	IORD1	3,932,160	196,608	0	4,128,768
IORDERS2	INDEX	IORD2	5,898,240	294,912	0	6,193,152
IORDER_LINE	INDEX	IORDL	114,176,000	5,708,800	21,959,038	141,843,838
ISTOCK	INDEX	ISTK	10,265,600	513,280	0	10,778,880
ITEM	TABLE	ITEMS	6,667	333	0	7,000
IWAREHOUSE	INDEX	WARE	2,575	129	0	2,704
ORDERS	TABLE	ORD	5,992,931	299,647	1,152,598	7,445,176
ROLL_SEG	SYS	ROLL	1,048,064	52,403	0	1,100,467
STOCK	TABLE	STOCKS	192,000,003	9,600,000	0	201,600,003
SYSTEM	SYS	SYSTEM	1,048,064	52,403	0	1,100,467
WAREHOUSE	TABLE	WARE	9,601	480	0	10,081
Total			500,128,213	25,006,410	24,771,930	549,906,553

Dynamic space	128,801,626	
Static space	396,332,997	
Free space	24,771,930	
Daily growth	24,771,930	
Daily spread	0	Oracle may be configured such that daily spread is 0
180-day space (blk.)	4,855,280,397	
Block size (bytes)	2,048	
180-day (GB)	9,260.71	
Log block size	512	
Log blocks/N_O txn.	28.0270	Log blocks used per New-Order transactions
8-hour log (GB)	740.25	

Appendix E. Driver Scripts

The following code sections show how the transactions are generated and how statistics are gathered. Each of the transaction functions generates the input data for that transaction, sends it to the client, reads the output form and computes keying, response and think time statistics.

This is the main loop of the RTE

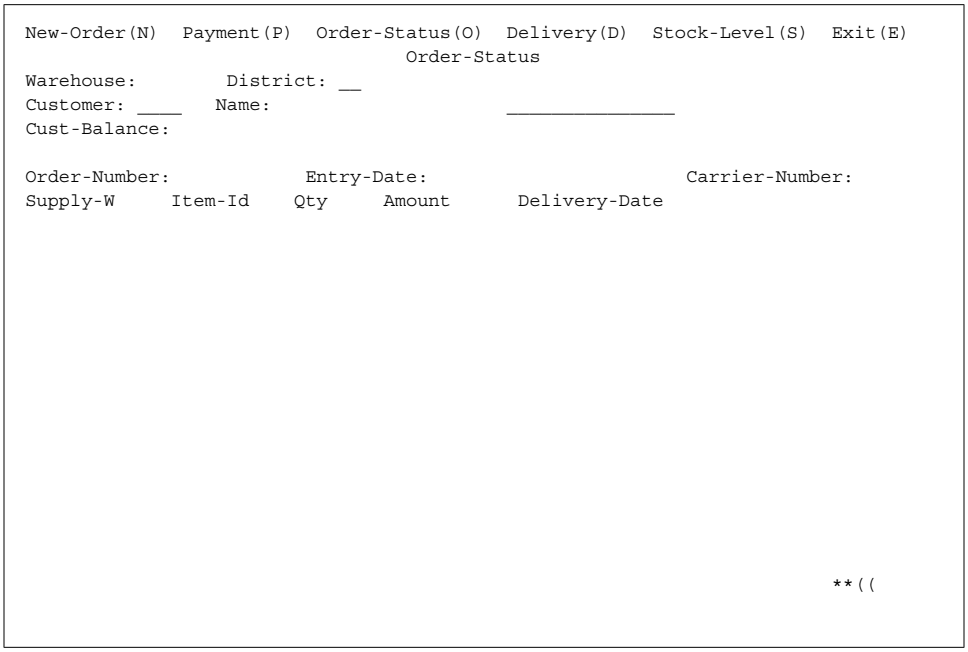
```
/* run for ramp up without capturing the stats */
i=0;
in_ramp = 1;
while (1)
{
tx_type = do_menu();/* Select transaction */
switch (tx_type) {
case NEWORDER:
do_neworder();
break;
case PAYMENT:
do_payment();
break;
case DELIVERY:
do_delivery();
break;
case ORDSTAT:
do_ordstat();
break;
case STOCKLEVEL:
do_stocklevel();
break;
default:
fprintf(stderr, "%s: Slave %d: Internal error. Tx-type = %d\n",
hostname, slave_num, tx_type);
cleanup(-1);
}
end_time = gettime();
if ( end_time >= control->end_rampup &&
end_time < control->end_stdystate )
in_ramp = 0;
else
in_ramp = 1;
if (end_time >= control->end_rampdown)
break;
}
The do_menu function selects the transaction to execute based on the weighted
distribution
algorithm.
int
do_menu()
{
int val, result, menu_start, menu_end, menu_resp;
char ch;
/* Read menu line from client */
/* Choose tx. type*/
/* Now select menu and compute menu response time */
menu_start = gettime();
/* Write menu selection to client */
/* Read input form for this transaction type */
menu_end = gettime();
menu_resp = menu_end - menu_start;
if ( ! in_ramp) {
statsp->menu_resp += menu_resp;
/* Post in histogram bucket */
if ((menu_resp / MENU_BUCKET) < MENU_MAX)
statsp->menu_hist[menu_resp / MENU_BUCKET]++;
else
statsp->menu_hist[MENU_MAX - 1]++;
if (menu_resp > statsp->menu_max)
statsp->menu_max = menu_resp;
}
return(result);
}
/*
 * Function: do_neworder
 * This function executes the neworder transaction
 * It generates all the input fields, sends it to the
 * client over the keying time, measures the response
 * time, reads the results and delays for the think time.
 */
 /* The code for the other transactions is similar */
do_neworder()
{
struct newo_fld no;
struct items_fld *itemp = no.items;
int ol_cnt, rbk, remote = 0, i, x;
char *bufp = fldbuf;
int start_time, end_time, key_time, resp_time, elapse_time, del;
start_time = gettime();
/* Now wait for keying time */
poll (0, 0, NEWO_KEY);
/* Generate all input data */
no.d_id = random(1, 10);
no.c_id = NURand(1023, 1, 3000, CONST_CID);
ol_cnt = random(5, 15);
rbk = random(1, 100);/* trans. to be rolledback */
sprintf(bufp, "%02d%04d", no.d_id, no.c_id);
bufp += strlen(bufp);
/* Generate all the item fields */
for (i=0; i < ol_cnt; i++, itemp++) {
itemp->ol_i_id = NURand(8191, 1, 100000, CONST_IID);
/* If last item and rbk, select unused item */
if (i == ol_cnt - 1 && rbk == 1) {
itemp->ol_i_id = 100001;
}
x = random(1, 100);
if ( x > 1)
itemp->ol_supply_w_id = W_ID;
else {
/* Select a warehouse other than w_id */
do {
x = random(1, control->scale);
} while (x == W_ID);
itemp->ol_supply_w_id = x;
remote++;
}
itemp->ol_quantity = random(1, 10);
sprintf(bufp, "%04d%06d%02d",itemp->ol_supply_w_id,
itemp->ol_i_id, itemp->ol_quantity);
bufp += strlen(bufp);
}
strcpy(bufp, leave_key);
bufp += 2;
/* Compute keying time info */
end_time = gettime();
key_time = end_time - start_time;
start_time = end_time;

/* Now send fields to client */
/* Read output screen from client */
end_time = gettime();
/* Store elapse time info for thruput */
elapse_time = end_time - control->start_time;
/* compute the how long it took to run the tx */
resp_time = end_time - start_time + control->newo_delta;
/* Wait think time */
del = delay(control->newo_think, 5*control->newo_think);
poll(0, 0, del + control->newo_delta);
end_time = gettime();
/* Now post all stats */
if ( ! in_ramp && end_time <= control->end_stdystate) {
statsp->newo_cnt++; /* another one bytes the dust */
if ( rbk == 1 )
statsp->newo_rbkcnt++;
statsp->newo_remote += remote;
statsp->newo_olcnt += ol_cnt;
statsp->newo_key += key_time;
/* Save keying time in histogram bucket */
statsp->newo_resp += (double) resp_time;/* sum up the response time */
/* Save response time in histogram bucket */
statsp->newo_think += (double) del;
/* Save think time in histogram bucket */
}
}
```

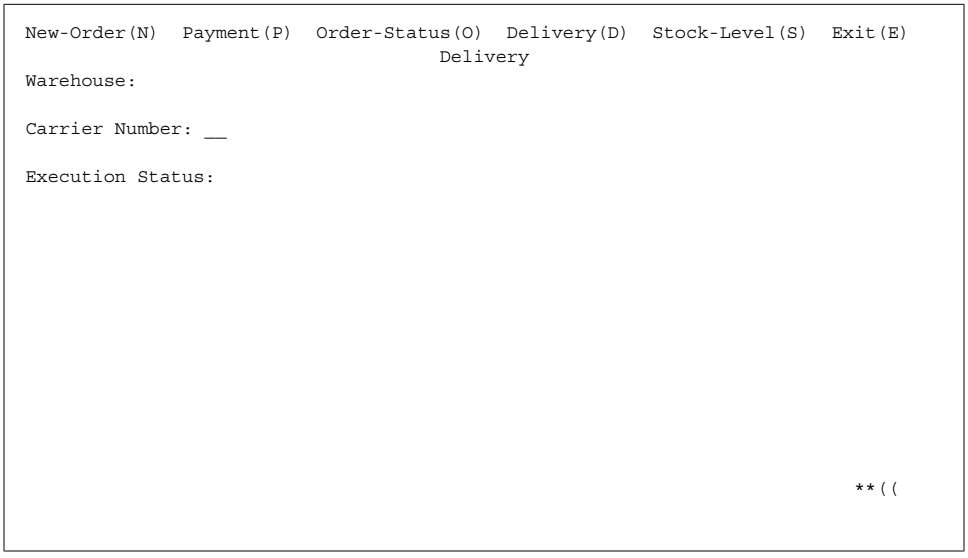
Appendix F. Screen Layout

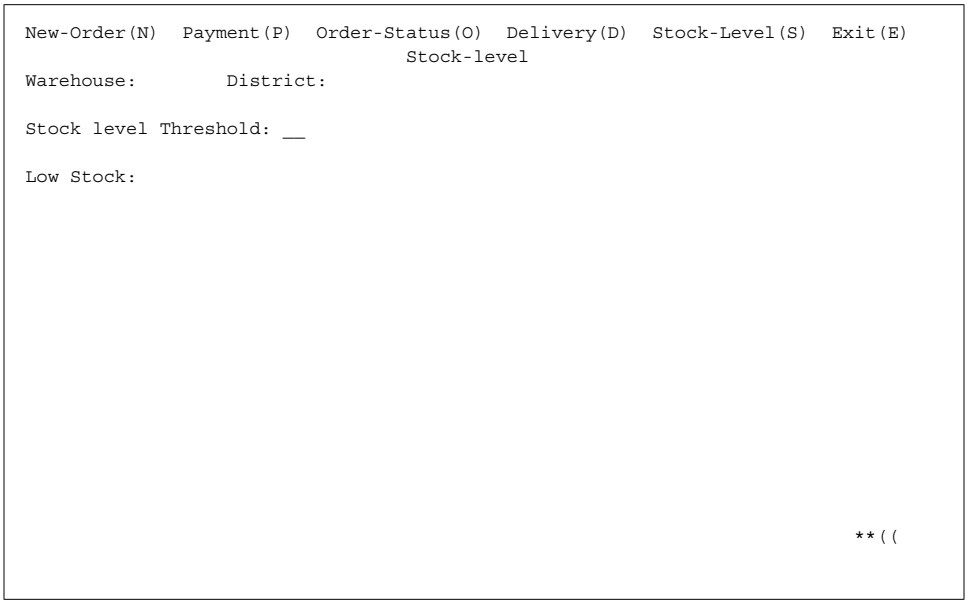
This Appendix contains the screen form layouts for the 5 transactions.

```
New-Order(N)  Payment(P)  Order-Status(O)  Delivery(D)  Stock-Level(S)  Exit(E)
                                   New Order
Warehouse:        District: __                      Date:
Customer: ____    Name:                  Credit:      %Disc:
Order Number:           Number of Lines:           W_tax:         D_tax:

 Supp_W  Item_Id  Item Name                 Qty  Stock  B/G  Price    Amount
  ____   ______                            __
  ____   ______                            __
  ____   ______                            __
  ____   ______                            __
  ____   ______                            __
  ____   ______                            __
  ____   ______                            __
  ____   ______                            __
  ____   ______                            __
  ____   ______                            __
  ____   ______                            __
  ____   ______                            __
  ____   ______                            __
  ____   ______                            __
  ____   ______                            __
Execution Status:                                          Total:
                                                                    **((
```

```
New-Order(N)  Payment(P)  Order-Status(O)  Delivery(D)  Stock-Level(S)  Exit(E)
                                    Payment
Date:

Warehouse:                              District: __




Customer: ____  Cust-Warehouse: ____  Cust-District: __
Name:                          _______________     Since:
                                                    Credit:
                                                    %Disc:
                                                    Phone:

Amount Paid:          _______       New Cust-Balance:
Credit Limit:

Cust-Data:




                                                                  **((
```


New-Order(N) Payment(P) Order-Status(O) Delivery(D) Stock-Level(S) Exit(E)
Order-Status
Warehouse: District: __
Customer: ____ Name: _____
Cust-Balance:
Order-Number: Entry-Date: Carrier-Number:
Supply-W Item-Id Qty Amount Delivery-Date
**((


New-Order(N) Payment(P) Order-Status(O) Delivery(D) Stock-Level(S) Exit(E)
Delivery
Warehouse:
Carrier Number: __
Execution Status:
**((


New-Order(N) Payment(P) Order-Status(O) Delivery(D) Stock-Level(S) Exit(E)
Stock-level
Warehouse: District:
Stock level Threshold: __
Low Stock:
**((

Appendix G. Price Quotes

The following pages contain the pricing quotes for the hardware and software included in this FDR.

NETLUX

14180 Live Oak Ave., Unit E
Baldwin Park, Ca. 91760

1-800-789-1780
Phone#626-851-9737
Fax #626-851-9837

March 22, 1999

Sun Microsystems Inc.

Quotation

Quantity	Part No.	Description	Unit Price	Total
10	NX-SOHODH8	8-port 10/100Mbps FAST Ethernet Hub	$150.00	$1,500.00
12,778	NX-H9EZ	8+1-port 10Mbps Ethernet Hub	$30.00	$383,340

Terms and Conditions:
FOB Origin
Quote Valid for 90 days
5 Year Warranty

Sincerely,
Martin Parry
NETLUX

THE ENTERPRISE MIDDLEWARE SOLUTION

2315 N. First Street
San Jose, CA 95131
Direct Phone: 408-570-8353
Fax: 408-570-8901

Fax

To:	Glenn Rysko/Strategic Applications Engineering	From:	Christina Claure/Global Alliances Manager
Fax:	503.520.7724	Date:	March 21, 1999
Phone:	503.520.7718	Pages:	1
Re:	Tuxedo 6.3 CFS pricing	CC:	

¤ Urgent ¤ For Review ¤ Please Comment ¤ Please Reply ¤ Please Recycle

Dear Glenn,

For purposes of your benchmarking activity, we recommend the use of BEA TUXEDO 6.3 available through our Core Functionality Services (CFS) program. I understand the computer that will be used for this benchmark will be a single processor workstation or server, and therefore will be subject to Tier 1 Pricing as follows:

Unlimited User License Fees Per Server	Number of Users	Dollar Amount	Maintenance (5x8) per year	Maintenance (7x24) per year
Tier 1 – PC Servers with 1 or 2 CPUs, entry level RISC Uniprocessor workstation and servers	Unlimited	$3,000.00	$450.00	$660.00

This quote is good for 90 days. Please contact me at 408-570-8019 if you have any questions.

Sincerely,

Christina Claure

Global Alliances Manager

Sales Quotation

Quote Number:RO0129901
Date: March 22,1999
Valid for 90 days
FOB: Warehouse
Terms: Net 30, 1 1/2% per month after 30 days

Brad Carlile
Manager, Strategic Applications Engineering
Sun Microsystems, Inc.
8300 SW Creekside Place
Beaverton, OR 97008
(503) 520-7622

Dick Crouch
CAT Technology, Inc.
1900 Camden Avenue
Suite 201
San Jose, CA 95124
Phone: 408-369-7878
(408) 369-7870

ITEM	PART NO.	DESCRIPTION		UNIT PRICE	QTY		TOTAL
1	E10000-3	E10000 Base Cabinet	$	165,000.00	1	$	165,000.00
2	2760A	System Board, Unpopulated	$	48,750.00	16	$	780,000.00
3	2570A	CPU, 400MHz, 4MB L2$	$	12,750.00	64	$	816,000.00
4	7025A	Memory Board, unpopulated	$	7,500.00	16	$	120,000.00
5	7023A	1GB for Ex000	$	7,125.00	64	$	456,000.00
6	2730A	Dual Sbus I/O daughter card	$	5,625.00	16	$	90,000.00
7	2751A	System Service Proc	$	7,500.00	1	$	7,500.00
8	3875A	AC input module	$	2,250.00	4	$	9,000.00
9	9685A	48 volt power supply	$	3,000.00	8	$	24,000.00
10	9681A	Power Control Module	$	750.00	1	$	750.00
11	9671A	Fan tray	$	1,500.00	16	$	24,000.00
12	2720A	Control Board w/Enet Cable	$	15,000.00	1	$	15,000.00
13	3850A	Power Cord for System	$	-	4	$	-
14	979A	12 Meter SCSI cable	$	198.75	49	$	9,738.75
15	1062A	Sbus Fast/Wide SCSI-2 (Diff)	$	971.25	3	$	2,913.75
16	1065A	Sbus Ultra Diff Fast/Wide SCSI	$	971.25	46	$	44,677.50
17	6515AR4	RSM Tray (7 X 9.1GB Disk)	$	13,950.00	2	$	27,900.00
18	SG-XDSK020A-18G	18.2 gb Disk MultiPack	$	2,657.20	1	$	2,657.20
19	SG-XARY360A-545G	545GB StorEdge A3500	$	123,487.50	23	$	2,840,212.50
20	SG-XARY362A-763G	763-GB Sun StorEdge A3500	$	180,900.00	4	$	723,600.00
21	6283A	12-24GB 4mm DDS-3 Tape Drive	$	1,012.50	1	$	1,012.50
22	3800A	Power	$	-	27	$	-
23	1059A	Sbus FastEthernet 2.0	$	596.25	8	$	4,770.00
24	A22UHC1A9P-B128CP	Ultra 10 Model 333	$	3,908.45	32	$	125,070.40
25	7033A	512 MB memory for Ultra 10	$	1,633.45	64	$	104,540.80
26	1049A	Quad Fast Ethernet Controller	$	1,496.25	32	$	47,880.00
		Total				$	6,442,223.40